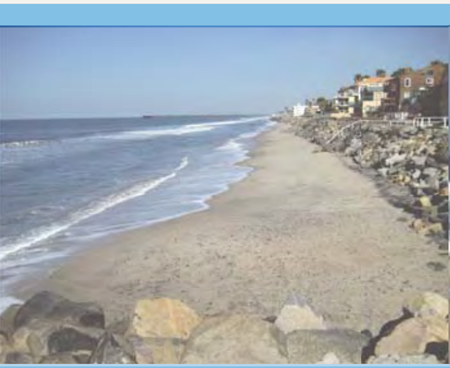
Revised
Environmental Assessment/Final Environmental Impact Report

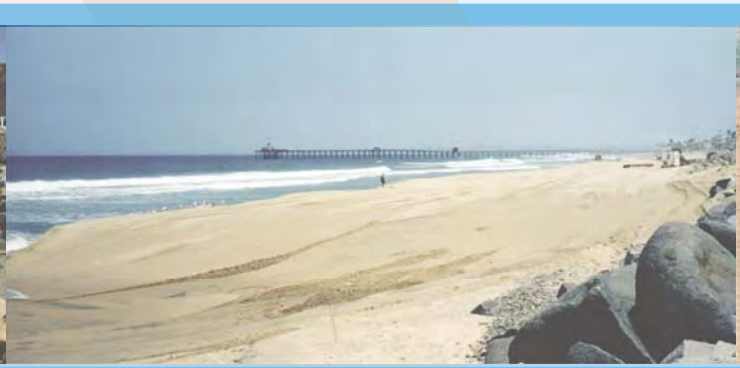
For the

San Diego Regional Beach Sand Project II

State Clearinghouse Number 2010051063

May 27, 2011





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May 27, 2011 File Number 3200200

TO: Interested Agencies, Organizations, and Individuals

FROM: Rob Rundle, Principal Regional Planner (SANDAG)

SUBJECT: Changes Incorporated into the Environmental Assessment/ Final Environmental Impact Report (EA/Final EIR) for the Regional Beach Sand Project (RBSP) II, (State Clearinghouse Number 2020051063)

This document is being prepared and processed as a joint document under both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The United States Army Corps of Engineers (USACE) is serving as the lead agency under NEPA, while SANDAG is the lead agency under CEQA. As part of the CEQA process, SANDAG certified this Final EIR for the Preferred Alternative 2-R. The NEPA component of this project, presented in "Chapter 7, Corps Decision Document Requirements," is also being analyzed by the USACE. This document constitutes the Final EIR, but not necessarily the final EA. The title of the document has been updated to reflect that difference (EA/Final EIR). During the analysis process for the EA, the USACE may prepare an updated Final EA, if appropriate. Information from the EIR may still be incorporated by reference, but certification of the Final EIR would not be affected.

Following the public review period on the Draft EIR/EA for RBSP II, clarifications and corrections were incorporated into the EA/Final EIR. The changes incorporated into the document did not result in the identification of new significant environmental impacts. Key changes are identified and summarized in the table below. Text changes in the EA/Final EIR are noted with a line in the margin next to the modified text. Note that some minor changes (e.g., typographical corrections) are not reflected in this table but are identified in the text margin. Copies of all letters received regarding the Draft EIR/EA and the responses to the comments are found in Appendix I.

The Draft EIR/EA did not identify a Preferred Alternative. Subsequent to release of the Draft EIR/EA for RBSP II, a Preferred Alternative was defined as Alternative 2-Reduced (2-R). Alternative 2-R is the proposed project. The Preferred Alternative 2-R includes components of both Alternatives 1 and 2, representing a reduced alternative compared to Alternative 2. Similar to Alternatives 1 and 2, the Preferred Alternative 2-R has identified no significant impacts. The Preferred Alternative 2-R is detailed in the following Preface, including a brief discussion of Alternative 2-R with respect to each issue area evaluated in the EA/EIR and other substantive chapters in the document. Alternatives 1 and 2, as evaluated in the Draft EIR/EA, are now discussed in the Chapter 7 Alternatives section. The complete analysis for Alternatives 1 and 2 remains in the Final EIR to facilitate comparison with the published draft document. Minor clarifications have been made in response to comments received during the public review period and agency coordination that occurred after release of the Draft EIR/EA, as noted above.

Summary Table of Changes Incorporated into the EA/Final EIR for RBSP II

Location in the EA/Final EIR	Description of Change
ES-12, ES-13, 2-65, 2-68, 2-57, 4.2-1, 4.2-2, 4.2-6, 4.2-7, 4.2-8, 4.2-9, 4.2-10, 5-15	Additional language regarding lagoon sedimentation methodology, significance criteria, funding commitment for sediment removal and clarification of lagoon conditions monitoring components.
ES-12, 2-57, 2-60, 2-64, 2-70	Added Marine Mammal and Turtle Contingency Plan component to project
1-7, 2-13	Clarification on depth of closure and littoral system
2-5	Expanded GENESIS and supplemental cross-shore modeling approach
2-13, 3.1-9, 3.4-4	Clarified bathymetric differences at dredge sites
2-21	Clarified that footprints reflect preliminary design and may be slightly shifted and/or refined through the design and permit process
2-49	Clarified cutterhead dredge operations
2-52, 4.6-3	Clarification regarding limited nature of public access restrictions
2-62, 2-68, Figure 2-7, 3.4-17, 3.4-34, 3.4-36, 4.4-25,	Updated critical habitat areas and clarified sand placement would not occur in proposed or designated critical habitat at the Batiquitos site
2-71, 4.4-33	Expanded commitments for mitigation, if required, based on focused monitoring results
2-76	Clarification that a noise variance would be required in Carlsbad
3.1-7, 3.7-8	Updated Moonlight Beach annual replenishment volumes
3.4-14, 3.8-23	Clarified importance of surfgrass to lobster
3.7-1, 4.7-7	Clarified visual effects of dredge
4.1-5	Expanded description of effects on onshore waves
4.4-2	Clarified definition of significant impacts to biological resources
4.4-7	Clarified turbidity effects on fish and mammals
ES-9, 2-13, 4.4-21	Added SO-6 dredge depth may extend to a maximum of 20 feet
4.4-23	Clarified effects of anticipated underwater noise
4.4-27, 7-1, 7-14, 7-33	Clarification that separate Section 7 consultation is not anticipated with the U.S. Fish and Wildlife Service
4.6-4, 4.6-8	Clarified potential effects to surfing reef breaks
4.13-5	Clarification regarding distances from dredge to beachfront residents
5-7, 5-13, 5-15	Clarification regarding cumulative projects in the cities of Carlsbad, Encinitas, and Imperial Beach
Chapter 7	Clarified Preferred Alternative is proposed project and updated section

RRU/KLE/kca

ENVIRONMENTAL ASSESSMENT/
FINAL ENVIRONMENTAL IMPACT REPORT
SAN DIEGO REGIONAL BEACH SAND PROJECT II

State Clearinghouse Number 2010051063

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May 2011

PREFACE

The SANDAG board is anticipated to approve an Alternative for the Regional Beach Sand Project (RBSP) II that differs from the Preferred Alternative, Alternative 2-Reduced (2-R), originally detailed in the Preface to the Environmental Assessment/Final Environmental Impact Report (EA/Final EIR). Revisions to Alternative 2-R include the placement of less sand than originally anticipated at Solana Beach (volumes would now be equivalent to Alternative 1 volumes). The description for Alternative 2-R has been updated below to reflect this change.

The Draft Environmental Impact Report/Environmental Assessment (EIR/EA) for the Regional Beach Sand Project II (RBSP II) did not identify a Preferred Alternative in order to enable SANDAG to take public and agency input into consideration in the selection of a Preferred Alternative. Subsequent to release of the Draft EIR/EA for RBSP II, and based upon input from the public and local and regulatory agencies, a Preferred Alternative has been defined, referred to as Alternative 2-Reduced (2-R). The Preferred Alternative 2-R is the proposed project and incorporates components of both Alternative 1 and Alternative 2, as described in detail in the Draft EIR/EA. Under Preferred Alternative 2-R, all cities would implement Alternative 2, except for the City of Carlsbad and City of Solana Beach, which would implement Alternative 1. Specifically, under Preferred Alternative 2-R, **no material** would be placed at the **South Carlsbad South** receiver site and **less material** would be placed at the **South Carlsbad North** receiver site (158,000 cubic yards versus 220,000 cubic yards) and the **Solana Beach** receiver site (146,000 cubic yards versus 360,000 cubic yards). In total, up to 2.3 million cubic yards of sand would be placed at up to 10 receiver sites for RBSP II under Alternative 2-R. Table P-1 identifies maximum sand quantities that would be placed at each beach receiver site under the Preferred Alternative 2-R, in comparison to Alternative 1 and Alternative 2, as described in Chapter 4. Note that because both Alternative 1 and Alternative 2 proposed similar volumes to RBSP I at most of the receiver sites, only one site under Preferred Alternative 2-R of RBSP II would actually receive more sand than RBSP I: Imperial Beach. Table P-2 identifies the anticipated duration of construction at each receiver site under Preferred Alternative 2-R, which is anticipated to be slightly shorter in duration than Alternative 2. Overall, construction is anticipated to last approximately 7.5 months (230 days versus 270 days). Because less material would be required in the Carlsbad and Solana Beach locations, less material would be necessary from the SO-5 borrow site. These data are comparable to the schedule and production information disclosed in the EA/EIR in Table 2-5.

Table P-1
Comparison of Sand Replenishment Volumes
Proposed RBSP II Preferred Alternative (Alternative 2-R) with Alternatives 1 and 2 Evaluated in the Draft EIR/EA

Receiver Site	Preferred Alternative 2-R (cubic yards)	Alternative 1 (cubic yards)	Alternative 2 (cubic yards)
Oceanside	420,000	420,000	No Change
North Carlsbad	225,000	225,000	No Change
South Carlsbad North	158,000	158,000	220,000
South Carlsbad South	0	0	142,000
Batiquitos	118,000	118,000	No Change
Leucadia	117,000	117,000	No Change
Moonlight Beach	105,000	105,000	No Change
Cardiff	101,000	101,000	No Change
Solana Beach	146,000	146,000	360,000
Del Mar	N/A	N/A	N/A
Torrey Pines	245,000	245,000	No Change
Mission Beach	N/A	N/A	N/A
Imperial Beach	650,000	120,000	650,000
Total	**2,285,000**	**1,755,000**	**2,703,000**

Table P-2
Schedule and Production Associated with Alternative 2-R

Borrow Site	Receiver Site	Proposed Project		
		Quantity (cy)	Replenishment Site Construction (estimated days)	Duration of Pipeline Activity (estimated days)
SO-6	Oceanside	420,000	40	63
	North Carlsbad	225,000	23	
SO-5	South Carlsbad North	158,000	15	97
	South Carlsbad South	0	0	
	Batiquitos	118,000	12	
	Leucadia	117,000	12	
	Moonlight Beach	105,000	10	
	Cardiff	101,000	10	
	Solana Beach	146,000	15	
	Torrey Pines	245,000	23	
MB-1	Imperial Beach	650,000	70	70
Total		**2,285,000**	**230**	**230**
Average Estimated Production Rate		10,000 (cy/day)		

The environmental document for RBSP I concluded no significant impacts would occur from that project. Field monitoring conducted following implementation of RBSP I confirmed long-term significant impacts did not occur. The analysis for RBSP II Alternative 2 (in Chapter 4 of this EA/Final EIR) does not anticipate any significant impacts to occur as a result of implementation of this alternative. The Preferred Alternative 2-R would be similar to RBSP I in all but one location, and overall would place less sand on fewer receiver sites than Alternative 2. Implementation of Alternative 2-R would therefore not result in any new significant impacts, nor impacts that would be substantially increased beyond that disclosed for Alternative 2. For full disclosure of anticipated impacts associated with the Preferred Alternative 2-R, a brief discussion by issue area is provided below. This discussion is derived from the information in Chapters 3 and 4 of this EA/Final EIR and notes where impacts and benefits would be similar or different between Alternative 2 and the Preferred Alternative 2-R.

Geology and Soils

Section 4.1 anticipates a minor increase in the sand thickness at the nearshore bar for specific receiver sites under Alternative 2. This increase would be short term and less than significant. In addition, this section notes that sand placement onshore would not impact the littoral transport process. Because the Preferred Alternative 2-R would place less sand at fewer receiver sites than Alternative 2, a smaller increase in sand thickness would occur and less than significant impacts would also be anticipated.

Coastal Wetlands

The Preferred Alternative 2-R would place less sand at the South Carlsbad North receiver site and the Solana Beach receiver site than identified under Alternative 2 in Section 4.2, and would not place any sand at the South Carlsbad South receiver site. Lagoon sedimentation rates at Batiquitos Lagoon, located south of Carlsbad, and at San Dieguito Lagoon, located south of Solana Beach, would therefore be less under Alternative 2-R than under Alternative 2, and would be consistent with Alternative 1 volumes discussed in Section 4.2. Updated lagoon sedimentation rates for the Preferred Alternative 2-R are identified in Table P-3 below. The San Diego Association of Governments (SANDAG) has committed to providing funds to offset predicted sedimentation into individual lagoons as part of the project, as described in Appendix G. Similar to impact conclusions for Alternative 2 in Section 4.2, impacts to coastal wetlands would be less than significant with implementation of the Preferred Alternative 2-R.

Table P-3
Potential Estimated Lagoon Shoaling and Compensation Estimates for Alternative 2-R

Lagoon	Estimated Sand Shoaling Volume (cubic yards)	Estimated Cost to be paid to Lagoon Management Entity[1]
Agua Hedionda	0	0
Batiquitos	25,700	$245,800
San Elijo	10,000	$32,600
San Dieguito	4,200	$20,076
Los Peñasquitos	10,200	$24,650

[1] Funding amounts have been calculated based on proposed placement volumes, which may differ than those ultimately placed. Final compensation would be based on actual volumes placed at each relevant receiver site and would be provided to the appropriate management entity upon the completion of construction.

Water Resources

Section 4.3 anticipates elevated turbidity, reduced water quality, and discoloration due to dredging under Alternative 2. Impacts would be localized, short term and less than significant. Because the Preferred Alternative 2-R would require less dredging and would place less sand at fewer receiver sites than Alternative 2, a shorter period of elevated turbidity, reduced water quality, and discoloration would occur and less than significant impacts would also be anticipated.

Biological Resources

The Preferred Alternative 2-R would place less sand at fewer receiver sites than evaluated in Section 4.4 for Alternative 2. As a result, less dredged material would be required under Alternative 2-R.

Compared to the analysis for Alternative 2 in Section 4.4, the area of direct impact to beach habitat and invertebrate resources would be decreased with implementation of the Preferred Alternative 2-R and fewer acres of beach habitat would be disturbed by construction. In addition, the duration of turbidity effects associated with dredging would also be decreased with implementation of Alternative 2-R as a result of less sand volume.

Sedimentation risk to areas with sensitive resources is also evaluated in Section 4.4. Table 4.4-3 summarizes areas subject to potential risk of sedimentation under Alternative 2. Because the Carlsbad and Solana Beach receiver sites would receive sand volumes evaluated under Alternative 1, less area would be subject to risk of sedimentation, corresponding to acreages presented in Table 4.4-1. An updated table is provided below (Table P-4) to identify areas at risk for sedimentation associated with the Preferred Alternative 2-R. In general, the Alternative 2-R scenario would be similar to conclusions for Alternative 2 for Imperial Beach, and similar to Alternative 1 for all other receiver sites (Section 4.4). Impacts would be less than significant. No monitoring would be required with this alternative, since no elevated risk of burial of persistent sensitive reef habitat is identified near receiver sites compared to RBSP I, which confirmed no long-term significant impacts occurred as a result of sand placement.

Summary of Indirect Sedimentation Impacts

Under the Preferred Alternative 2-R, there is a risk that partial sedimentation could occur to 0.1 acre of hard substrate with surfgrass at Batiquitos, with minimal areas of sedimentation at Torrey Pines. No burial of surfgrass for extended periods of time is anticipated under Alternative 2-R. No burial or partial sedimentation of kelp beds is predicted for this alternative. There is a risk that partial sedimentation of up to 1.2 acres of reef with sensitive indicators could occur under the Preferred Alternative 2-R, and burial of up to 1.1 acres of such reef could also occur, which is less than under Alternative 2. This is a conservative estimate that could also include some reef with only nonsensitive algal turfs and crusts. This impact is considered less than significant because reefs are not expected to be overtopped by sand for extended periods of time and surfgrass is naturally adapted to shallow seasonal burial similar to predicted levels under RBSP II.

Cultural Resources

No impacts to National Register of Historic Places-eligible or California Register of Historical Resources-eligible cultural resources at the receiver sites would occur under Alternative 2, as discussed in Section 4.5. Section 4.5 discusses a monitoring program that would be implemented with Alternative 2 during dredge operations to ensure that no impacts to submerged resources occur. With implementation of the Preferred Alternative 2-R, less material would be required for placement on receiver sites and there would be less potential for discovery of submerged resources. A monitoring program would be implemented under the Preferred Alternative 2-R, as described in Section 4.5, and impacts to cultural resources would remain less than significant.

Table P-4
Estimated Acreage of Potential Impact to Nearshore Reefs Based on Model Predicted Increase in Sand Elevation for the Preferred Alternative 2-R

Jurisdiction	Acres of Hard-Bottom Offshore Jurisdiction[1]	Estimated Sedimentation								Duration
		Receiver Site	Surfgrass		Kelp Bed		Understory Algae[2]		Partial Sedimentation (Reef Height Reduced to ≤1 ft)[4]	
			Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour		
Oceanside	6.9 (Cobble, Bedrock)	Oceanside	0	0	0	0	0	0.2	0	Years 1-5
Carlsbad	396 (Bedrock, Cobble)	North Carlsbad	0	0[5]	0	0	0	0.3[5]	1.2[5] (U)	Year 1 (scour), Years 1-5 (height)
		South Carlsbad North	0	0	0	0	0	0	0.8 (0.3 S, 0.5 U)	Years 1, 4-5
		South Carlsbad South	NA	NA	NA	NA	NA	NA	NA	NA
Encinitas	759 (Bedrock, Cobble)	Batiquitos	0	0.1	0	0	0	<0.1	1.3 (0.8 S, 0.5 U)	Year 1 (scour), Years 1-3 (height)
		Leucadia	0	0	0	0	0	0	<0.1 (S, U)	Years 4-5
		Moonlight	0	0	0	0	0	0	0	0
		Cardiff	0	0	0	0	0	0	0	0
Solana Beach	267 (Bedrock)	Solana Beach	0	0	0	0	0	0	0.1 (U)	Year 1
City of San Diego[3]	107 (Bedrock, Cobble)	Torrey Pines	0	<0.1	0	0	0	0.6	2.1 (0.1 S, 2 U)	Year 1 (scour), Years 2-4 (height)
Imperial Beach	2,396 (Cobble)	Imperial Beach	0	0	0	0	1.1	0.1	2.5 (U)	Years 1-5
Total			0	0.1[5]	0	0	1.1	1.2[5]	8[5] (1.2 S, 6.8 U)	

[1] Acreage based on 2002 Nearshore Program Habitat Map; predominant hard-substrate type is listed first (see Table 3.2-6 in Appendix C)
[2] 2002 map category may include a mix of substrate with sensitive indicators and non-sensitive algal turfs and crusts; S = surfgrass, U = understory algae
[3] Acreage for City of San Diego includes 1 mile up and downcoast of Torrey Pines receiver site
[4] There is relatively greater uncertainty of potential impacts from estimated reef height reduction
[5] Potential for greater sedimentation acreage in Year 5 after project implementation under low gross transport conditions based on preliminary model results

Land and Water Use

As described in Section 4.6, there would be temporary beach closures on portions of the receiver sites and no significant, long-term impacts would occur to surfing or other recreational activities. Temporary beach closures would be limited to active construction areas and would be immediately reopened to public access once sand placement is completed. As sand placement activities shift up or down the beach, the closure area would also shift, providing a sequentially larger open beach after each segment of the project is completed. Horizontal access along the back beach or adjacent public corridors would be maintained to either side of the active sand placement area at most of the receiver sties. To ensure public safety, some sites may require temporarily restricted horizontal access if sand placement must extend to the back beach and no alternative horizontal access exists (e.g., where a wet beach directly abuts bluffs). In these locations, existing vertical access would be maintained and closures along the back of the beach would be limited to the extent practicable during daytime hours. Because the Preferred Alternative 2-R would place less sand at fewer receiver sites than Alternative 2, beach closures would be shorter at specific receiver sites and less sand would be distributed throughout the nearshore system. As a result, less short-term change to recreational users would be anticipated, and less sand would be available for accumulation at nearshore sandbars or reefs, therefore resulting in less effects to existing surf breaks than identified under Alternative 2. Impacts would remain short term and less than significant with implementation of the Preferred Alternative 2-R.

Aesthetics

Impacts to aesthetics under Alternative 2 would be short-term views of construction due to beach replenishment activities (Section 4.7), but the result would be beach enhancement. Because the Preferred Alternative 2-R would require less dredging and place less sand at fewer receiver sites than Alternative 2, views of construction would be shorter in duration and impacts would remain short term and less than significant.

Socioeconomics

As discussed in Section 4.8, temporary impacts at the individual fishing operation level for target species may occur under Alternative 2. No impacts to areas that support giant kelp are predicted. Temporary impacts to diving and sport fishing may occur as a result of localized turbidity but would be less than significant. Because the Preferred Alternative 2-R would require less dredging and place less sand at fewer receiver sites, localized turbidity would decrease and impacts would remain less than significant.

Public Health and Safety

As discussed in Section 4.9, under both Alternative 1 and Alternative 2, active construction zones would be closed to public access and all necessary safety measures would be performed. Temporary relocation of lifeguard towers may occur but would not impair the ability of the lifeguards. Section 4.9 does not anticipate hazardous or dangerous materials to be found in the dredge materials; however, in this event, dredging and disposal activities would stop and evaluations would determine the next course of action. Impacts would be less than significant. All safety measures taken under Alternative 2 would be taken under the Preferred Alternative 2-R, and impacts would remain less than significant.

Structures and Public Utilities

As discussed in Section 4.10, sand placement at receiver beaches under Alternative 1 and Alternative 2 would stabilize public stairs and public access ramps, as well as provide additional protection to lifeguard towers. Additionally, sand placed around storm drain outlets would be designed to allow proper drainage. Sand placement under the Preferred Alternative 2-R would have similar effects to structures and public utilities as under Alternative 1 and Alternative 2, and impacts would remain less than significant.

Traffic

Section 4.11 does not anticipate impacts to traffic or parking under Alternative 2. Because the Preferred Alternative 2-R would place less sand at fewer receiver sites, this alternative would generate fewer trips and require fewer parking spaces than Alternative 2 and impacts would remain less than significant.

Air Quality

As discussed in Section 4.12, estimated project emissions under Alternative 2 would demonstrate General Conformity and conformance with the State Implementation Plan. Additionally, less than significant impacts due to dust generation are anticipated. Because the Preferred Alternative 2-R would require less dredging and place less sand at fewer receiver sites, fewer emissions due to project-related activities would occur and impacts would remain less than significant.

Noise

As discussed in Section 4.13, dredging and placement activities under Alternative 2 would generate noise and increase noise levels at receiver sites. Nighttime and weekend work would be performed under variance from local noise ordinances (where required) and residents near receiver sites would be notified prior to work. Impacts from noise would be less than significant. Because the Preferred Alternative 2-R would place less sand at fewer receiver sites, noise impacts due to project-related construction activities would be less than under Alternative 2 and impacts would remain less than significant.

Climate Change

As discussed in Section 4.14, total emissions under Alternative 2 would remain under the guidance level provided by the Council on Environmental Quality and the South Coast Air Quality Management District. The project's greenhouse gas (GHG) emissions would not have a significant impact. Because the Preferred Alternative 2-R would require less dredging and would place less sand at fewer receiver sites, GHG emissions would be less than under Alternative 2 and impacts would not be significant.

Cumulative Impacts

As discussed in Chapter 5, no significant cumulative impacts to any of the above resource areas are anticipated with the implementation of RBSP II Alternative 2. Because the Preferred Alternative 2-R would place less sand at fewer receiver sites, implementation of Alternative 2-R would not result in any significant cumulative impacts to the above resource areas.

Overall Conclusion

The Preferred Alternative 2-R would be similar to RBSP I in all but one location, and overall would place less sand on fewer receiver sites than Alternative 2. Implementation of the Preferred Alternative 2-R would therefore not result in any new significant impacts, nor impacts that would be substantially increased beyond that disclosed for Alternative 2.

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
AMSL	above mean sea level
APCD	Air Pollution Control District
APE	Areas of Potential Effect
ARB	Air Resources Board
ASBS	Area of Special Biological Significance
ATCM	Air Toxic Control Measures
BACT	best available control technology
Basin Plan	Water Quality Control Plan for the San Diego Region
BECA	Beach Erosion Concern Area
BLM	Bureau of Land Management
BMP	best management practice
BOE	Bureau of Ocean Energy
B.P.	before present
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCAR	California Climate Action Registry
CCC	California Coastal Commission
CCD	Coastal Consistency Determination
CCSTWS	Coast of California Storm and Tidal Waves Study
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERF	California Environmental Rights Foundation
CESA	California Endangered Species Act
CFC	chlorofluorocarbon
C.F.R.	Code of Federal Regulations
CH_4	methane
CHRIS	California Historical Resources Information System
cm	centimeter
CNEL	community noise equivalent level
CO	carbon monoxide

CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CSMW	Coastal Sediment Management Workgroup
CT	census tract
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	A weighted decibel
DEIR	Draft Environmental Impact Report
DGPS	Differential Global Positioning System
DNL	day/night average sound level
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENSO	El Niño–Southern Oscillation
°F	degrees Fahrenheit
FESA	Federal Endangered Species Act
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FRH	Frederic R. Harris, Inc.
GHG	greenhouse gas
GIS	Geographic Information System
GPS	global positioning system
HAPC	Habitat Areas of Particular Concern
HDPE	high-density polyethylene
HFC	hydrofluorocarbon
Hz	hertz
I-5	Interstate 5
IPA	Integrated Preferred Alternative
IPCC	Intergovernmental Panel on Climate Change
JPA	Joint Powers Authority
KY	Kilo-Year
L_{eq}	equivalent noise level

LCP	Local Coastal Plan
LF	linear feet
LiDAR	Light Detection and Ranging
LUP	Land Use Plan
m	meters
MACT	maximum available control technology
MBAR	Mission Bay Artificial Reef
MCBCP	U.S. Marine Corps Base Camp Pendleton
mcy	million cubic yards
mgd	million gallons per day
mg/L	milligrams per liter
MHHW	mean higher high water level
MLLW	mean lower low water level
MLPA	Marine Life Protection Act
mm	millimeter
MPA	marine protected area
MPO	Metropolitan Planning Organization
msl	mean sea level
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NEL	Naval Experimental Lab
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
NOAA	National Oceanic and Atmospheric Administration
NOSC	Naval Ocean Surveillance Center
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
NWR	National Wildlife Refuge
O_3	ozone
OPR	Office of Planning and Research

PADI	Professional Association of Diving Instructors
Pb	lead
PFC	perfluorocarbon
PM	particulate matter
ppm	parts per million
ppt	parts per thousand
PRC	Public Resources Code
RAQS	Regional Air Quality Strategy
RBSP	Regional Beach Sand Project
ROG	reactive organic gas
RONA	Record of Non-Applicability
RSM Plan	Regional Sediment Management Plan
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SANDAG	San Diego Association of Governments
SAP	Sampling and Analysis Plan
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCB	Southern California Bight
SCOUP	Sand Compatibility Opportunistic Use Program
SCS	Sustainable Communities Strategy
SDAB	San Diego Air Basin
SDUPD	San Diego Unified Port District
SDURA	San Diego Underwater Recreation Area
SELRP	San Elijo Lagoon Restoration Project
SF_6	sulfur hexafluoride
SIO	Scripps Institute of Oceanography
SIP	State Implementation Plan
SMARA	Surface Mining and Reclamation Act
SMCA	State Marine Conservation Area
SO_2	sulfur dioxide
SO_X	oxides of sulfur
SPCC	Spill Prevention Control and Counter-Measures Plan
SPS	Shoreline Preservation Strategy
SQUIRT	Screening Quick Reference Table
TAC	toxic air contaminant

TOC	total organic carbon
TSS	total suspended solid
URBEMIS	Urban Emissions Model
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USMCB	U.S. Marine Corps Base
VOC	volatile organic compound
Working Group	SANDAG's Shoreline Preservation Working Group
YD	Younger Dryas episode

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EXECUTIVE SUMMARY

This section begins the updated Draft EIR/EA published in January 2011 for public review. As indicated in the introduction memo and Preface, the main body of the document does not evaluate the Preferred Alternative 2-R separately. Rather the evaluation focuses on the alternatives identified at the time of public review, Alternative 1 and Alternative 2. The Preferred Alternative (Alternative 2-R) is the proposed project and would include components of both Alternatives 1 and 2, representing a reduced alternative compared to Alternative 2. For an evaluation of the Preferred Alternative 2-R by issue area, as well as a comparison of potential impacts with Alternatives 1 and 2 evaluated below, please refer to the Preface.

ES-1 INTRODUCTION

This joint Environmental Assessment/Final Environmental Impact Report (EA/Final EIR) addresses the potential environmental consequences of the San Diego Regional Beach Sand Project II (RBSP II), which proposes dredging and placement of sand on numerous potential receiver sites in the San Diego region. The San Diego Association of Governments (SANDAG) is the state lead agency responsible for compliance with the California Environmental Quality Act of 1970 (CEQA) statutes (Cal. Pub. Res. Code § 21 et seq., as amended) and implementing guidelines (Cal. Code Regs., Title 14, § 15000 et seq. (1998). SANDAG has assumed the lead agency role consistent with terms of a Memorandum of Understanding (MOU) between SANDAG and the participating cities, including Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach. The U.S. Army Corps of Engineers (USACE) is the federal lead agency responsible for compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code § 4332 [1994]) in accordance with the Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [C.F.R.] §§ 1500–1508).

The proposed project/action would replenish between 1.8 and 2.7 million cubic yards (mcy) of clean beach-quality sand on up to 11 receiver sites in the San Diego region. The receiver sites are located from Oceanside in the north to Imperial Beach in the south. Sand would be dredged from up to three offshore borrow sites. A regional location map, including the proposed receiver sites and sand borrow sites, is shown in Figure ES-1.

ES-2 BACKGROUND

The San Diego region's beaches and seacliffs have been steadily eroding for several decades. The region is experiencing a net loss of sand at numerous beaches along its coastline. In 1993,

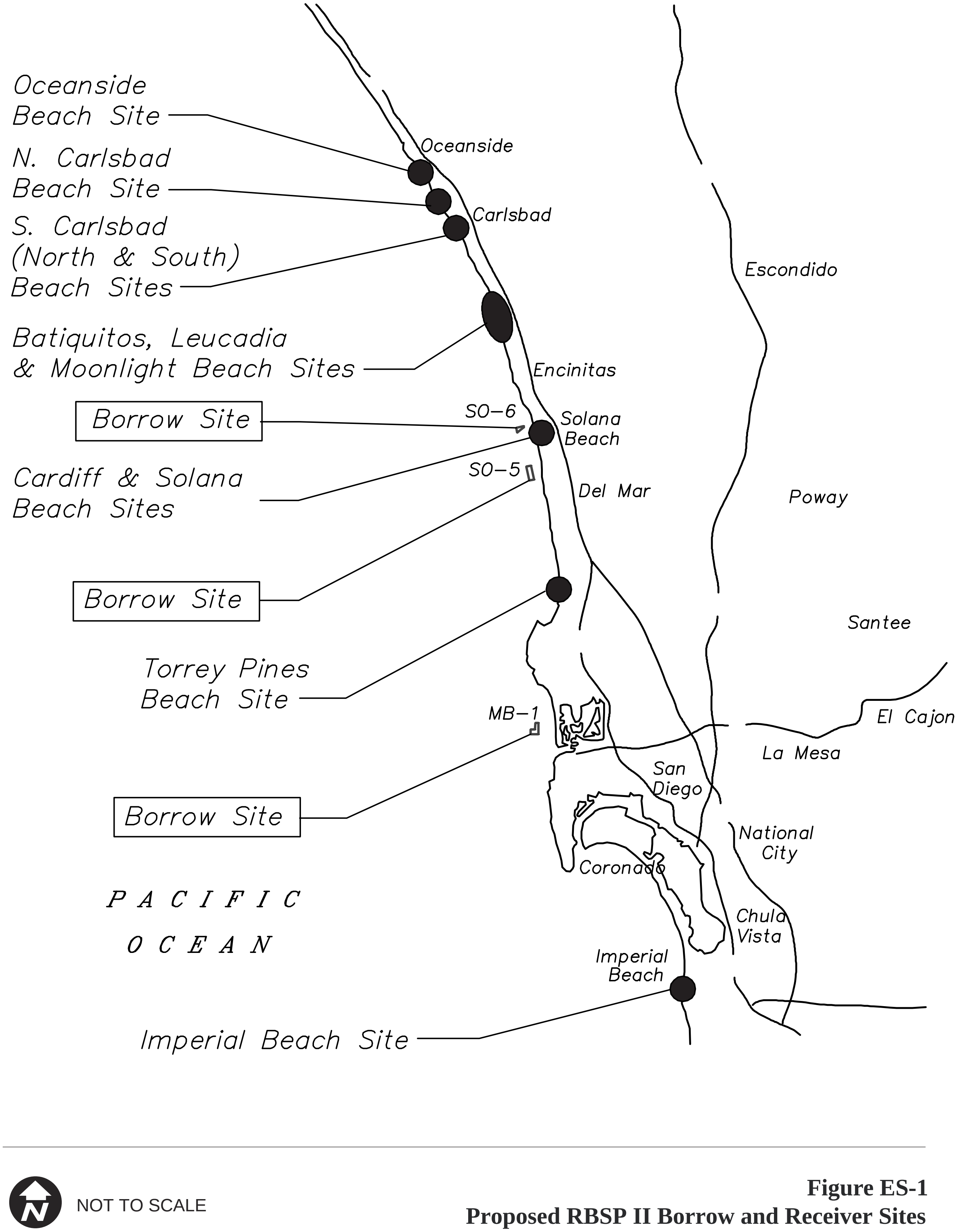


Figure ES-1
Proposed RBSP II Borrow and Receiver Sites

SANDAG prepared the *Shoreline Preservation Strategy for the San Diego Region* (SPS), which describes the region's beach erosion trends, as well as policies and strategies for restoring and maintaining the beaches. Independent of that report, the Navy analyzed a separate action in *Final Environmental Impact Statement for the Development of Facilities in San Diego/Coronado to Support the Homeporting of One NIMITZ Class Aircraft Carrier* (EIS; U.S. Navy 1995). To accommodate the carrier, the Navy proposed to dredge portions of the San Diego Bay navigation channel, the sand from which was initially believed suitable for beach replenishment. As one option to dispose of the dredged material from the Homeporting project, the Navy evaluated nine beach receiver sites in the San Diego region in this EIS. The Navy subsequently prepared two EAs as tiered analyses to the EIS due to subsequent changes in the location of beach receiver sites. These two EAs are *Environmental Assessment for Beach Replenishment at South Oceanside and Cardiff/Solana Beach, California* (U.S. Navy 1997a) and *Environmental Assessment for Beach Replenishment at North Carlsbad, South Carlsbad, Encinitas, and Torrey Pines* (U.S. Navy 1997b). During beach replenishment in Oceanside, however, munitions were found in the dredged materials from San Diego Bay and replenishment efforts were halted.

In 1999, SANDAG, in cooperation with the Navy, prepared a *Final EIR/EA for the San Diego Regional Beach Sand Project* (SCH No. 1999041104) (SANDAG 1999). RBSP I was designed to place approximately 2 mcy over generally the same receiver sites as the Navy's permitted project. However, the sand source was changed from dredged material in San Diego Bay to dredged material from six offshore borrow sites, and additional receiver site locations were added. Existing data from the Navy's prior analyses were used, where applicable. The monitoring program established by the Navy project permits was used as a framework for designing the monitoring program for RBSP I. RBSP I was successfully constructed between March and September of 2001. Monitoring occurred before, during, and after construction.

SANDAG finalized the Coastal *Regional Sediment Management Plan for the San Diego Region* (RSM Plan) in March 2009. The RSM Plan uses the information established in the SPS as a baseline guideline for the level of comprehensive nourishment needed for the San Diego region. This RSM Plan was developed to further inform the public and decision-makers on sand deficits and related issues within the region, and proposes solutions for existing sediment management problems along the coast. Insufficient sediment or sand volumes exist along the San Diego County shoreline, leading to coastal erosion, narrowing of beaches, damage to infrastructure, habitat degradation, threats to public safety, and reduced recreational and economic benefits.

The 2010 *California Beach Erosion Assessment Survey* published by the Coastal Sediment Management Workgroup (CSMW) also identifies beach erosion concern areas in coastal

California, providing decision-makers with a list of locations identified as a concern to federal, state or regional entities in certain portions of coastal California.

The proposed RBSP II is designed to provide a second regional beach sand replenishment project in the San Diego region. The receiver sites are generally in the same location as those included in RBSP I, with some variations due to economic and recreational needs. Table ES-1 summarizes key similarities and differences between RBSP I and RBSP II.

Table ES-1
Comparison of Sand Replenishment Volumes
2001 RBSP I and Proposed RBSP II

Receiver Site	RBSP I[1] (cubic yards)	RBSP II (cubic yards)		Receiver Site Boundaries[2] Relative to RBSP I
		Alternative 1	Alternative 2	
Oceanside	421,000	420,000	No Change	Shifted approximately 1,800 ft north toward pier from RBSP I
North Carlsbad	225,000	225,000	No Change	Identical to RBSP I
South Carlsbad North[3]	158,000	158,000	220,000	Identical to RBSP I, or extended north 1,000 ft
South Carlsbad South	N/A	0	142,000	Directly south of Encinas Creek
Batiquitos	118,000	118,000	No Change	Identical to RBSP I
Leucadia	132,000	117,000	No Change	Identical to RBSP I
Moonlight Beach	105,000	105,000	No Change	Identical to RBSP I
Cardiff	101,000	101,000	No Change	Identical to RBSP I
Solana Beach	146,000	146,000	360,000	Identical to RBSP I or extended 1,000 ft north and 1,800 ft south
Del Mar	183,000	N/A	N/A	N/A
Torrey Pines	245,000	245,000	No Change	Identical to RBSP I
Mission Beach	151,000	N/A	N/A	N/A
Imperial Beach	120,000	120,000	650,000	Shifted 1,300 ft closer to pier or extended 1,750 ft north and 1,700 ft south
Total	**2,105,000**	**1,755,000**	**2,703,000**	

ft = feet
[1] RBSP I volumes reflect the as-built project (Noble 2001).
[2] The minimum quantity alternative may be identical to RBSP I, while the maximum quantity alternative may extend farther up or down the beach.
[3] An additional Carlsbad site has been added to RBSP II. The South Carlsbad site used in RBSP I is now referred to as South Carlsbad North, while the South Carlsbad South site is a newly proposed replenishment site.

ES-3 PROJECT PURPOSE AND NEED

The purpose of the proposed beach replenishment project is to replenish beaches in accordance with the SPS and RSM Plan. These documents identified regional coastal areas with critical shoreline problems and the need for large regional replenishment projects to place up to 30 mcy of sand to address these problems. Although a number of small and/or localized replenishment projects are currently being implemented or planned in the region, these efforts would not substantially reduce the 30-mcy deficit identified in the SPS and supported in the RSM Plan. SANDAG's Shoreline Preservation Working Group has used the SPS and RSM Plan, in conjunction with monitoring results from RBSP I, as a basis for developing the proposed RBSP II. The project identifies up to 11 receiver sites that have continued to experience erosion and exhibit a need for large-scale replenishment.

Each of the receiver sites is identified as an initial Beach Erosion Concern Area in the RSM Plan. Placement at the proposed receiver sites would provide additional sand for two of the three littoral cells within the region.

The proposed action would serve 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. USACE has determined the overall project purpose is to provide beach nourishment to identified beaches within the San Diego region. USACE has determined the basic purpose of the proposed project is beach nourishment, which is considered water dependent.

ES-4 PROPOSED PROJECT/ACTION

The proposed action evaluated in this EA/Final EIR is beach replenishment of the San Diego region's eroding beaches using between 1.8 (Alternative 1) and 2.7 (Alternative 2) mcy of dredged sediment from three offshore borrow sites. Since release of the Draft EIR/EA, a final proposed project has been identified. The proposed project, identified as Preferred Alternative 2-R, includes some components of both Alternative 1 and Alternative 2, as detailed in the Preface to this document. The proposed project is anticipated to be constructed in spring and summer of 2012. The exact timing for particular receiver sites would depend on the contractor selected to implement the dredging and disposal activities, the alternative selected for implementation, and construction work windows that may be required at receiver sites in proximity to sensitive species nesting sites. However, scheduling would be coordinated to the maximum extent possible to avoid conflicts with national holidays and scheduled major beach events. Between the two alternatives, a total of 11 receiver sites are proposed. Most of the 11 possible receiver sites are within suburban areas of the San Diego region and are bordered by residential, commercial, or light industrial uses. All or portions of the beaches in Carlsbad, Encinitas, and San Diego are State Beaches. All of the proposed borrow sites are surrounded by ocean water; the primary recreational activities occurring nearby are boating, sailing, and diving.

ES-5 ALTERNATIVES ANALYSIS

Section 404(b)(1) of the Clean Water Act requires that an alternatives analysis be completed for projects under the jurisdiction of USACE. The analysis includes a sequenced evaluation of other practicable alternatives to the project, ultimately identifying the project's least environmentally damaging practicable alternative (LEDPA). A project cannot be permitted by USACE if there is a practicable alternative that would have less adverse impact on the aquatic system. The proposed RBSP II is a water-dependent project, and the evaluation of alternatives included in this EA/EIR provides the information required under Section 404(b)(1).

Based on the thorough alternatives evaluations process completed to date, two alternatives were selected for detailed evaluation in this EA/EIR. Alternative 1 would result in placement of approximately 1.8 mcy of sand along the San Diego region coastline, and Alternative 2 would result in placement of up to approximately 2.7 mcy of sand. All sand would be placed onshore as a constructed berm. Table ES-2 illustrates the sand quantities at each beach receiver site under both alternatives and the borrow site that would provide material for each receiver site. Finally, the No Project Alternative is evaluated.

Table ES-2
Sand Quantities Proposed Under Each Alternative

Receiver Site	Probable Borrow Site	Alternative 1 (cubic yards)	Alternative 2 (cubic yards)
Oceanside	SO-6 and/or SO-5	420,000	420,000
North Carlsbad		225,000	225,000
South Carlsbad North	SO-5	158,000	220,000
South Carlsbad South		N/A	142,000
Batiquitos		118,000	118,000
Leucadia		117,000	117,000
Moonlight Beach		105,000	105,000
Cardiff		101,000	101,000
Solana Beach		146,000	360,000
Torrey Pines		245,000	245,000
Imperial Beach	MB-1	120,000	650,000
	TOTAL	**1,755,000**	**2,703,000**

A more detailed description of the individual receiver sites under each alternative is provided below.

Alternative 1

Alternative 1 would involve beach replenishment with approximately 1.8 mcy of sand to be deposited at 10 receiver sites, as identified in Table ES-3.

Table ES-3
Schedule and Production

		Alternative 1			Alternative 2		
Borrow Site	**Receiver Site**	**Quantity (cy)**	**Replenishment Site Construction (estimated days)**	**Duration of Pipeline Activity (estimated days)**	**Quantity (cy)**	**Replenishment Site Construction (estimated days)**	**Duration of Pipeline Activity (estimated days)**
SO-6	Oceanside	420,000	40	63	420,000	40	63
	North Carlsbad	225,000	23		225,000	23	
SO-5	South Carlsbad North	158,000	15	97	220,000	21	138
	South Carlsbad South	0	0		142,000	14	
	Batiquitos	118,000	12		118,000	12	
	Leucadia	117,000	12		117,000	12	
	Moonlight Beach	105,000	10		105,000	10	
	Cardiff	101,000	10		101,000	10	
	Solana Beach	146,000	15		360,000	36	
	Torrey Pines	245,000	23		245,000	23	
MB-1	Imperial Beach	120,000	14	14	650,000	70	70
Total		**1,755,000**	**174**	**174**	**2,703,000**	**271**	**271**
Average Production Rate		10,000 (CY/day)			10,000 (CY/day)		

Receiver Sites

Beach replenishment at the Oceanside receiver site would place sand from Wisconsin Avenue south to Morse Street, a shift of approximately 1,800 feet north relative to RBSP I. The 4,100-foot-long beach fill would have a 200-foot-wide berm at +13 feet mean lower low water (MLLW). The total volume proposed for Oceanside for Alternative 1 is 420,000 cubic yards (cy).

Beach replenishment at North Carlsbad would involve placement of sand just south of Buena Vista Lagoon to approximately Oak Street. The proposed beach fill would have a 135-foot-wide berm at +12 feet MLLW. Approximately 225,000 cy of beach fill is proposed at North Carlsbad for Alternative 1.

Beach replenishment at South Carlsbad North would place sand just north of Encinas Creek. Approximately 158,000 cy is proposed over a 2,100-foot-long beach fill. The proposed berm would be approximately 180 feet wide at +12 feet MLLW.

Beach replenishment at Batiquitos would involve the placement of sand south of the Batiquitos lagoon inlet. The Batiquitos fill area would be approximately 1,490 feet long, with an 180-foot-wide berm at +12 feet MLLW. Approximately 118,000 cy of beach fill is proposed.

At the Leucadia site, approximately 117,000 cy of sand is proposed for beach replenishment along a narrow 2,700-foot-long reach with a 120-foot-wide berm at +12 feet MLLW.

The Moonlight receiver site is located at the end of B and C streets. This small site only extends approximately 770 feet in length with an 180-foot-wide berm, which would result in just over 100,000 cy of beach fill.

The Cardiff Beach site is located just south of the San Elijo Lagoon inlet. This site is also small and would place just over 100,000 cy extending over a 780-foot length with a 150-foot-wide berm.

Beach replenishment at the Solana Beach site would extend 1,900 feet south from the access at Fletcher Cove and would place approximately 146,000 cy of sand. The berm width would be 70 feet at an elevation of +13 feet MLLW.

The Torrey Pines site is located at Torrey Pines State Beach. Approximately 245,000 cy of sand is proposed at this site in a 1,620-foot-long beach fill with a 160-foot-wide beach berm at +12 feet MLLW.

Beach replenishment at the Imperial Beach site would result in sand placement closer to the pier relative to RBSP I to improve the economic cost-benefit ratio at this site. Approximately 120,000 cy of fill is proposed along a 2,310-foot-long beach fill. The beach berm would be 120-feet-wide at +12 feet MLLW.

Borrow Sites

The three proposed borrow sites are located within or adjacent to borrow sites defined during RBSP I; SO-6, SO-5, and MB-1. Investigations for RBSP II focused on the previous borrow sites, then expanded those to determine whether additional deposits of beach quality sand were present. These additional investigations resulted in the expansion of some of the previous borrow site boundaries to encompass areas with the highest quality sand. Proposed dredge areas for RBSP II would be located within these expanded borrow sites. Table ES-4 provides a summary of borrow site characteristics including the volume of material to be dredged, the surface area affected, the depth of the dredge, and the water depth.

Table ES-4
Borrow Site Characteristics

	Borrow Site SO -6	Borrow Site SO-5	Borrow Site MB-1
Approximate Volume Available for Dredging (cy)*	700,000	1,900,000	1,600,000
Maximum Surface Area to be dredged (in acres)	44	124	107
Water Depth (ft, MLLW)	-42 to -56	-34 to -49	-60 to -74
Potential Volume of Sand to Be Dredged (cy)**			
Alt 1 (1.8 mcy)	645,000	990,000	120,000
Alt 2 (2.7 mcy)	645,000	1,408,000	650,000

Source: Moffatt & Nichol 2009a
* Assumes entire footprint dredged 10 feet; more sand would be available if dredging extends deeper, as proposed at SO-6 (20 feet).
** Volume varies within footprint by increasing the depth of dredge.

Alternative 2

Alternative 2 would be similar to Alternative 1 (see Tables ES-2 and ES-3) and would involve sand replenishment at the 10 beach receiver sites proposed for Alternative 1, with the addition of one new site (South Carlsbad South). The same three borrow sites would provide the material for replenishment though the volume would increase to 2.7 mcy for this alternative. Individual receiver sites are described below, including similarities and differences relative to Alternative 1.

Beach replenishment at Oceanside and North Carlsbad receiver sites would be identical to that proposed under Alternative 1.

South Carlsbad North would have an increased beach fill length to 3,100 feet and the volume would increase to 220,000 cy. The berm width would be 180 feet at an elevation of +13 feet MLLW.

Beach replenishment at South Carlsbad South would consist of approximately 142,000 cy of sand over a 1,830-foot beach fill length. The berm width would be 170 feet at an elevation of +13 feet MLLW. This site is located south of Encinas Creek.

Beach replenishment at Batiquitos, Leucadia, Moonlight, and Cardiff receiver sites would be identical to that proposed under Alternative 1.

The receiver site at Solana Beach would be lengthened to 4,700 feet with approximately 360,000 cy of sand proposed for placement. The beach fill would extend north and south of Fletcher Cove. The berm width would be 135 feet at an elevation of +13 feet MLLW.

The Imperial Beach receiver site would be extended to 5,750 feet in length. A volume of 650,000 cy is proposed with a 260-foot-wide berm.

Borrow Sites

Under this alternative, the borrow site locations would remain as under Alternative 1, but the sand quantity would change and the number of receiver sites would increase. Overall, the surface area would remain the same under Alternatives 1 and 2, but the depth of the dredge would increase at borrow sites.

No Project/No Federal Action Alternative

The proposed beach nourishment is water dependent and must be conducted within USACE jurisdiction to be effectively implemented. Because a federal permit must be issued for any activities within USACE jurisdiction, the no federal action alternative is equivalent to the no project alternative.

Under the No Project Alternative, no dredging or beach replenishment activities would occur, and erosion at the region's beaches would continue without intervention. This alternative would not serve to enhance property protection, recreational opportunities, or the tourism value at specific receiver sites. In addition, if no sand is placed at specific receiver sites through sand replenishment activities, then no additional sand would be available for transport in the three littoral cells along the San Diego coastline. This could indirectly preclude the enhancement of other beach locations. Therefore, the regionwide benefit would also remain unaddressed under this alternative. The No Project Alternative would have specific ramifications to the potential receiver sites, and some indirect relationships to the littoral cells, but would also not satisfy the regional goals of beach replenishment promulgated by the Shoreline Preservation Working Group.

ES-6 MONITORING AND MITIGATION FRAMEWORK

As part of the permits issued for RBSP I, a monitoring program was devised and implemented with elements occurring during the preconstruction, construction, and postconstruction phases. That monitoring effort, combined with other research over the last 10 years, has provided valuable information to guide design of RBSP II. While a detailed monitoring plan for RBSP II cannot be prepared until permit conditions are known, like RBSP I, it is appropriate for the EA/EIR to describe the framework of the monitoring program that would be implemented for RBSP II based on the information available at this time and lessons learned from RBSP I monitoring. Postconstruction monitoring for RBSP I was primarily conducted to confirm that modeling predictions were accurate in anticipating that no significant impacts would occur. It is anticipated that the modeling approach for RBSP II, which is similar to RBSP I but uses updated information and more precise baseline data, would provide similar certainty in sand transport predictions. In general, where RBSP I monitoring confirmed no impacts occurred and receiver sites and volumes are similar for RBSP II, no postconstruction monitoring is proposed. The intent of monitoring would be to verify that:

1. the project is carried out consistent with project design features as well as permit conditions, and
2. there are no long-term, significant impacts to sensitive biological resources in specific locations under Alternative 2 where there is greater risk of deposition and modeling

uncertainty. If significant impacts are identified through monitoring, then mitigation would be required.

This EA/EIR describes the framework for monitoring and mitigation for RBSP II. The final details would be determined upon selection of an alternative and negotiation of permit conditions with the resource agencies. Items such as exact monitoring locations would depend on the alternative to be implemented. Monitoring can be divided into three distinct phases:

1. preconstruction (initiated approximately 6 months prior to construction),
2. during construction (approximately 6–9 months duration), and
3. postconstruction (proposed 4 years after construction is complete).

Preconstruction monitoring would focus on verification of environmental constraints prior to construction, and also to establish a pre-project baseline for physical and biological conditions that would be subject to construction or postconstruction monitoring. Monitoring during construction would be required to ensure compliance with specific permit conditions and that site-specific resources are not significantly impacted (e.g., cultural resources). Because of the highly dynamic ocean system, postconstruction monitoring would be conducted for 4 years after implementation of RBSP II to understand project performance and to confirm no significant impacts occur to resources as a result of project implementation. Table ES-5 summarizes the monitoring that would be performed during each of the three construction phases by element.

Table ES-5
Summary of Monitoring Elements and Timing Requirements for RBSP II

Monitoring Element	EA/EIR Analysis Section	Monitoring Phase		
		Preconstruction	During Construction	Postconstruction
Beach Conditions	Various	✓		✓
Lagoon Conditions	4.2	✓		✓
Water Quality (Turbidity)	4.3		✓	
Biological Site Constraints	4.4	✓		
Nearshore Biological Resources	4.4	✓		✓
Threatened and Endangered Species	4.4		✓	
Grunion	4.4	✓	✓	
Marine Mammal and Turtle	4.4	✓	✓	
Pismo Clam	4.4	✓		
Cultural Resources	4.5	✓	✓	

Preconstruction Monitoring

In this phase, monitoring would be primarily conducted to support finalization of construction details (e.g., anchor plans, pipeline routes), and to establish baseline existing conditions at long-term monitoring locations. Preconstruction monitoring tasks for RBSP II would establish baseline data at physical profile locations, lagoon mouths, and long-term biological monitoring locations. Assessment of receiver sites for potential habitat suitability to support spawning by California grunion would be conducted, depending on construction periods relative to spawning runs, to minimize adverse impacts. In addition, the presence of established Pismo clam beds would be determined by conducting preconstruction surveys at focused sites. Contractor educational efforts would also be initiated to alert workers to measures included in the Marine Mammal and Turtle Contingency Plan and to potential sensitive cultural resources and impact minimization measures to be implemented during construction.

Monitoring during Construction

During the approximately 6- to 9-month construction phase, monitoring would be conducted to comply with permit conditions regarding turbidity and used to identify concerns and solutions in the immediate time frame, with the anticipation that adjustments could be made and significant impacts avoided. As with RBSP I, SANDAG is committed to coordinating with commercial fishermen to avoid gear loss in the transit and dredge areas. Other specifics of the Notice to Mariners procedure prior to and during construction are discussed in Section 2.4.1.

Postconstruction Monitoring

Postconstruction monitoring would be primarily focused on confirming the absence of significant impacts to sensitive nearshore biological resources and lagoon conditions that may occur as a result of project-related sediment transport. Additional physical monitoring would be conducted as part of the ongoing coastal profile program, with an enhanced program for 4 years after implementation of RBSP II. The current general lagoon condition observation and analysis program would be continued to provide updated information regarding lagoon inlet conditions and maintenance, but would be reduced relative to RBSPI based on lessons learned. Lagoon monitoring would rely primarily on an assessment of lagoon closure and maintenance records as a proxy for a change in sedimentation or lagoon performance relative to the historical condition. Direct observations in the form of semi-annual aerial photography and monthly ground photographs also would be obtained. As noted above, RBSP I had a broad spectrum of postconstruction monitoring for nearshore biological resources, as the processes and impacts associated with large-scale regional sand placement were relatively unknown in 2000. Monitoring from RBSP I did not identify significant long-term impacts to nearshore biological resources as a result of placement at the different receiver sites. This confirmed model-predicted results and no mitigation was required. It is anticipated that potential impacts would be similar with RBSP II for those receiver sites with the same sand volumes, placement locations, and similar sand transport modeling results as RBSP I. Monitoring for RBSP II would therefore focus on sites that would receive larger volumes of sand and have a higher potential for sedimentation of persistent sensitive marine habitats, specifically under Alternative 2. Focused monitoring would be conducted at South Carlsbad and Solana Beach.

ES-7 AFFECTED ENVIRONMENT

This EA/Draft EIR provides a description of the existing environmental conditions in the project areas. This document describes existing conditions for the following resource categories: geology and soils, coastal wetlands, water resources, biological resources, cultural resources, land and water use, aesthetics, socioeconomics, public health and safety, structures and utilities, traffic, air quality, noise, and climate change.

ES-8 ENVIRONMENTAL CONSEQUENCES

No long-term significant adverse impacts are expected to occur from implementation of the project. No burial of surfgrass is predicted under either project alternative, while there is a risk for partial sedimentation to affect a total of 0.1 acre and 0.9 of surfgrass by Alternative 1 or Alternative 2, respectively. No burial or sedimentation of kelp beds is predicted for either alternative. Burial of up to 2.5 acres of reef with sensitive indicators could occur under Alternative 2, while a risk for partial sedimentation of 1.1 acre or 3.0 acres of reef with sensitive indicators has been identified under Alternatives 1 and 2, respectively. Alternative 1 is nearly identical to RBSP I, where 4 years of monitoring confirmed this conclusion that no significant impacts would occur. For Alternative 2, model predictions have been evaluated and no significant long-term impacts were identified, but monitoring would occur to confirm no significant impacts occur in specific locations that would receive more sand compared to RBSP I and have greater risk for sedimentation. As noted in Section ES-5, monitoring would occur during construction to ensure avoidance of site-specific resources and to confirm permit conditions are satisfied. Monitoring would occur for 4 years subsequent to the action to verify no long-term significant impacts occur to sensitive marine biological resources (for specific receiver sites under Alternative 2 only). If significant long-term impacts do occur, then SANDAG would implement action to mitigate those impacts. Mitigation for any significant impacts to sensitive marine habitats would be restoration of habitat at a minimum 2:1 ratio unless the USACE receives and approves a functional assessment model and mitigation plan that restores the functions impacted. Mitigation would be restoration of like habitat as a first priority, then out-of-kind artificial reef restoration if like habitat restoration is found not to be feasible, unless a functional assessment is approved as noted above. Feasibility of surfgrass restoration must be determined by implementation of an experimental pilot program.

Table ES-6 summarizes the potential effects under each alternative.

ES-9 CUMULATIVE IMPACTS

State CEQA guidelines require a discussion of potential significant environmental impacts that would result when the incremental effects of a project are considerable when viewed in combination with the effects of "past, present, and probable future projects" or in relation to "a summary of projections contained in an adopted general plan or related planning document" (Cal. Code Regs., Title 14, § 15065(c) and § 15130(b)(1)(A)(B)). Federal guidelines implementing NEPA define a cumulative impact as one that would result from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions (40 C.F.R. § 1508.7). Cumulative impacts were analyzed in consideration with other reasonably foreseeable projects in the vicinity of RBSP II. Cumulative projects considered in the analysis include other ongoing or proposed beach nourishment projects adjacent to the receiver sites, capital improvement or development projects proposed adjacent to receiver sites, and proposed actions adjacent to the borrow sites. Overall, a conservative approach with respect to sand volumes added to the system and their potential for transport within the system was taken with the cumulative analysis because of the uncertainty inherent in modeling and predicting future wave climate and current conditions. The analysis concludes that no significant cumulative impacts would result with implementation of Alternative 1, Alternative 2, or the No Project/No Federal Action Alternative.

ES-10 OTHER CEQA/NEPA CONSIDERATIONS

This section of the EA/EIR addresses various other topics required by CEQA and NEPA.

Significant Unavoidable Adverse Effects

The EA/EIR evaluated the proposed alternatives with respect to numerous issues. None of the potential impacts associated with the proposed project, as defined to include the monitoring and mitigation plan described in subsection ES-5, would be considered significant.

Table ES-6
Summary of Environmental Changes

Alternative 1	Alternative 2	No Project/No Federal Action
GEOLOGY AND SOILS		
A minor increase in the sand thickness at the nearshore bar is expected for specific receiver sites, but these would be short term and less than significant. Based on past fill events, placement of sand onshore at each receiver site would not impact the littoral transport process.	Impacts under this alternative would be similar to those under Alternative 1. For receiver sites where more sand is proposed under this alternative than Alternative 1, further increases would occur to sand thickness in offshore sand bars. This impact would be short term and less than significant.	No significant impacts would occur under this alternative; however, receiver beaches would continue to erode.
COASTAL WETLANDS		
Potential impacts to coastal lagoons would be related to indirect sedimentation or turbidity; no direct impacts would occur. Incremental increases in shoaling would not result in increased maintenance frequencies. SANDAG has committed to provide funds to offset project-related sediment volumes predicted to potentially accumulate at individual lagoon mouths based on a methodology developed in cooperation with lagoon management entities. Impacts would be less than significant.	Impacts to coastal wetlands would be similar to those under Alternative 1. Incrementally more project-related sand may accumulate in lagoons adjacent to receiver sites with larger placement volumes than proposed under Alternative 1; however, incremental increases in shoaling would not result in increased maintenance frequencies. Impacts would be less than significant.	No potential impacts to coastal wetlands would occur under this alternative.
WATER RESOURCES		
Dredging operations would not cause toxicity, bioaccumulation of pollutants to levels that would be harmful to aquatic life or humans, or otherwise interfere with beneficial uses. Elevated turbidity, reduced water quality, and discoloration would occur due to dredging, though effects would be short term and less than significant. Dredging and sand placement operations would be short term, localized, and compliant with permit conditions, and would not result in significant impacts.	Impacts to water resources under this alternative would generally be the same as under Alternative 1. Longer dredging periods under Alternative 2 would result in longer periods of elevated turbidity, reduced water quality, and discoloration. However, the impacts would remain localized, short term, and less than significant.	No impacts to sediment or water quality would occur under this No Project Alternative.

Alternative 1	Alternative 2	No Project/No Federal Action
BIOLOGICAL RESOURCES		
No significant direct impacts would occur from sand placement as biological resources at those locations are adapted to seasonal burial and would quickly recolonize. A monitoring program has been designed during sand placement to ensure no significant impacts to grunion. No significant indirect impacts would occur due to turbidity or to shorebird foraging. Although modeling suggests a risk for increased sand thickness at some locations, sedimentation would be less than significant. No burial of either kelp or surfgrass is anticipated; partial sedimentation of 0.1 acre of surfgrass is predicted. No sedimentation of kelp beds are predicted to occur. Partial sedimentation of up to 1.1 acre of reef with sensitive indicators could occur. Dredging would impact up to 125 acres of surface area, which is less than 1% of the available shelf habitat. Biota in these locations would recover quickly and the impacts would be less than significant based on RBSP I monitoring results and model predictions. Dredging would create localized turbidity plumes but buffers have been provided between the dredge area and marine resources and the amount of turbidity reaching reefs/kelp would be expected to be within normal ranges. There would be no significant impacts.	As with Alternative 1, no significant direct impacts would occur from sand placement or indirect impacts due to turbidity or shorebird foraging. A monitoring program has been designed during sand placement to ensure no significant impacts to grunion. Sediment transport patterns suggest areas of higher sedimentation risk (based on duration and depth) at locations near South Carlsbad North, South Carlsbad South, Solana Beach, and Imperial Beach, which would also receive more sand than RBSP I or Alternative 1. No burial of either kelp or surfgrass is anticipated; a risk for partial sedimentation of 0.9 acre of surfgrass is identified. No sedimentation of kelp beds are predicted to occur. Partial sedimentation of up to 3.0 acres of reef with sensitive indicators could occur, while there is a risk for burial of up to 2.5 acres. This partial sedimentation would not result in long-term significant indirect impacts based on RBSP I monitoring results and model predictions. No direct impacts would occur from dredging at the same borrow sites as proposed under Alternative 1.	No impacts to biological resources would occur under this alternative.
CULTURAL RESOURCES		
No impacts to National Register of Historic Places or California Register of Historical Resources-eligible cultural resources would occur at any of the receiver sites. To avoid potentially significant impacts to cultural resources at the borrow sites, a monitoring program would be implemented. If	The impacts to the receiver and borrow sites would be similar to those under Alternative 1; impacts to cultural resources would not be significant.	No dredging would occur under this alternative; therefore, no impacts to cultural resources would occur.

Alternative 1	Alternative 2	No Project/No Federal Action
resources are identified, the dredge would be relocated to stop materials removal at that site and avoid further impacts. No further measures would be necessary.		
LAND AND WATER USE		
During replenishment there would be temporary beach closures on portions of the receiver sites, but adjacent beach areas would remain open to public use and after completion the total beach area would be increased. No significant, long-term impacts would occur to surfing or other recreational activities, e.g., recreational fishing.	Impacts under this alternative would be similar to those under Alternative 1 with longer closures at specific sites. Impacts would remain short term and less than significant.	No land and water use or recreation impacts would occur under this alternative.
AESTHETICS		
Impacts to aesthetics would be short-term views of construction due to beach replenishment activities, resulting in long-term beach enhancement. Impacts would be less than significant and would result in long-term beach enhancement.	Increased duration of borrow activity, longer construction duration at three receiver sites, plus the addition of one more receiver site would result in a larger footprint under this alternative; however, impacts would remain short-term and less than significant and would result in long-term beach enhancement.	Under this alternative construction activities related to beach replenishment would not impact visual resources, and beach enhancement would not occur.
SOCIOECONOMICS		
No long-term significant impacts would occur to commercial fishery as a result of area preclusion, adverse effects to nursery habitat, or gear loss/limited access. In terms of the regional fishery, no significant impact would occur to the overall San Diego region fishery. The individual fishing operation level may feel temporary impacts to target species as a result of displacement from favored fishing locations; however, these impacts cannot be accurately quantified with the currently available data. Nursery habitat would not experience significant impacts. The potential for	Impacts resulting from Alternative 2 would be similar to those identified for Alternative 1, but somewhat larger in area and different in specific locations. Under worst-case assumptions, partial sedimentation of small areas that support giant kelp is predicted. Impacts would be less than significant.	Under this alternative there would be no change to current fisheries fluctuations, and no benefits of enhanced beaches for recreation, property protection, or tourism.

Alternative 1	Alternative 2	No Project/No Federal Action
impacts resulting from gear loss would be minimized by the designation of a 300-foot buffer around the discharge pipe connection buoys during dredging operations. Global positioning system equipment would track dredging activities. Coordination with commercial fisherman in advance of dredging operations for the borrow sites and transit areas would be conducted. Dive operations in the "Wreck Alley" area off of Mission Beach may experience short-term adverse impacts, and temporary impacts may occur to sport fishing and diving resulting from localized turbidity plumes at borrow and receiver sites. Impacts to recreational fishing and diving would be less than significant.		
PUBLIC HEALTH AND SAFETY		
Construction zones would be closed to public access to prevent unsafe conditions; all necessary safety measures would be performed. If necessary, lifeguard towers would be temporarily relocated during construction, but this would not impair the ability of lifeguards to ensure public safety at the receiver beaches. Although not anticipated, hazardous or dangerous materials may be found in the dredge materials; in this event, dredging and disposal activities would stop and evaluations would determine the next course of action. Impacts would be less than significant.	Public health and safety impacts would be similar to those described for Alternative 1; impacts would be less than significant.	Under this alternative no dredging or beach replenishment activities would occur, and erosion of the bluffs at several receiver sites would continue, deteriorating public health and safety.
STRUCTURES AND UTILITIES		
At all receiver sites, sand placed around storm drain outlets would be designed to allow proper drainage. The bottom of public stairs and public access ramps may be covered by sand, which would stabilize them. Sand at the base of lifeguard towers would provide additional protection against storm surge	Impacts under this alternative would be similar to those under Alternative 2. Impacts would be less than significant.	No impacts or beneficial effects would occur under the No Project Alternative.

Alternative 1	Alternative 2	No Project/No Federal Action
damage and would temporarily benefit the lifeguard towers. Overall, impacts would be less than significant.		
TRAFFIC		
Beach replenishment activities would not significantly affect traffic or parking, as this alternative would generate very few trips, and require few parking spaces. After completion of sand replenishment, traffic could potentially increase, as receiver site locations would become more attractive. The long-term impact of the proposed beach sand replenishment on traffic and parking would not be significant.	Alternative 2 impacts would be similar to impacts under Alternative 1; impacts would be less than significant.	No impacts to traffic would occur as no sand replenishment would occur under this alternative.
AIR QUALITY		
Estimated project emissions would demonstrate General Conformity and conformance with the State Implementation Plan. The potential for dust generation would be very low due to the moisture of the sand. Emissions would not expose sensitive receptors to pollutant concentrations. Air quality impacts would be less than significant.	Impacts under this alternative would be similar to those under Alternative 1; therefore, air quality impacts would be less than significant.	As no construction would occur, no impacts to air quality would result under this alternative.
NOISE		
While dredging activity and placement of the conveyor pipe and sand distribution at the receiver sites would generate noise, the impact would be less than significant. Nighttime and weekend work would be performed under variance from the local noise ordinance where required. Residents of homes near the receiver sites would be notified prior to work, and nighttime noise events would occur for no more than 3 consecutive days.	The noise impacts under this alternative would be similar to those under Alternative 1. The addition of one receiver site and increased volumes at several other receiver sites under this alternative are not anticipated to increase noise levels from those levels under Alternative 1, and impacts would remain less than significant.	No change to current noise levels would occur under this alternative.

Alternative 1	Alternative 2	No Project/No Federal Action
CLIMATE CHANGE		
Construction emissions would be finite and subside upon completion of the project. There are no operational emissions associated with the project. Total emissions would remain under the guidance level provided by the Council on Environmental Quality (CEQ) and the South Coast Air Quality Management District (SCAQMD) and no further analysis would be required. The project's greenhouse gas (GHG) emissions would not have a significant impact.	The increased construction period under this alternative would result in greater GHG emissions under this alternative than Alternative 1; however, total emissions would still be well under the guidance level provided by the CEQ and the SCAQMD and no further analysis would be required.	There would be no GHG emissions under this alternative.

Short-term Uses and Long-term Productivity

Implementation of the proposed action would not result in any environmental impacts that would significantly narrow the range of beneficial uses of the environment or pose long-term risks to the health, safety, or general welfare of the public communities surrounding the receiver sites. Rather, the project would provide for future beneficial beach resources (e.g., recreational activities, sandy shoreline habitat).

Irreversible/Irretrievable Commitments of Resources

The proposed action would result in the consumptive uses of nonrenewable energy sources and labor required to operate dredges, trucks, pumping equipment, and grading equipment. The proposed action would not result in the use of a substantial amount of resources and would be short term in nature. Additionally, no natural resources would be permanently destroyed and beach replenishment would be considered beneficial to the region.

Growth Inducement

The proposed action would result in a temporary increase in beach area and sand cover at up to 11 receiver sites. A benefit of the project would be enhancement or continuation of the recreational use of each of the receiver sites. 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.

Effects Found Not to Be Significant

Several issues were determined to not be significant for RBSP I and were therefore not analyzed in the EIR/EA for that project. Because RBSP II is proposed as a similar project and conditions for those issues have not changed in ways that would affect the project, the same issues would not be significant and are not addressed in this EA/EIR. These issues include hazards and hazardous materials, mineral resources, public services, agricultural resources, and population and housing. The remainder of the issue areas identified under CEQA are evaluated in detail in this document in Chapter 4.0. This analysis determined that the proposed RBSP II project, as defined to include the monitoring and mitigation program in subsection ES-5, would not have a long-term significant effect on any of the evaluated issue areas.

<u>Protection of Children from Environmental Health Risks and Safety Risks</u>

There would be no disproportionate impacts to children during implementation of the proposed sand replenishment project. No significant impacts would occur and there is no indication that any impacts would disproportionately accrue to children. Areas of replenishment would be restricted during project implementation for safety reasons and no long-term effects would occur after the beach areas were reopened for public use.

<u>Environmental Justice</u>

The proposed sand replenishment project would not have a disproportionate impact on minority populations or low-income populations because the areas encompassed by the replenishment sites do not include disproportionately high minority populations or low-income populations compared to the contiguous cities or the county.

<u>Essential Fish Habitat</u>

No long-term or significant effects to quality or quantity of Essential Fish Habitat (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 receiver and borrow sites, and Habitat Areas of Particular Concern (e.g., estuaries, canopy kelp, sea grass, rocky reefs), are anticipated and would constitute temporary adverse impacts (e.g., temporary turbidity plume due to dredging or loss of prey items at borrow or receiver sites due to dredging or 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.

ES-10 CORPS DECISION DOCUMENT REQUIREMENTS

SANDAG and USACE, as the two lead agencies under CEQA and NEPA, have agreed to prepare a joint EA/EIR. Specific requirements associated with the Corps Decision Document are detailed in Chapter 7 of this EA/EIR. This chapter includes analysis, or references analysis in Chapter 4, Environmental Consequences, to support the NEPA process for USACE. No significant adverse impacts have been identified.

ES-11 AGENCY COORDINATION

Federal, state, and local agencies were consulted prior to and during the preparation of this EA/EIR. Coordination with agencies has been ongoing through public SANDAG Shoreline Preservation Working Group meetings; focused natural resource agency meetings; scheduled public meetings; and publication of a Notice of Preparation announcing preparation of a Draft EIR/EA, as required by CEQA. The agencies' viewpoints were solicited with regard to activities within their jurisdiction. In addition, close coordination has occurred among SANDAG, USACE, local jurisdictions, and regulatory agencies since inception of this project. The alternatives analyzed in this document are the result of an iterative process to present information to agencies, obtain their input, incorporate modifications into project design, and present the revised plan.

ES-12 CORPS OF ENGINEERS/EPA DREDGED MATERIAL/BEACH NOURISHMENT SUITABILITY DETERMINATION

In fall 2005, sediment samples were collected and analyzed for the proposed receiver sites. Samples were analyzed by or under the direction of Calscience Environmental Laboratories in accordance with the approved Sampling and Analysis Plan (SAP) and compared to the National Oceanic and Atmospheric Administration Screening Quick Reference Table (SQUIRT) Guidelines. Based on the SAP results, the physical and chemical properties of the borrow site materials are acceptable, and the materials are appropriate for beach nourishment.

CHAPTER 1.0
INTRODUCTION

1.1 BACKGROUND

This Environmental Assessment/Environmental Impact Report (EA/EIR) addresses the potential environmental impacts associated with the San Diego Regional Beach Sand Project (RBSP) II proposed by the San Diego Association of Governments (SANDAG). The proposed project would be similar to RBSP I, a pilot project implemented by SANDAG in 2001, which provided sand replenishment at 12 San Diego region beaches. At that time, approximately 2 million cubic yards (mcy) of clean beach-quality sand was dredged from six offshore borrow sites and placed on receiver sites located from Oceanside to Imperial Beach. Similarly, the proposed RBSP II would dredge sand from three offshore sites (possible quantity ranging between 1.8 and 2.7 mcy) to provide sand for up to 11 receiver sites (depending on the alternative) from Oceanside to Imperial Beach. This document evaluates two build alternatives, as well as a No Project Alternative, representing a reasonable range of sand replenishment opportunities for the region. As noted in the Preface, subsequent to completion of the evaluation of Alternatives 1 and 2 for the Draft EIR/EA, a Preferred Alternative was identified and defined as Alternative 2-R. This Preferred Alternative is summarized in the Preface of this EA/Final EIR, and potential impacts are discussed by issue area in that preface. The analysis of Alternatives 1 and 2 remains in Chapters 3 and 4 of the EA/Final EIR, with minor clarifications based on public input and agency coordination that occurred after release of the Draft EIR/EA.

Generally, the proposed borrow sites would be located concurrent or adjacent to those utilized for RBSP I. RBSP II would replenish 10 of the 12 receiver beaches constructed in RBSP I, with one potential additional site, and design variations to provide additional recreational and economic benefits. RBSP II includes one additional receiver site at South Carlsbad South, which was originally evaluated as an alternative in RSBP I but was not constructed. RBSP II does not propose replenishment at the previous Del Mar or Mission Beach receiver sites. Figure 1-1 identifies the proposed RBSP II receiver and borrow sites.

SANDAG is the state lead agency responsible for compliance with the California Environmental Quality Act of 1970 (CEQA) statutes (Cal. Pub. Res. Code § 21 et seq., as amended) and implementing guidelines (Cal. Code Regs., Title 14, § 15000 et seq. (1998). The U.S. Army Corps of Engineers (USACE) is the federal lead agency responsible for compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] § 4332 [1994]) in accordance with the Council on Environmental Quality (CEQ) regulations

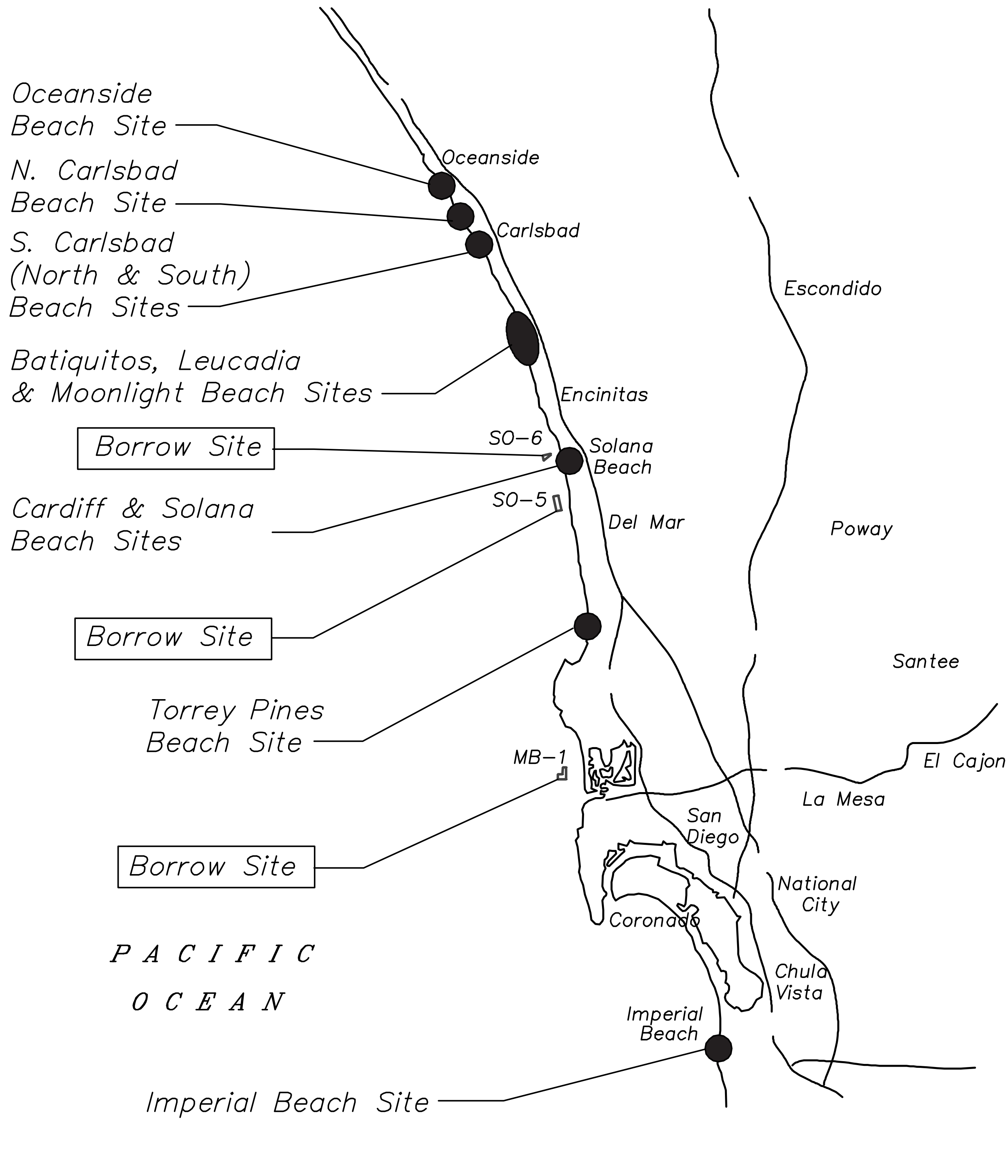


Figure 1-1
Proposed RBSP II Borrow and Receiver Sites

P:\2008\08080112 RBSP II EIR\5.0 Graphics (Non-CAD)\5.4 Proj_Graphics\Fig 1-1rmap.ai (dbrady) 8/19/10 implementing NEPA (40 Code of Federal Regulations [C.F.R.] §§ 1500–1508). The two agencies have agreed to prepare a joint EA/EIR pursuant to both CEQA and NEPA, with SANDAG representing the participating cities. Specific requirements associated with the USACE NEPA Decision Document are detailed in Chapter 7 of this EA/EIR. This chapter includes analysis, or references analysis in Chapter 4, Environmental Consequences, to support the NEPA process for the USACE.

1.1.1 Project Background

The San Diego region's beaches and seacliffs have been steadily eroding for several decades. The region is experiencing a net loss of sand at numerous beaches along its coastline. Insufficient sediment or sand volumes exist along the San Diego County shoreline, leading to coastal erosion, narrowing of beaches, damage to infrastructure, habitat degradation, threats to public safety, and reduced recreational and economic benefits. In 1993, SANDAG prepared the *Shoreline Preservation Strategy for the San Diego Region* (SPS), which identified regional coastal areas with critical shoreline problems and recommended a strategy to address the issue. The SPS acknowledged a deficit condition in the region and recommended large-scale beach nourishment. As noted in the SPS, "a beach building and maintenance program is recommended as the primary shoreline management tactic for each of the problem areas. These problem areas, from south to north, are the shoreline segments for:

- Silver Strand State Beach in the southern part of Coronado, all of Imperial Beach, and extending about 2½ miles south into Mexico; and
- the entire shoreline from Oceanside Harbor south to and including La Jolla Shores beach in San Diego.

Beach building and maintenance programs emphasize the nourishment of narrow beaches with sand to make them wide enough to provide increased property protection and recreational capacity, and the periodic resupply of sand to these beaches to maintain them."

In March 2009, SANDAG finalized the *Coastal Regional Sediment Management Plan for the San Diego Region* (RSM Plan). The RSM Plan uses the information established in the SPS as a baseline to guide the level of comprehensive nourishment needed for the San Diego region over the next 50 years. This RSM Plan was developed to further inform the public and decision-makers of sand deficits and related issues within the region. The RSM Plan proposes solutions for existing sediment management problems along the coast including beach nourishment with offshore and upland sources and using sediment management devices, if proven effective. The

2010 *California Beach Erosion Assessment Survey* published by the Coastal Sediment Management Workgroup (CSMW) provides an initial listing of Beach Erosion Concern Areas (BECAs) throughout California to inform decisions-makers on the beach erosion problems in the state. The BECAs were identified based on the California RSM plan and each of the receiver sites are within a BECA. The CSMW survey supports the idea of placing sand to augment eroding beaches at locations determined appropriate in order to solve coastal erosion problems along the California coast.

The *Coast of California Storm and Tidal Waves Study* (CCSTWS), a 6-year scientific evaluation of the San Diego region's shoreline conducted by the USACE documented the factors causing shoreline erosion and also projected trends of increasing beach loss and property damage into the future (USACE 1991).

Littoral sand moves in both the cross-shore and longshore directions. The natural cross-shore sand cycle is a seasonal process. Sand moves on- and offshore along the beach profile, which extends from the above-water (exposed) shoreline area to the offshore depth at which seasonal sand movement is detected. The water depth at the outer limit of seasonal sand movement is referred to as the depth of closure, which varies depending on site-specific conditions. Typically, for the San Diego region, greater sand movement from the exposed beach to the offshore portion of the profile occurs in the winter due to large storms and waves, followed by a period of sand gain to the exposed beach 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, including both winter and summer sand shifts, comprise a complete cross-shore sedimentation cycle. Figure 1-2 illustrates the seasonal cycle (before and after summer) that can be seen at one location in Solana Beach. This is similar to other San Diego beaches.

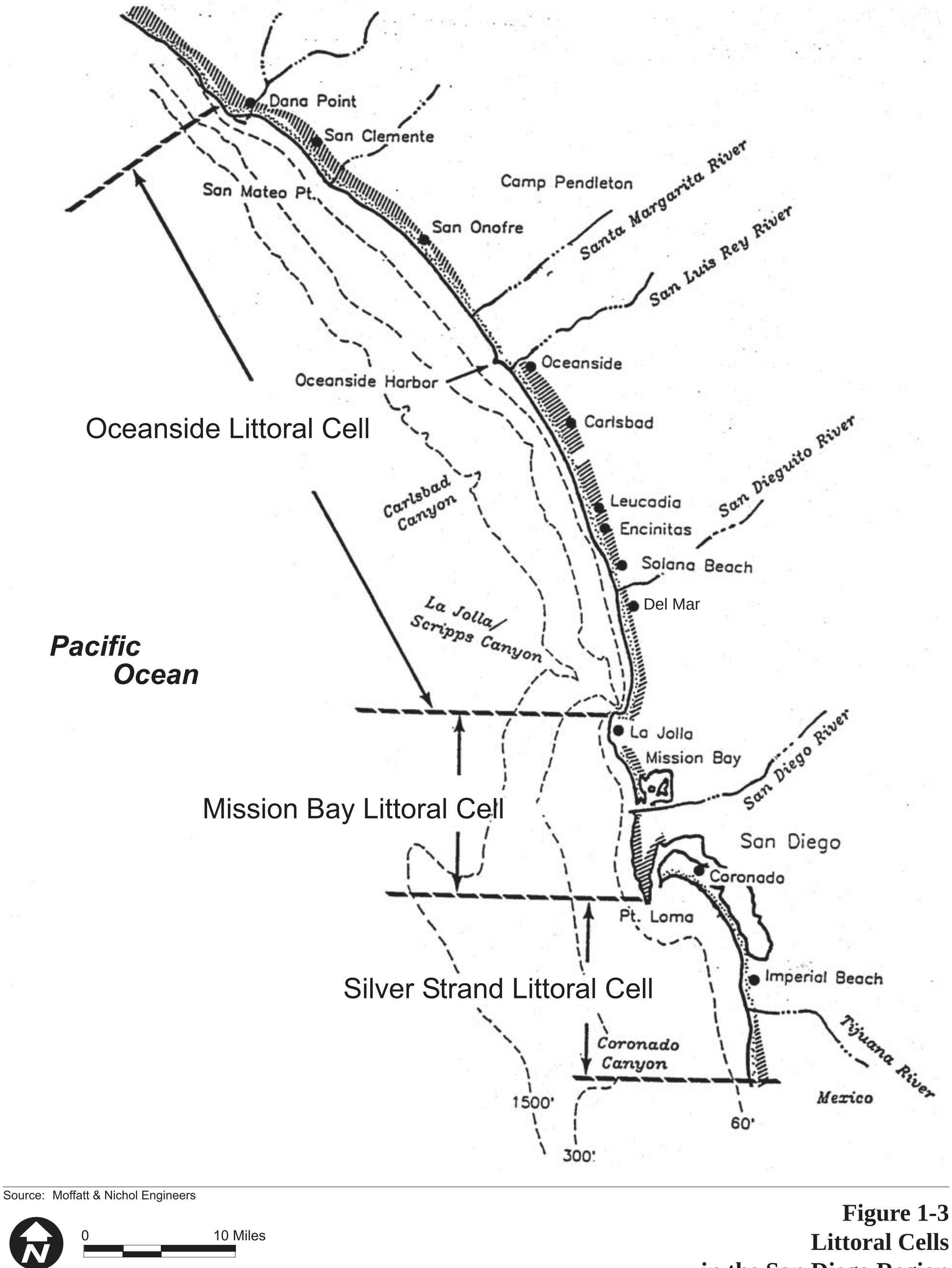
Longshore sand transport occurs continually and also varies seasonally. A littoral cell is a coastal reach bounded by physiographic features (e.g., submarine canyons, coastal headlands, harbors, etc.) where sediment enters, moves along, and leaves the coast. It is the dynamic interface between the ocean and the land. Along the San Diego region's coast, there are three littoral cells (Figure 1-3). Bounded on one side by the landward limit of the beach and extending seaward beyond the area of breaking waves, a littoral cell is the region where wave energy dissipates. Littoral cells are physically interconnected; occurrences in one part of a littoral cell may ultimately have an impact on other parts. The three littoral zones off of the San Diego region include the southern half of the Oceanside Littoral Cell, the Mission Bay Littoral Cell, and the Silver Strand Littoral Cell. The southern half of the Oceanside Littoral Cell stretches from Oceanside to La Jolla[1] and includes the

[1] The northern half of the Oceanside Littoral Cell extends from Oceanside to Dana Point in Orange County.

Photograph A: Looking north at Solana Beach receiver site – September 2009

Photograph B: Looking north at Solana Beach receiver site – June 2010

Figure 1-2
Typical Sand Cycles on San Diego Beaches



Source: Moffatt & Nichol Engineers

Figure 1-3
Littoral Cells
in the San Diego Region

shorelines of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, and San Diego. The Mission Bay Littoral Cell includes Pacific, Mission, and Ocean beaches in the city of San Diego. The Silver Strand Littoral Cell extends from south of the international border to the Zuniga Jetty at San Diego Bay and includes the shorelines of the cities of Imperial Beach and Coronado.

Within the littoral cell, sand can move up and down the coast (alongshore) as well as onshore and offshore (cross-shore). Sand can also be carried by littoral drifting into submarine canyons. For example, it has been estimated that Scripps Submarine Canyon near La Jolla captures an average of 70,000 cubic yards (cy) of sand annually from littoral drift (Moffatt & Nichol 2000). Sand capture rates at Scripps Canyon vary and were higher in the 1950s at 200,000 cy per year (Chamberlain 1960) and lower in the 1980s at 29,000 cy per year (Everts and Dill 1988). Sand that drifts into submerged canyons essentially exits the littoral cell and is no longer available to replenish beaches during the summer.

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, except during severe coastal storm wave events. Insufficient shoreward energy exists to move sand from outside the depth of closure back into the littoral cell. In San Diego, the depth of closure ranges from approximately -13 to -32 feet mean sea level (msl) (Coastal Frontiers 2010). The proposed dredging activities would take sand from borrow sites[2] outside (deeper than) the depth of closure and place sand within the most eroded two of the three regional littoral cells. The majority of new sand being introduced to the system is expected to remain within the respective littoral cells and enter the seasonal cycle of beach loss and gain. Even if some of the dredged material were to be carried by waves past the depth of closure from a storm event, there would still be a net gain of material. Sand carried outside of the depth of closure essentially exits the littoral cell and is no longer available to naturally replenish beaches during the summer. Conversely, dredging inside (shallower than) the depth of closure would merely relocate sand material already within the littoral cell and not constitute a net addition (examples include maintenance dredging of coastal lagoon mouths).

Beach sand is a product of weathering of the land. The primary natural sources for the region's beaches are sediment carried from upcoast, and from inland areas by rivers and streams and, to a lesser extent, coastal bluff erosion. Over the past half century, human actions have been the major influence affecting the shoreline. Through urban development activities, including harbor construction, water storage reservoir and dam building, flood control systems, and sand mining,

[2] The term "borrow" refers to material to be taken from one location to be used as fill at another location.

natural sediment transport has been hindered or eliminated. For example, Oceanside Harbor acts as a major barrier/sink to longshore sand transport to the Southern Oceanside Littoral Cell from upcoast. Also, most major coastal streams have at least one dam and reservoir. Much of the freshwater that naturally flowed to coastal wetlands is diverted to farms and cities. These dams reduce the size of flood flows and thus reduce the sediment yield from the watershed. They also trap sand that would otherwise nourish coastal beaches. This sand would ultimately become beach sand, which is the primary buffer protecting seacliffs and coastal development from erosion and storm damage. To help offset the loss of natural sand sources no longer reaching the San Diego region shoreline, previous projects have supplemented the natural process of beach building by periodically replenishing beach sand from offshore or upland sources. Aside from the previous RBSP I project, most of the sand used for this purpose in the San Diego region has come from the massive harbor construction projects in San Diego Bay and Oceanside Harbor. Smaller nourishment is associated with routine maintenance of harbors and lagoons and associated inlets, most notably:

- Maintenance dredging and nourishment at Los Peñasquitos Lagoon,
- Maintenance dredging and nourishment at San Elijo Lagoon,
- Restoration of San Dieguito Lagoon and maintenance of the inlet with beach nourishment,
- Solana Beach opportunistic beach fill program (SCOUP),
- Carlsbad opportunistic beach fill program (SCOUP),
- Encinitas opportunistic beach fill program (SCOUP),
- Oceanside Harbor navigational maintenance dredging,
- Agua Hedionda Lagoon dredging to maintain conditions for a power plant operation, and
- Batiquitos Lagoon maintenance dredging and nourishment.

Recently, some local jurisdictions have adopted the Sand Compatibility Opportunistic Use Program (SCOUP) concept to capture smaller-scale sand sources that otherwise would be landfilled or disposed of (Moffatt & Nichol 2006). On a city-by-city basis, permits associated with SCOUP may allow several thousand cubic yards of sand that would otherwise remain land locked to be placed on beach receiver sites. These projects are specifically discussed in Chapter 5 of this EA/Final EIR in the context of potential cumulative impacts. Quantities associated with harbor construction and dredging efforts remain low relative to the regional loss and are the opportunistic by-product of development. While the likelihood is low that sources of sand as large as these dredging projects will be available in the future, sand replenishment projects represent one option that can help offset the gradual narrowing and disappearance of the region's beaches; loss of associated environmental, recreational, economic, and aesthetic benefits; and the increasing storm damage to coastal property and infrastructure. Although sand replenishment provides a buffer for infrastructure and supplements the sand supply already in the littoral system, the sand is mobile and will move on- and offshore as well as laterally along the shore as described below. Erosion of the coastline is not halted, but the sand can provide a buffer while on the beach in specific locations. The need for nourishment as one way to help buffer the effects of coastal erosion may become even more critical in the future with potential sea level rise.

In 2001, SANDAG implemented RBSP I, which nourished 12 receiver sites with approximately 2 mcy of sand. This project provided enhanced beach areas and served as an opportunity to study the effects of large-scale nourishment within the region. Sand placed on receiving beaches as part of RBSP I was anticipated to provide discernible benefits for approximately 5 years. The 5-year period also was judged to be the outer limit of credible modeling predictions of sand dispersion. Postconstruction monitoring indicated that the placement and subsequent dispersal of the beach nourishment material produced beach width and sand volume gains, some of which persisted more than eight years (Coastal Frontiers 2010). While the results varied by region, on average, beach width gains in the region persisted for a period of 4 years and shorezone volume gains were sustained for approximately 6 years. As of 2009, there still appeared to be RBSP I sand residing in the system. This material may serve as a foundation for the planned RBSP II.

Despite the success of RBSP I, the region is still experiencing a sediment deficit relative to historical conditions (Patsch and Griggs 2006). The SPS identified an initial regional beach building program need of up to 30 mcy. The placement of 2 mcy during RBSP I slightly reduced that need, but did not eliminate the deficiency. While some new sand placed as part of RBSP I and various small-scale opportunistic nourishment projects may remain in the littoral system, additional replenishment is required to decrease the sand budget deficit identified in the SPS and ongoing sand loss documented by monitoring (Coastal Frontiers 2010). The proposed RBSP II project would serve as a second large-scale regional beach sand replenishment project to actively address these issues.

In October 2008, SANDAG began preliminary planning activities associated with RBSP II. To initiate RBSP II, a preliminary engineering study was performed to help define an overall project description, identify potential receiver and borrow sites, and develop viable project alternatives to carry forward in the environmental analysis, permitting, and final engineering. Development of this study was a collaborative effort, involving input from several consultants as well as a larger group of stakeholders that participate in SANDAG's Shoreline Preservation Working Group (Working Group). The Working Group is composed of stakeholders from each coastal jurisdiction, resource agencies, and related community organizations.

Since October 2008, the Working Group has met several times to discuss project progress, funding, and other concerns related to RBSP II. Through this collaborative process, borrow and receiver sites have been identified and refined based on sand grain size as well as accessibility.

1.1.2 Previous Environmental Documentation Related to this Project

SANDAG's San Diego Regional SPS describes the region's beach erosion trends, as well as policies and strategies for restoring and maintaining the beaches. Independent of that report, the Navy analyzed a separate action in *Final Environmental Impact Statement for the Development of Facilities in San Diego/Coronado to Support the Homeporting of One NIMITZ Class Aircraft Carrier* (EIS; U.S. Navy 1995). To accommodate the carrier, the Navy proposed to dredge the carrier berthing area, turning basin, and the San Diego Bay navigation channel. A portion of the dredged sediment was initially believed suitable for beach replenishment. As one option to dispose of the dredged material from the Homeporting project, the Navy evaluated nine beach receiver sites in the San Diego region in this EIS. The Navy subsequently prepared two EAs as tiered analyses to the EIS due to subsequent changes in the location of beach receiver sites; *Environmental Assessment for Beach Replenishment at South Oceanside and Cardiff/Solana Beach, California* (U.S. Navy 1997a) and *Environmental Assessment for Beach Replenishment at North Carlsbad, South Carlsbad, Encinitas, and Torrey Pines* (U.S. Navy 1997b). As a result of the Homeporting project and subsequent EAs, permits were issued to the Navy to place approximately 5.5 mcy of sand dredged from San Diego Bay, both onshore and nearshore, at 11 receiver sites along the San Diego region coastline. During beach replenishment in Oceanside, however, munitions were found in the dredged materials from San Diego Bay and replenishment efforts were halted. Prior to the halting of the beach replenishment disposal, approximately 284,000 cy of sediment were placed on three receiver sites; specifically, Oceanside, Del Mar, and Mission Beach. Oceanside received 102,000 cy (onshore), Del Mar received 170,000 cy (nearshore), and Mission Beach received 12,000 cy (nearshore).

In 1999, SANDAG, in cooperation with the Navy, prepared *Final EIR/EA for the San Diego Regional Beach Sand Project* (SCH No. 1999041104) (SANDAG 1999). RBSP I was designed to place approximately 2 mcy over generally the same receiver sites as the Navy's permitted project. However, the sand source was changed from dredged material in San Diego Bay to dredged material from six offshore borrow sites, and additional receiver site locations were added. Existing data from the Navy's prior analyses were used, where applicable. The monitoring program established by the Navy project permits was used as a framework for designing the monitoring program for RBSP I. RBSP I was successfully constructed between March and September of 2001. Monitoring occurred before, during, and after construction.

Postconstruction monitoring involved measuring the elevation of the beach and seabed at key transects (profiles) as well as nearshore at key reef locations.

The proposed RBSP II project is designed to provide a second regional beach sand replenishment project in the San Diego region. The receiver sites are generally in the same locations as those included in RBSP I, with some variations due to economic, recreational, and public property and infrastructure protection needs. A second site in South Carlsbad has been identified; however, the Del Mar site and the Mission Beach site would not be included as part of the proposed project. To the extent possible, this EA/EIR relies on the analysis included in the EIR/EA for RBSP I. A comparison of RBSP I and RBSP II sand volumes and receiver site locations is provided in Table 1-1.

Table 1-1
Comparison of Sand Replenishment Volumes
2001 RBSP I and Proposed RBSP II

Receiver Site	RBSP I[1] (cubic yards)	RBSP II (cubic yards)		Receiver Site Boundaries[2] Relative to RBSP I
		Alternative 1	Alternative 2	
Oceanside	421,000	420,000	No Change	Shifted approximately 1,800 feet north toward pier from RBSP I
North Carlsbad	225,000	225,000	No Change	Identical to RBSP I
South Carlsbad North[3]	158,000	158,000	220,000	Identical to RBSP I, or extended north 1,000 feet
South Carlsbad South	N/A	0	142,000	Directly south of Encinas Creek
Batiquitos	118,000	118,000	No Change	Identical to RBSP I
Leucadia	132,000	117,000	No Change	Identical to RBSP I
Moonlight Beach	105,000	105,000	No Change	Identical to RBSP I
Cardiff	101,000	101,000	No Change	Identical to RBSP I
Solana Beach	146,000	146,000	360,000	Identical to RBSP I or extended 1,000 feet north and 1,800 feet south
Del Mar	183,000	N/A	N/A	N/A
Torrey Pines	245,000	245,000	No Change	Identical to RBSP I
Mission Beach	151,000	N/A	N/A	N/A
Imperial Beach	120,000	120,000	650,000	Shifted 1,300 feet closer to pier or extended 1,750 feet north and 1,700 feet south
Total	**2,105,000**	**1,755,000**	**2,703,000**	

[1] RBSP I volumes reflect the as-built project (Noble 2001).
[2] The minimum quantity alternative may be identical to RBSP I, while the maximum quantity alternative may extend farther up or down the beach.
[3] An additional Carlsbad site has been added to RBSP II. The South Carlsbad site used in RBSP I is now referred to as South Carlsbad North, while the South Carlsbad South site is a newly proposed replenishment site.

1.2 PURPOSE AND NEED

The purpose of the proposed beach replenishment project is to replenish beaches in accordance with the SPS and RSM Plan. These documents identified regional coastal areas with critical shoreline problems and the need for large regional replenishment projects to place up to 30 mcy of sand to address these problems. Although a number of small and/or localized replenishment projects are currently being implemented or planned in the region, these efforts would not substantially reduce the 30 mcy deficit identified in the SPS and supported in the RSM Plan. The Working Group has used the SPS and RSM Plan, in conjunction with monitoring results from RBSP I, as a basis for developing the proposed RBSP II. The project identifies up to 11 receiver sites that have continued to experience erosion and exhibit a need for large-scale replenishment.

Each of the receiver sites is identified as an initial Beach Erosion Concern Area (BECA) in the RSM Plan. Placement at the proposed 11 receiver sites would provide additional sand placement within two of the three littoral cells within the region.

The proposed action would serve 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. USACE has determined the overall project purpose is to provide beach nourishment to identified beaches within the San Diego region. USACE has determined the basic purpose of the proposed project is beach nourishment, which is considered water dependent.

1.3 PROPOSED PROJECT/PROPOSED ACTION

The proposed project would provide beach replenishment at San Diego region beaches. Between 1.8 and 2.7 mcy of dredged sediment from three offshore borrow sites located outside of the depth of closure (i.e., outside of the respective littoral cells) would be placed on up to 11 receiver beaches. This document evaluates, at an equal level of detail, two possible alternatives for replenishment, identified as Alternatives 1 and 2. Alternative 2 represents the maximum volume of sand that could be placed on each receiver site. Depending on additional permit constraints or funding limitations, actual volumes could be less than proposed. A complete description of each alternative is found in Section 2.4. Since release of the Draft EIR/EA, a final proposed project has been identified. The proposed project, identified as Preferred Alternative 2-R, includes some components of both Alternative 1 and Alternative 2, as detailed in the Preface to this document. The proposed project is anticipated to be constructed in spring and summer of 2012.

Implementation of the project would occur on some or all of the following 11 receiver beaches in the San Diego region:

- Oceanside
- North Carlsbad
- South Carlsbad North
- South Carlsbad South
- Batiquitos
- Leucadia
- Moonlight Beach
- Cardiff
- Solana Beach
- Torrey Pines
- Imperial Beach

Most of the 11 possible receiver sites are within suburban areas of the San Diego region and are bordered by residential, commercial, or light industrial uses. The proposed receiver sites are located in the cities of Oceanside (1 site), Carlsbad (3 sites), Encinitas (4 sites), Solana Beach (1 site), San Diego (1 site) and Imperial Beach (1 site). All or portions of the beaches in Carlsbad, Encinitas, and San Diego are State Beaches managed by the California Department of Parks and Recreation. The locations of all the potential receiver sites (north to south) are identified briefly below. The locations reflect the receiver site footprint with the maximum length under each of the two alternatives. Refer to Section 2.4 for a detailed description of receiver sites under each alternative. As illustrated in Figure 1-2, seasonal variation in sand conditions at individual beaches in San Diego can be dramatic. Site surveys were conducted in September of 2009 and June of 2010 to capture the most recent seasonal conditions. Any substantial differences in beach characteristics between those two surveys are noted below. Refer to Section 3.7 for a detailed aesthetic description and photos of receiver sites.

The Oceanside receiver site, under the maximum length alternative, extends from Wisconsin Avenue south to Morse Street. The fill would extend up to 4,100 linear feet (LF) and include up to 420,000 cy of sand. The proposed site is similar to RBSP I but has been shifted 1,800 feet north. The proposed receiver site consists of a predominately flat, sandy beach with cobbles that extends approximately 60 to 80 feet from the high tide line to The Strand. (The Strand is a narrow public road between the beach and abutting residence.) South of Wisconsin Avenue, the receiver site narrows into an eroded beach with riprap (large boulders) slopes from the back of existing residences to the approximate high tide mark. The receiver site gently slopes from the high tide mark into the surf zone. Since the September 2009 site visit, it appears some sand loss along the site has occurred and more rocks (riprap) are visible throughout the site. South of Oceanside Boulevard, there is a sandy pocket beach approximately 150 feet wide and 125 feet from the road to the line of riprap. This pocket beach protects homes north and south of Buccaneer Beach to just north of Kelly Street.

The North Carlsbad receiver site is located south of Buena Vista Lagoon and extends for up to 3,100 LF to Oak Street. Up to 225,000 cy of sand would be placed at this site. The proposed site is similar to RBSP I. This beach segment consists of a predominantly flat sandy beach, extending approximately 50 feet from the surf line to riprap slopes and seawalls that protect existing beach front residences and fragile bluffs. Similar to the Oceanside receiver site, less sand was present in June 2010 as compared to September 2009.

The South Carlsbad receiver sites, both North and South, are adjacent to the Carlsbad State Beach campground facilities located north and south of Encinas Creek. These beach fills would extend up to 3,100 and 1,830 LF, respectively, and would include a maximum of 220,000 and 142,000 cy of sand placement. The South Carlsbad North site would be similar to RBSP I but would be extended 1,000 feet to the north in the maximum length alternative. The South Carlsbad South site was not included as part of RBSP I but would begin just south of Encinas Creek. The existing beach at the South Carlsbad North site is completely washed over during high tide and vegetated bluffs approximately 40 to 50 feet in height abut the beach. The beach at the South Carlsbad South site consists of a slightly wider but eroded flat beach predominately composed of cobbles. This proposed receiver site also lies at the base of vegetated bluffs varying in height from approximately 60 to 80 feet. Portions of the South Carlsbad receiver site are located on Carlsbad State Beach.

The Batiquitos receiver site is located approximately 1,000 feet south of Batiquitos Lagoon (the area is also known as “Ponto”), stretching for approximately 1,490 feet into the community of Leucadia and Leucadia State Beach. Up to 118,000 cy of sand would be placed on this site. The Batiquitos receiver site would be similar to RBSP I. At the northern part of the receiver site, a relatively flat, sandy and cobbly beach exists. Steep vegetated cliffs abut the southern portion of the proposed receiver site, where a gently sloping sand beach with scattered rocks, cobbles, and riprap exists. Along this southern portion, the beach is completely washed over by incoming surf during high tide. Several residences are located on the bluff above.

The proposed receiver site at Leucadia extends approximately 2,700 LF from just south of the Grandview access stairs to Jasper Street. The proposed receiver site is similar to RBSP I. Up to 117,000 cy of sand would be used to replenish this beach. The Leucadia receiver site is similar to the southern end of the Batiquitos receiver site in that steep vegetated cliffs abut the beach. The beach consists of a gently sloping sand beach with scattered rocks, cobbles, and riprap. At high tide waves reach the bluffs. Several residences are located on the bluff above.

The proposed Moonlight Beach receiver site is located at the foot of B and C streets at Moonlight State Beach. The proposed receiver site is similar to RBSP I and extends approximately 770 LF. Up to 105,000 cy would be used for beach replenishment at this site. The receiver site consists of a gently sloping sandy beach extending approximately 100 feet from the high tide line to the adjacent residential uses and existing recreational area. Riprap is located at the northern extent of the receiver site to protect residences.

The Cardiff receiver site is located south of the San Elijo Lagoon mouth and Restaurant Row along Coast Highway 101. The receiver site extends approximately 780 feet and would receive up to 101,000 cy of sand. The receiver site is similar to RBSP I. The beach along this receiver site extends approximately 30 to 40 feet from the high tide line to cobble and riprap. The riprap provides an approximately 10- to 15-foot buffer for Coast Highway 101, a key north-south arterial. Riprap exists along the northern portion of the site to protect several existing restaurants. The beach and surfing area is also known as George's.

The Solana Beach receiver site's northern boundary begins north of Fletcher Cove Beach Park and extends approximately 4,750 feet south under the maximum length alternative. The receiver site is similar to RBSP I but would be extended 1,000 feet to the north and 1,800 feet to the south under the maximum length alternative (Alternative 2). Up to 360,000 cy of sand would be placed on this site. Steep cliffs (approximately 80 feet tall) abut the receiver site and the beach consists of a gently sloping sand beach with scattered rocks and cobbles. Riprap, notch fills, and seawalls line the cliffs in an ongoing effort to slow wave-induced erosion. At high tide, no dry beach exists along the majority of the receiver site as waves reach the cliffs and existing sea walls. Similar to the Oceanside and North Carlsbad receiver sites, less sand was present along the cliffs and sea walls in June 2010 compared to September 2009. Several pocket beaches exist along the receiver site, with a small sandy beach at Fletcher Cove, which sits above the high tide mark.

The Torrey Pines receiver site is bordered by Los Peñasquitos Lagoon and Torrey Pines State Reserve. The receiver site stretches for approximately 1,620 feet and is located on Torrey Pines State Beach. The receiver site is similar to RBSP I and a total of 245,000 cy would be placed on this site. The beach is a gently sloping, thin-sand beach with scattered cobbles and high bluffs along Torrey Pines State Reserve. During high tide, waves reach the bluffs along the southern portion of the receiver site. There is also riprap to protect North Torrey Pines Road from storm wave action.

The Imperial Beach receiver site is north of the Tijuana Slough National Wildlife Park and has been shifted north compared to RBSP I. The receiver site, under the maximum length alternative, would receive up to 650,000 cy of sand and would extend for approximately 5,750 feet from Imperial Beach Boulevard north of the pier to approximately 1,000 feet south of Encanto Avenue. The north and south ends of the receiver site are predominantly residential, with a commercial node located at the base of the pier. In addition, a park and open space are adjacent to the pier, which is located at a relatively wide sandy beach area that stretches from Palm Avenue to Beach Avenue. Riprap is in place along the north and south ends of the site to protect adjacent residential development from wave action. The southern end of the receiver site is mostly cobbles with some sand.

The three proposed borrow sites are located within or adjacent to borrow sites defined during the RBSP I project; SO-6, SO-5, and MB-1. Investigations for RBSP II focused on the previous borrow sites, then expanded those to determine whether additional deposits of beach quality sand were present. These additional investigations resulted in the expansion of some of the previous borrow site boundaries to encompass areas with the highest quality sand. Proposed dredge areas for RBSP II would be located within these expanded borrow sites, which are further discussed in Section 2.4.

1.4 PUBLIC INVOLVEMENT PROCESS

Throughout the environmental process, SANDAG has solicited input on key issues and concerns relevant to the scope of this EA/EIR from public agencies, stakeholder and interest groups, and the general public. The public scoping process has been designed to determine the range of issues addressed in the EA/EIR. Additional stakeholder meetings have also assisted in defining the concerns addressed within this document. The different aspects of public scoping discussed in this section include the Notice of Preparation (NOP) and specific stakeholder group coordination, as well as areas of controversy identified as a result of the scoping process.

1.4.1 Notice of Preparation

Both NEPA and CEQA regulations require an early and open process for determining the scope of issues that should be addressed prior to implementation of a proposed action. SANDAG initiated the 30-day scoping process on May 21, 2010, by issuing an NOP of an EIR for RBSP II.

The NOP provided formal notification to all federal, state, and local agencies involved with funding or approval of the project, as well as interested public groups, stakeholders, and individuals, that an EIR/EA would be prepared for the project. The NOP is intended to encourage interagency communication concerning the proposed action 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/EA.

In addition to distribution of the NOP, a series of public scoping meetings were held to provide additional opportunities for agency and public interaction and input. These meetings, identified in Table 1-2, were held during the 30-day public scoping period at various times and locations to encourage public input.

Table 1-2
Scoping Meeting Times and Locations

Date	Time	Location
June 3, 2010	12:30–2:00 p.m.	SANDAG, 7th floor conference room 401 B. Street, Suite 800, San Diego, CA 92101
June 3, 2010	6:00–7:30 p.m.	City of Encinitas, Poinsettia Room 505 South Vulcan Avenue, Encinitas, CA 92024
June 8, 2010	6:00–7:30 p.m.	Dempsey Holder Safety Center 950 Ocean Lane, Imperial Beach, CA 91932

General verbal and specific written comments were accepted at these meetings. Additionally, verbal and written comments were accepted via phone, e-mail, and mail. A copy of the NOP and written comments received is included as Appendix A.

1.4.2 Stakeholder Coordination

A series of stakeholder meetings were held by SANDAG to encourage input from interested organizations and interested parties during the planning process for RBSP II. These meetings were initiated during the planning phase of the project to ensure relevant issues and concerns were incorporated into project design. Stakeholders included the Surfrider Foundation, Sierra Club, WildCoast, California Environmental Rights Foundation (CERF), lobster and urchin fishers, and Scripps Institute of Oceanography. Chapter 8 contains additional discussion regarding stakeholder coordination.

1.4.3 Comments Received during Scoping

Comments received during the 30-day scoping period included both verbal comments from scoping meetings, as well as written comments submitted both at scoping meetings and separately during the scoping period. A total of 16 commentors provided input to the project, including federal, state, and local agencies; local stakeholder groups; and interested individuals. A copy of all written comments submitted as part of the scoping process is included in Appendix A. The main issues raised during the scoping process are summarized by issue area below.

Description of Proposed Action and Alternatives

- use historical data for baseline conditions because of seasonal variability
- clarify that the current natural state of beaches is eroding/retreat
- utilize more conservative modeling and biological predictions/evaluations
- monitoring should address: (1) what are environmental impacts, (2) where does sand go after placement, and (3) how long will sand last
- consider the effects of potential sea level rise predictions
- consider impacts of lagoons in transport of sand along the coast
- consider impacts of burying the wavecut platform

Air Quality, Water Quality, GHG Emissions

- include information of greenhouse gas emissions (e.g. from construction)
- consider water quality issues such as turbidity and sedimentation

Biological Resources

- evaluate impacts to plants, fish, and wildlife populations and their habitats
- impacts and mitigation for the California least tern, western snowy plover, and grunion should be addressed
- impacts resulting from increased turbidity to biological resources and commercial invertebrate species (e.g. lobster, sea urchins) in their larval and post-larval settlement stages should be addressed
- avoid burial of seagrass habitats

Cultural Resources

- evaluate potential submerged cultural resources

Land and Water Use

- engage the surfing community
- provide a pre- and post-project monitoring program to understand the impacts on surfing resources
- evaluate temporary and permanent loss of recreation resources and public access and include mitigation if necessary
- evaluate potential changes and impacts to current transportation routes into and out of areas during construction and include mitigation if necessary

Outreach and Coordination

- create a webpage with information and allow people to send photos
- make arrangements for information sharing and coordination among organizations

Public Health and Safety

- evaluate whether conditions within the project area may pose a threat to human health or environment

Noise

- evaluate impacts of noise and vibrations from dredge and placement work

1.4.4 Areas of Special Concern to Commentors

Concerns raised by the public and agencies during the scoping period focused on issues related to biological resources, physical processes, commercial fisheries, water quality, recreation, and communication. These concerns are specifically evaluated in Chapter 4, Environmental Consequences.

1.5 INTERAGENCY COORDINATION

SANDAG is the lead agency for the proposed project under CEQA on behalf of the participating cities, while the NEPA lead agency is USACE. SANDAG has developed the project in coordination with a number of member cities, listed below, which function as part of the Working Group.

County of San Diego
City of Carlsbad
City of Coronado
City of Del Mar
City of Encinitas
City of Imperial Beach
City of Oceanside
City of San Diego
City of Solana Beach
San Diego Unified Port District
U.S. Navy

A number of additional agencies have either jurisdiction or permitting authority over the project. Consequently, the agencies listed below have been coordinating with the Lead Agencies on the proposed action. A more detailed description of the extensive agency and public coordination undertaken as part of this project is provided in Chapter 8.0.

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marines Fisheries Service/National Oceanographic and Atmospheric Administration
California Coastal Commission
California Department of Boating and Waterways
California Department of Fish and Game
California Department of Parks and Recreation
California Regional Water Quality Control Board (San Diego, Region 9)
California State Mining and Geology Board
California State Lands Commission
City of Oceanside
City of Carlsbad
City of Encinitas
City of Solana Beach
City of San Diego
City of Imperial Beach
County of San Diego
Port of San Diego
Native American Heritage Commission

CHAPTER 2.0
ALTERNATIVES CONSIDERED

CEQA and NEPA require that an EA/EIR evaluate a range of "reasonable" alternatives that satisfy the purpose and need of a proposed project. According to the CEQA Guidelines, "… an EIR shall 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" (Cal. Code Regs., Title 14, § 15126.6(a)). Under NEPA, reasonable alternatives are those that are practical or feasible from a technical or economic perspective, and based on common sense (46 Fed. Reg. 18026, as amended, 51 Fed. Reg. 15618). Under CEQA, the factors that can determine feasibility are site suitability, economic limitations, General Plan consistency, other plan or regulatory limitations, and jurisdictional boundaries. An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative.

This chapter of the EA/EIR is organized into seven primary sections. Section 2.1 discusses the alternative selection criteria. Section 2.2 briefly describes the process undertaken to generate and evaluate alternatives, including a brief overview of the modeling process used to predict sand transport with implementation of the project. Alternatives eliminated from detailed review in this EA/EIR and the reasons for their elimination are addressed in Section 2.3. Section 2.4 provides a detailed description of the alternatives evaluated in this EA/EIR. Monitoring for RBSP I confirmed no significant impacts occurred with implementation of that project. Similarly, monitoring would be required for RBSP II in focused areas with different predicted sedimentation risk than RBSP I to understand how the nearby ocean system modifies the initial fills and transports the added sand. Mitigation commitments are identified given various outcomes. The framework for monitoring and mitigation is provided in Section 2.5. A summary comparison of the potential impacts for each alternative is provided in Section 2.6. Section 2.7 provides a list of permits and approvals required for the proposed project.

As noted in the Preface, subsequent to completion of the evaluation of Alternatives 1 and 2 for the Draft EIR/EA, a Preferred Alternative was identified and defined as Alternative 2-R. This Preferred Alternative is summarized in the Preface of this EA/Final EIR, and potential impacts are discussed by issue area in that preface. Preferred Alternative 2-R is the proposed project and is comprised of components from both Alternative 1 and Alternative 2, depending on the receiver site, as identified in the Preface. The figures and tables in Section 2.4 remain applicable for readers to identify specific project footprints. No changes to the construction methods or borrow site locations would occur with implementation of the Preferred Alternative 2-R and those discussions also remain relevant. The other information presented in this chapter also remains applicable to Preferred Alternative 2-R, including design features, the framework monitoring approach, and permits required.

2.1 ALTERNATIVE SITE SELECTION CRITERIA

Various alternatives for beach replenishment were established based on the following selection criteria. Following this selection process, three sites were selected for dredging activities, and up to 11 sites were selected for beach sand replenishment.

2.1.1 Consistency with SANDAG Shoreline Preservation Strategy and Coastal Regional Sediment Management Plan

SANDAG developed the *Shoreline Preservation Strategy for the San Diego Region* (1993) (SPS), which identified regional coastal areas with critical shoreline problems. The *Coastal Regional Sediment Management Plan* (Moffatt & Nichol 2009b) (RSM Plan) proposed solutions for existing sediment management problems along the coast. Based on these studies and input from local communities, beaches in critical need of replenishment and potential nourishment options were identified. The SANDAG studies were used to determine site-specific alternatives for beach replenishment. Implementation of the proposed action reflects the critical need for sand at the proposed receiver sites.

2.1.2 Project Design to Avoid Sensitive Marine Resources

Beach sites along the San Diego coast were analyzed for onshore beach replenishment suitability. Locations with substantial areas of sensitive marine resources, such as rocky intertidal reefs, subtidal vegetated reefs with feather boa kelp, surfgrass, and/or sea palm, or nearshore reefs with giant kelp were avoided for direct sand placement.

2.1.3 Compatibility of Material Between Receiver and Borrow Sites

Beach replenishment using dredged sediments is generally considered beneficial, assuming the dredged material does not contain contaminants and consists primarily of sand (i.e., compatible with that of the beach and nearshore zone to be nourished). The USACE and U.S. Environmental Protection Agency (USEPA) generally require a minimum of 80% or greater sand composition in material for beach replenishment (referred to as the “80/20 rule”), and that the percentage of silts/clays (fines) in the material not exceed that at the placement point by 10%. Receiver beach sand quality is quantified by developing a “composite gradation envelope” from samples of the existing beach receiver sites and adjacent nearshore zone that shows the acceptable proportion of sand versus fines in fill material. To determine if the beach replenishment material is suitable, sediment samples of the material to be dredged are compared to the composite gradation envelope. Generally, fill material with less than 10% fines that is determined to be beach compatible can be placed directly on the beach. Material with more than 10% fines that is still determined to be suitable is typically placed along the low tide line at the beach to more rapidly disperse to the nearshore zone.

Based on results of grain size analysis of the sediments sampled within the proposed dredge footprints, approximately 4.2 mcy of sediment from three offshore borrow sites would be considered suitable for beach replenishment. This volume assumes dredging a 10-foot-deep cut from the existing seabed throughout the entire footprint of the borrow sites and does not consider potential environmental or engineering constraints, which could limit the actual quantity to be dredged (Moffatt & Nichol 2009).

2.1.4 Budget Considerations

Funding for RBSP II would be obtained from two sources. The California Department of Boating and Waterways has committed 85% (up to $6.5 million) for each fiscal year from 2009 to 2011. The remaining 15% of funding is being provided by participating municipal jurisdictions, based on a methodology that includes weighing three factors: amount of sand received, miles of the coastline restored, and population. Approximately $150,000 of Federal Bureau of Ocean Energy (BOE) money would also be obtained for this project. Funding must cover all engineering design and construction plans; all environmental compliance costs, including CEQA/NEPA documentation, monitoring, and mitigation (if necessary); all permitting activities; and construction. The total maximum budget is over $22 million.

Specific jurisdictions participating in RBSP II are responsible for a portion of the funding for implementation of the project. As a result of budget constraints, the City of Del Mar chose not to participate and the City of San Diego is participating in a limited capacity in RBSP II.

2.2 PROCESS BY WHICH ALTERNATIVES WERE DERIVED

RBSP II alternatives were developed based on the need for nourishment and protection of public property and infrastructure, local jurisdiction interest, and economic return, and were designed to accommodate two proposed alternatives. In addition, the project design minimizes potential impacts to sensitive resources. By designing such a project, SANDAG can more readily obtain necessary permit approvals, minimize costs for postconstruction monitoring and mitigation, and maximize funds to pay for dredging, thereby maximizing sand quantity to be placed.

Identification of sensitive resources, definition of appropriate borrow and dredge locations, and design of appropriate receiver site footprints were based on RBSP I monitoring results, fieldwork in 2009 (including biological reconnaissance surveys and vibracore sampling), and updated sand transport modeling. Due to engineering, environmental, and budgetary constraints, some potential borrow sites were eliminated from further consideration and some receiver site footprints were modified or sites were eliminated. Sand quantities proposed for specific receiver sites were also varied from RBSP I for alternatives evaluated in this document.

To define appropriate borrow sites for RBSP II, eight potential offshore borrow sites were investigated for sand availability, potential constraints, and beach replenishment suitability based on grain size analyses (URS 2008). Of those, one borrow site (SO-7) was eliminated due to a lack of available sand and inshore man-made reef constraints. Four of the remaining sites (SM-1, TP-1, ZS-1, and SS-1) were ranked low in priority as sources due to the presence of relatively fine sand as borrow material. Three sites (SO-6, SO-5, and MB-1) were determined to yield the highest quality sand to satisfy project requirements. Within these remaining three borrow sites, the probable dredge locations were refined to focus on areas with the highest quality sand and to avoid resources that were identified during the environmental process, e.g., artificial reefs and underwater archaeological sites. The borrow sites that were eliminated and/or modified are described in Section 2.3.

To predict the movement of sand once placed on the various receiver sites, and therefore potential direct and indirect impacts to sensitive resources, both analytical and numerical sand transport modeling were performed. Analytical modeling (diffusion method) was used for the Imperial Beach receiver site. The diffusion method is a simplified condition that assumes an idealized straight shoreline and waves approaching parallel to shore. Given the location of the beach fill and breaking wave height, sand is dispersed symmetrically up and down the shoreline. This simplified model is appropriate for one isolated site that is located distant from other fill sites.

Numerical modeling was used for the San Diego North County receiver sites because multiple fill sites exist in proximity to one another with the potential for combined effects, and the region's northern coast is more geographically complex with coves, promontories, lagoons, and structures (e.g., jetties). The model used for this project, and for RBSP I, the Generalized Model for Simulating Shoreline Change (GENESIS), predicts sand movement up and down the coast only (longshore only, in one dimension) and does not predict on- and offshore movement. Rather, it assumes that sediment movement on and off the beach (cross-shore) is seasonal and averages out over the long term; therefore, no long-term change would occur in the beach profile. The GENESIS model is the most appropriate tool for this effort and is approved for such applications by the USACE, which is familiar with its capabilities. It provides a robust, but relatively coarse level of prediction to enable broad analyses over a long reach of coast. There are other available models that simultaneously consider both longshore and seasonal cross-shore sediment transport, but they are very detailed (in three dimensions) and are typically applied to more site-specific problems such as effects of structures. Evaluating an entire 20-mile reach of coast at that level of detail would be overwhelming from budget and time standpoints, and may not prove any more accurate than the one-dimensional model.

GENESIS is intended to provide a generalized long-term trend in shoreline response. The results can indicate anticipated general areas of sand gain (deposition) or erosion at orders of magnitude over large scales. The modeling of longshore sediment transport was supplemented with analysis of seasonal beach profile changes using an analytical method to predict cross-shore sand movement. The method involves converting the new mean sea level position predicted by GENESIS into a new beach profile at each beach profile location. The purpose of the work was to estimate the depth of sand cover attributable to the project over the average beach or an entire profile. This information was used to support assessment of potential effects to biota from increased sand levels. A depth of sand cover was calculated over the average winter profile at each location (for winter conditions) and over the average summer profile at each location (for summer conditions). This was done at 6-month intervals for 5 years after project construction to represent end-of-winter conditions (May) and end-of-summer conditions (October) for each year. Once the depth of sand cover was calculated at each beach profile location, the depth of cover at areas in between the profiles was interpolated from that at the profiles. A computer program was prepared to calculate the depth of sand cover between the profiles using a relationship developed for all North County beaches between predicted changes in shoreline position and the depth of sand cover along the length of the profile.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED REVIEW

The following text provides a description of various alternatives originally considered for the proposed project but eliminated from detailed review in this environmental document. The process used to evaluate and eventually select borrow sites is described in 2.3.4. The receiver sites eliminated are discussed in 2.3.5. Section 2.3.1 provides an overview of the various alternatives considered and rejected during RBSP I. Sections 2.3.2 and 2.3.3 discuss alternatives identified for RBSP II that were later eliminated from consideration. Structural methods to retain sand were also considered but subsequently eliminated from further consideration (Section 2.3.6), as were alternate placement strategies designed to further enhance recreational benefits (Section 2.3.7).

2.3.1 RBSP I Sand Source Placement Method Alternatives Eliminated

The preliminary engineering and planning effort for RBSP I evaluated a number of different sand sources and placement methods for the project. Through the alternatives selection process, many of these sources and methods were eliminated. Discussion of these eliminated preliminary alternatives, as identified in the EIR/EA for RBSP I, is repeated here for reference purposes and remains valid for this project.

Onshore Borrow Sites and Other Sand Sources

Onshore sources of material were considered for RBSP I, including (1) dredging sand from behind Lake Henshaw Dam, or other dams that act as sediment "sinks"; (2) removing dams that currently interrupt river-borne sediment; or (3) terminating regional sand mining activities that prevent sand from reaching the shoreline. Dredging sand from behind any dam and transporting that material to the shoreline would involve the use of trucks for transportation. A typical earthmoving truck (twin trailer) carries 14 cy of material. Fill quantities at receiver sites for RBSP I would have varied from roughly 100,000 to 470,000 cy (minimum and maximum alternatives) resulting in over 7,140 trips for the smallest site and over 33,570 truck trips for the largest site. Transportation and construction from onshore borrow sites would have resulted in air emissions, noise impacts, and conflicts with beach users for parking and access that resulted in the elimination of this alternative from consideration.

San Diego is a semiarid region and precipitation is highly variable. The need for a consistent source of water has led to the construction of dams on all major water courses in the region. Since the late 1940s, local water sources have been supplemented by imported water, which has been stored in reservoirs created by those dams (Pryde 1992). The local supply of water is limited and efforts continue to increase the amount of water storage and improve the delivery system. The San Diego County Water Authority is currently implementing the Emergency Storage Project, which will provide additional local water supplies by constructing a new dam in Olivenhain as well as raise the height of the dam at the San Vicente Reservoir. The need for local water supplies for the growing population would make it infeasible to remove dams in the region and allow sediment to flow naturally to the ocean.

Sand and aggregate mining in San Diego County is used to support the construction industry and provides raw material for making concrete, preparing road beds, and other uses. It is also a necessary raw material for road maintenance. The California Division of Mines and Geology Special Report 153 (n.d.) estimates a need for approximately 760 million tons of aggregate in San Diego County through the year 2030. If sand mining in San Diego were halted, or reduced, other sources would have to be found, most likely from Riverside and San Bernardino counties or Mexico. This would necessitate additional truck trips to carry the material, resulting in air and noise impacts, and there may not be enough material to support the local demand. It would not be feasible to interrupt the local supply and wait for local material to make its way down the river system to the ocean.

Nearshore Fill Placement

Nearshore placement of fill was discussed for RBSP I at four sites: Oceanside, Del Mar, Mission Beach, and Imperial Beach. Reefs along Encinitas and Solana Beach substantially constrain potential nearshore placement for those cities. Placing sediment in the nearshore zone would introduce material to the littoral cell, but site-specific benefits to receiver sites are less certain than with onshore placement. Also, as only four sites in the entire San Diego region were considered for RBSP I, the project was not truly "regional" by nature. Because this method of sand replenishment would not have the same immediate benefits to an intended receiver site, and would not fulfill the regional purpose and need of the project, it was eliminated from further consideration. Similarly, this method was eliminated from further consideration for RBSP II.

Feeder Beach Replenishment

Under this alternative, sand would be replenished at Oceanside and Carlsbad, and then travel south in the Oceanside Littoral Cell to replenish other San Diego North County beaches. Sand would also be placed at the Mission Beach and Imperial Beach receiver sites to feed their respective littoral cells. In 1996, 1.6 mcy were placed on Ponto Beach in southern Carlsbad. That action would be similar to this alternative. While this previous replenishment project did introduce sand to the Oceanside Littoral Cell and did enhance that specific location, the regional benefits have been difficult to quantify. Because the benefits of beach replenishment at the southern reaches of the Oceanside Littoral Cell would also be difficult to quantify, and there would not be immediate benefits at specific receiver sites, it is unlikely that this alternative would address specific receiver site needs identified by the Working Group.

2.3.2 Upstream Sand Sources – Lake Hodges Dam

Alternative sources of sand for beach nourishment were evaluated for potential use during design of RBSP I, including sand captured behind dams that act as sediment "sinks," as discussed above under Section 2.3.1. Lake Henshaw Dam was specifically evaluated as part of that analysis, as well as a more general overall regional assessment of the use of sand captured behind dams. For RBSP II, Lake Hodges Dam was identified as a potential source of sand located upstream from the beach. While this location is different than the specific evaluation conducted for RBSP I, similar reasons summarized above for RBSP I were identified that led to the elimination of this alternative from the project. Dredging sand from behind dams and transporting dredged material to the receiver sites would result in additional cost and environmental impacts with respect to transportation, air quality (emissions), noise impacts, and conflicts with beach users for parking access.

2.3.3 RBSP II 3.2 mcy Alternative

Under this alternative, a total of 3.2 mcy would have been placed on the following 11 beach fill sites: Oceanside, North Carlsbad, South Carlsbad North, South Carlsbad South, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, Torrey Pines, and Imperial Beach. This alternative proposed an overall higher volume of sand placement and an overall lengthening of the proposed receiver sites than the other proposed alternatives. The volumes of sand placement at beaches would have increased potential for sand transport to sensitive offshore resources, both due to receiver site proximity to such resources and an increased volume dispersed in the nearshore zone. Therefore, this alternative was eliminated from further consideration for RBSP II.

2.3.4 Offshore Borrow Sites

In the RBSP II preliminary engineering evaluation, eight offshore borrow sites were tested for beach replenishment suitability (URS 2009). These included a mixture of previously identified and/or RBSP I borrow areas and three new areas of investigation. Offshore sand explorations were conducted from Imperial Beach to Oceanside to characterize offshore borrow sediments for potential use as beach nourishment. The offshore field investigation was divided into two parts: marine geophysical (seismic reflection) surveys, followed by vibracore sediment sampling. Ultimately, one of these borrow sites was eliminated, and four others were ranked low in priority relative to the final three sites due to grain size issues. The sites that were evaluated included:

1. SM-1 Oceanside (new site, a sand fillet between the north Oceanside Harbor Jetty and the Santa Margarita Rivermouth)
2. SO-7 Batiquitos (RBSP I site that yielded excellent sand, expanded to search for new sand)
3. SO-6 San Elijo (RBSP I site that yielded good sand, expanded to search for new sand)
4. SO-5 Del Mar (RBSP I site that yielded poor sand, expanded to search for new and better quality sand)
5. TP-1 Torrey Pines (new site recommended by researchers at the Scripps Institution of Oceanography based on current research)
6. MB-1 Mission Beach (RBSP I site that yielded excellent sand, expanded to search for new sand)
7. ZS-1 Zuniga Shoal (new site at Zuniga Shoal just south of Zuniga Jetty)
8. SS-1 Imperial Beach (RBSP I site that yielded poor sand, expanded to search for new and better quality sand)

As shown in Table 2-1, borrow sites TP-1 and ZS-1 contained the finest sediments and were determined to be unsuitable for beach nourishment. Borrow sites SM-1 and SS-1 have fairly fine sediments and are considered marginal for beach nourishment because their median grain size (D_{50}) is fairly small compared to the existing sediments found on the receiving beaches.[3] Borrow site SO-7 was utilized for RBSP I, but was eliminated from consideration for RBSP II because it has an inadequate remaining volume for replenishment. Borrow sites SO-6, SO-5, and MB-1 were found to have the coarsest median grain size sand. Dredge areas within those sites were identified as containing sufficient volumes to accommodate any of the proposed RBSP II project alternatives. These sites also possess the lowest percentage of fines and a fairly narrow range of grain sizes. All other borrow sites were eliminated from further review due to their lack of potential use for beach replenishment for this particular project.

[3] The median grain size (D_{50}) is the statistical midpoint of the gradation, or the grain size diameter at which 50% of the sample is either smaller or larger. D_{50} is a commonly used indicator of approximate grain size, along with the range of grain sizes and the percentage of fines (silts and clays smaller than sand) in the sample.

Table 2-1
Summary of Average Grain Size Distributions for Potential Borrow Sites
(sites in bold indicate those proposed for use in RBSP II)

Borrow Site	Percent Fines[1] (%)	Grain Size[2] (mm)	Estimated Volume[3] (mcy)	Evaluation Outcome
SM-1	12	0.17	3.8	Ranked low in priority
SO-6	**5**	**0.35**	**0.7**	Carried forward
SO-5	**2**	**0.59**	**1.9**	Carried forward
TP-1	9	0.13	0.8	Eliminated
MB-1	**2**	**0.51**	**1.6**	Carried forward
ZS-1	14	0.13	1.1	Eliminated
SS-1	15	0.21	1.2	Eliminated
Estimated Quantity for All Borrow Sites			11.1	

Source: URS 2009
[1] Defined as percentage of material passing the No. 200 (0.074 mm) sieve.
[2] Grain size is represented by D_{50}, the median grain size. This is a commonly used indicator of approximate grain size in a sample.
[3] Assumes 10-foot dredge depth.

2.3.5 Preliminary Receiver Sites

As noted in Chapter 1, RBSP II builds on the successful implementation of RBSP I. As a result, the receiver beaches in RBSP I were used as a foundation for those proposed under RBSP II. Through an iterative coordination process with the cities, previous receiver sites were refined with respect to location and sand placement design. No additional sites were evaluated and eliminated. The City of Del Mar decided not to participate in RBSP II. This site was eliminated based on their fiscal decision, not due to engineering or environmental considerations. Additionally, the City of San Diego received sand at Mission and Pacific beaches from a dredging project completed by the USACE at the mouth of Mission Bay. Therefore, the Mission Beach receiver site does not need more sand at this time and was eliminated from RBSP II.

2.3.6 Sand Retention

Although the 1993 SPS and 2009 RSM Plan identify beach building and maintenance as the primary shoreline management tactic, a possible menu of other solutions is also outlined, including sediment management devices (structures to help hold sand in place such as offshore groins, artificial reef or other retention device). Sand retention strategies were considered as part of RBSP I and eliminated because the high cost of constructing sand retention devices along the coastline made them questionable from a cost-effectiveness standpoint and would detract from the volume of sand to be placed at each of the receiver sites, given the proposed action's fixed budget. For example, the estimated cost of extending the north jetty at Agua Hedionda Lagoon by 150 feet was $5.2 million in 2001, not considering environmental or permitting costs. The total budget for RBSP I was $14.2 million. Consequently, the focus of the RBSP I proposed action was defined only as sand replenishment.

Phase I engineering and planning for RBSP II conceptually considered retention devices to stabilize beaches and reduce sand loss (Moffatt & Nichol 2009a). SANDAG attempted to obtain additional state funding for further studies of retention options but was unsuccessful given the state's budget crisis at the time. Accordingly, SANDAG concluded that sand stabilization would not be included in RBSP II.

RBSP II involves beach fill only; therefore, beach replenishment including retention devices is not necessarily a foreseeable consequence of the RBSP II project, nor are the devices a future expansion of the project or an integral part of the same project. If funds are obtained for sand retention studies, the concept would be evaluated separately based on the engineering study results, which will help refine retention device design, location, and other engineering details. While sand retention structures may be considered in the future as one element of a sediment management strategy, a retention alternative is not carried forward for detailed analysis in this EA/EIR.

2.3.7 Surf Enhancement

RBSP II evaluated the potential to design receiver site sand placement to form sandbars in the surf zone for localized surf enhancement. Six potential receiver sites were identified for potential surf enhancement: Oceanside, South Carlsbad North, Moonlight Beach, Cardiff, Solana Beach, and Imperial Beach. Sand placement for this variation would have included both onshore and surf zone placement of dredged sand material. Under this design, sand at these receiver sites would be placed in a wide curve (or berm) out into the surf zone instead of parallel to the shore as was done for RBSP I. Construction of the beach berm would have required placement of fill to depths of approximately -8 feet mean lower low water (MLLW), posing a logistical challenge. The surf zone beach fills would have required placement of a large sand volume at selected surf enhancement sites to account for wave dispersion and still obtain the desired beach site enhancement. In addition, placement of material within the surf zone would have required additional construction strategies and methods to ensure proper placement of the material and minimize turbidity. Sand placed within the surf zone, while adding sand to the littoral cell, would result in less sand placed onshore and would have less of an immediate benefit at specific receiver sites. Material placed in the surf zone would also be likely to dissipate more rapidly than sand placed onshore, so it is unlikely that this alternative would address specific receiver site needs to the level identified by the Working Group. Given the additional cost associated with dredging and transporting more material and the added complexity of sand placement within the surf zone, the surf enhancement alternative was determined to not be feasible.

2.4 DETAILED DESCRIPTION OF ALTERNATIVES

Based on the alternatives evaluation process, two alternatives were selected for detailed evaluation in this EA/EIR. Alternative 1 would be relatively similar to RBSP I and would result in placement of approximately 1.8 mcy of sand at 10 receiver beaches along the San Diego region coastline. Alternative 2 would place up to approximately 2.7 mcy of sand at 11 receiver sites. Table 2-2 illustrates the sand quantities at each receiver site under each alternative and the most probable borrow site that would provide material for each receiver site.

Table 2-2
Sand Quantities Proposed Under Each Alternative

Receiver Site	Probable Borrow Site	Alternative 1 (cy)	Alternative 2 (cy)
Oceanside	SO-6 and/or SO-5	420,000	420,000
North Carlsbad		225,000	225,000
South Carlsbad North	SO-5	158,000	220,000
South Carlsbad South		N/A	142,000
Batiquitos		118,000	118,000
Leucadia		117,000	117,000
Moonlight Beach		105,000	105,000
Cardiff		101,000	101,000
Solana Beach		146,000	360,000
Torrey Pines		245,000	245,000
Imperial Beach	MB-1	120,000	650,000
	TOTAL	1,755,000	2,703,000

The construction approaches for Alternatives 1 and 2 would be similar to RBSP I. Dredged material would be piped to each receiver site, and then dispersed up and down the beach.

2.4.1 Borrow Sites

Each of the alternatives would utilize sand dredged from one of three borrow sites. The three borrow sites are located offshore along the coast from Encinitas to Mission Beach, in relative proximity to each receiver site but far enough offshore to be outside the littoral cell depth of closure. Accordingly, material dredged from these locations would not otherwise be available in the littoral system for seasonal onshore/offshore sand movement. “Borrow site” refers to a larger location that has been investigated as part of this project in terms of sediment characteristics, marine resources, seabed elevation, etc. Within that large area, a smaller dredge area has been identified where the material would actually be removed. The impact analyses evaluate the direct impacts of activity in the smaller dredge area, but the term “borrow site” is used when discussing this project feature as a category, i.e., instead of receiver sites. Where a further distinction is necessary, it is noted in the analysis. Table 2-3 provides a summary of borrow site characteristics under each alternative, including the volume of material to be dredged, the surface area affected, and the water depth. The proposed project would involve dredging to a maximum of 10 feet at borrow sites SO-5 and MB-1. Dredge depths at SO-6 could extend to 20 feet. These depths would provide adequate sand for all of the proposed receiver sites.

Table 2-3
Borrow Site Characteristics

	Borrow Site SO-6	**Borrow Site SO-5**	**Borrow Site MB-1**
Approximate Volume Available for Dredging (cy)*	700,000	1,900,000	1,600,000
Maximum Surface Area to be dredged (in acres)	44	124	107
Water Depth (feet, MLLW)	-42 to -56	-34 to -49	-60 to -74
Potential Volume of Sand to Be Dredged (cy)**			
Alt 1 (1.8 mcy)	645,000	990,000	120,000
Alt 2 (2.7 mcy)	645,000	1,408,000	650,000

Source: Moffatt & Nichol 2009a
* Assumes entire footprint dredged 10 feet; more sand would be available if dredging extends deeper, as proposed at SO-6 (20 feet).
** Volume varies within footprint by increasing the depth of dredge.

Figures 2-1 to 2-3 illustrate the dredge location for each of the three borrow sites, as well as the dredge area from RBSP I. Temporary pipelines to carry replenishment material would be constructed to the shoreline and then material would be pumped up and down the coast, as necessary, to various receiver beach sites. Dredge and transport methods are discussed in more detail in Section 2.4.3. The receiver site alternatives are discussed in detail in Section 2.4.2.

As described in Section 3.4 and Appendix C, biological surveys were performed in 2009 to compare conditions at RBSP I borrow sites, nearby areas at similar depths that had not been dredged, and proposed borrow sites. The fish, sediment, and benthic characteristics were similar between all three locations, but the bathymetric changes at the RBSP I dredge areas remained identifiable 8 years after the material was removed. Approximately 1 foot of post-RBSP I sedimentation was recorded at SO-5 in the 2009 surveys. 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. A storm event would be necessary to move material laterally at that depth and to convey material beyond the depth of closure to fill the dredge area.

SO-6

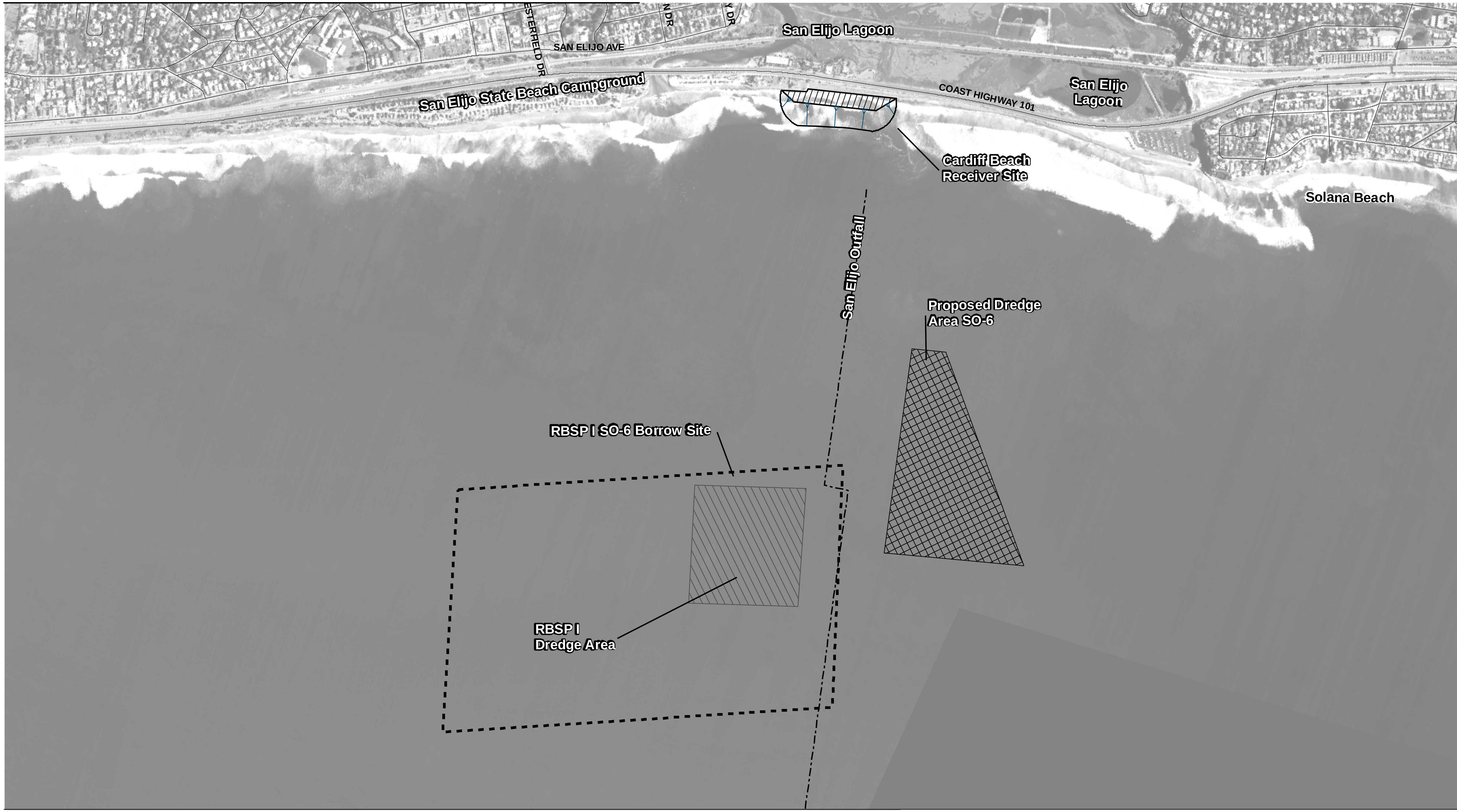
The RBSP I SO-6 borrow area initially yielded good quality, coarse sand for placement at two receiving beaches. However, continued dredging reportedly encountered some hard-bottom areas. A number of the previous RBSP I vibracores located north of the previous SO-6 borrow area also encountered bedrock. Based on the geophysical surveys, a southerly expansion of the previous SO-6 borrow area (south of the outfall pipeline) was considered more likely to provide an adequate volume of suitable beach material.

The refined RBSP II SO-6 borrow area is shown in Figure 2-1 and is located in the Swami's State Marine Conservation Area (SMCA) (further discussed in Section 3.6) west of San Elijo Lagoon and south of both the RBSP I SO-6 borrow area and the San Elijo wastewater outfall pipeline. This borrow area has been estimated to have a surface area of 44 acres and contains approximately 700,000 cy of sand. The site is determined to have minimal to no silt overburden. When dredged material is placed on a receiver site, lighter, finer material would quickly dissipate and the larger sand material would remain. Therefore, to achieve the final receiver site quality desired, any material dredged from the borrow site could potentially include a maximum overfill factor of 3 to 4% in proportion to the estimated silt quantity. The overfill factor is an increase in quantity to compensate for loss of the silts and clays during placement.

SO-5

The RBSP I SO-5 borrow area yielded some fine-grained material and was placed at four sites. Some of the relatively fine materials encountered may have been initially dredged from the surficial silt cover. The coarser materials may have been encountered at depth.

The RBSP II SO-5 borrow area is located offshore of the San Dieguito River, as shown in Figure 2-2. For RBSP II, SO-5 has been shifted closer to shore and to the north to intersect the offshore paleochannel of the San Dieguito River. This borrow area is estimated to have a surface area of 124 acres and contain almost 2,000,000 cy of sand, with minimal to no silt overburden. A maximum overfill factor of 5 to 7% may be appropriate based on the low estimated silt quantity.



Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

1,000 500 0 1,000 Feet

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

Figure 2-1
Beach Sand Borrow Site SO-6

Path: P:\2008\08080112 RBSP II EIR\6.0 GIS\6.3 Layout\RBSP_DetailMaps\Drafts\Donor_SO-6_Detail.mxd, 01/18/11, SteinB

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

1,000 500 0 1,000 Feet

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

Figure 2-2
Beach Sand Borrow Site SO-5

Path: P:\2008\08080112 RBSP II EIR\6.0 GIS\6.3 Layout\RBSP_DetailMaps\Rev_Sept2010\Donor_SO-5_Detail_.mxd, 01/18/11, SteinB

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

1,500 750 0 1,500 Feet

Scale: 1 = 18,000; 1 inch = 1,500 feet

Figure 2-3
Beach Sand Borrow Site MB-1

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MB-1

The MB-1 dredge site provided good-quality coarse sand in RBSP I, which was placed at Mission Beach and Imperial Beach. Hard-bottom conditions were not previously encountered at this site. No silt overburden exists and no overfill factor is required.

The MB-1 borrow area is located offshore of Mission Beach, north of the Mission Bay jetties, as shown in Figure 2-3. The area has been identified immediately adjacent to the south and east boundaries of the RBSP I borrow area. This borrow area has been estimated to have a surface area of 107 acres and contain approximately 1,600,000 cy of sand. The irregular-shaped borrow area was selected to avoid the previous dredge area, a number of shipwrecks, and other cultural features.

2.4.2 Receiver Sites

Receiver beach sites for RBSP II were selected based on the need for nourishment, local jurisdiction interest, and economic return, and were designed to accommodate two proposed alternatives. Two build alternatives are evaluated in this EA/EIR, as well as a No Project Alternative. These are summarized in Table 2-4 and described in more detail in this section. Table 2-4 provides information on the amount of fill at each site (in cy), the length of the receiver site (in linear feet or LF), and the location of the site relative to the RBSP I site. These footprints reflect the proposed sand placement areas at the preliminary design stage. As a result of the final design and/or permit process, specific dimensions, volumes, and/or locations may be refined.

Table 2-4
Summary of RBSP II Alternatives

Receiver Site	Alternative 1 1.8 mcy	Alternative 2 2.7 mcy
Oceanside	420,000 cy 4,100 LF RBSP I, but entire footprint shifted 1,800 feet closer to pier	Same as Alternative 1
N. Carlsbad	225,000 cy 3,100 LF Identical to RBSP I	Same as Alternative 1
S. Carlsbad N.	158,000 cy 2,100 LF Identical to RBSP I	220,000 cy 3,100 LF RBSP I with northern end extended 1,000 feet

Receiver Site	Alternative 1 1.8 mcy	Alternative 2 2.7 mcy
S. Carlsbad S.	---	142,000 cy 1,830 LF Located just south of Encinas Creek
Batiquitos	118,000 cy 1,490 LF Identical to RBSP I	Same as Alternative 1
Leucadia	117,000 cy 2,700 LF Identical to RBSP I	Same as Alternative 1
Moonlight	105,000 cy 770 LF Identical to RBSP I	Same as Alternative 1
Cardiff	101,000 cy 780 LF Identical to RBSP I	Same as Alternative 1
Solana Beach	146,000 cy 1,900 LF Identical to RBSP I	360,000 cy 4,700 LF RBSP I extended 1,000 feet north and 1,800 feet south
Torrey Pines	245,000 cy 1,620 LF Identical to RBSP I	Same as Alternative 1
Imperial Beach	120,000 cy 2,310 LF RBSP I, but shifted 1,300 feet closer to pier	650,000 cy 5,750 LF Similar to Alternative 1, but extended 1,750 feet to north and 1,700 feet south and with a wider berm. South boundary similar to RBSP I
TOTAL	1,755,000 cy	2,703,000 cy

For each receiver site, berm construction may be adjusted during fill placement depending on actual field conditions. Berm length as identified for each receiver site is measured along the top seaward edge of the berm. The landward edge would vary based on slope and topography at each site. The measurements indicated for the width of each berm are the initial postplacement widths. The constructed beach profile would be immediately subject to the forces of the waves and weather once constructed, and would equilibrate to assume a more natural slope that typically reduces the width of the berm.

Sand placement would occur around the clock, on a 7-day/24-hour basis. The longer construction hours would result in more efficient construction and greater production rates, and would allow for more sand to be placed on some of the receiver sites. These construction hours would necessitate a noise variance from several jurisdictions (i.e., Oceanside, Carlsbad, Solana Beach, and Imperial Beach). Table 2-5 identifies the schedule and production durations that would be required for each alternative.

Table 2-5
Schedule and Production

Borrow Site	Receiver Site	Alternative 1: Quantity (cy)	Alternative 1: Replenishment Site Construction (estimated days)	Alternative 1: Duration of Pipeline Activity (estimated days)	Alternative 2: Quantity (cy)	Alternative 2: Replenishment Site Construction (estimated days)	Alternative 2: Duration of Pipeline Activity (estimated days)
SO-6	Oceanside	420,000	40	63	420,000	40	63
	North Carlsbad	225,000	23		225,000	23	
SO-5	South Carlsbad North	158,000	15	97	220,000	21	138
	South Carlsbad South	0	0		142,000	14	
	Batiquitos	118,000	12		118,000	12	
	Leucadia	117,000	12		117,000	12	
	Moonlight Beach	105,000	10		105,000	10	
	Cardiff	101,000	10		101,000	10	
	Solana Beach	146,000	15		360,000	36	
	Torrey Pines	245,000	23		245,000	23	
MB-1	Imperial Beach	120,000	14	14	650,000	70	70
Total		**1,755,000**	**174**	**174**	**2,703,000**	**271**	**271**
Average Estimated Production Rate		10,000 (cy/day)			10,000 (cy/day)		

Alternative 1

Alternative 1 is similar to RBSP I in volume and receiver sites, although Del Mar and Mission Beach are no longer included. Approximately 1.8 mcy would be placed on 10 receiver sites. The sites include Oceanside, North Carlsbad, South Carlsbad North, Batiquitos, Moonlight Beach, Leucadia, Cardiff, Solana Beach, Torrey Pines, and Imperial Beach. Figures 2-4 to 2-13 illustrate the proposed receiver sites under this alternative. Two sites (Oceanside and Imperial Beach) would be shifted north compared to RBSP I. This shifts the site closer to the respective piers because the SANDAG economic study (SANDAG/Moffatt & Nichol 2007) indicates that a larger cost-benefit ratio would be gained in these locations. The proposed footprint for each receiver site under Alternative 1 is discussed below.

The **Oceanside** receiver site extends from Wisconsin Avenue south to Morse Street. The 4,100-foot-long beach fill would have a 200-foot-wide berm at +13 feet MLLW. The total volume proposed for Oceanside for Alternative 1 is 420,000 cy.

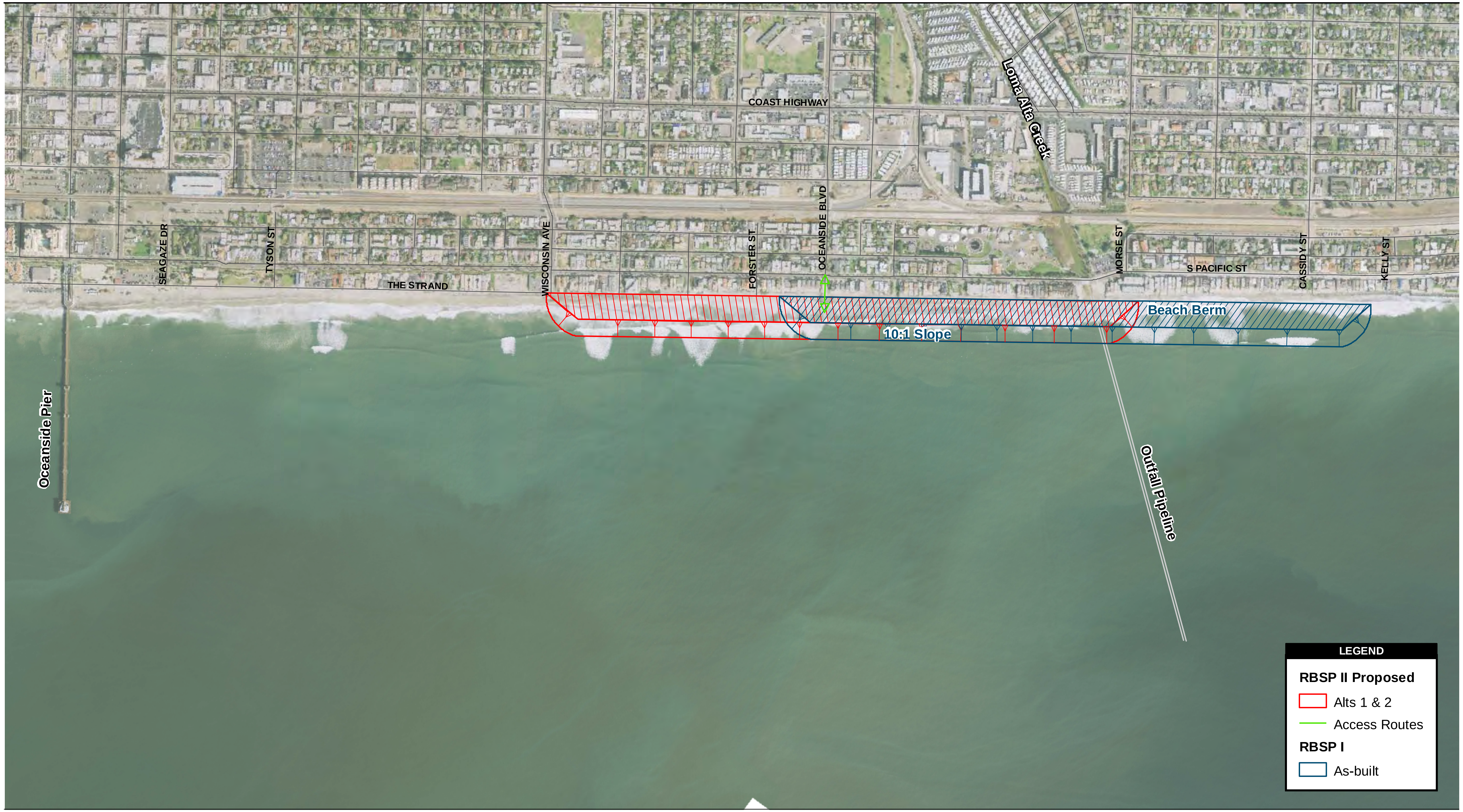
At **North Carlsbad**, the proposed footprint for Alternative 1 is a 3,100-foot-long beach fill just south of Buena Vista Lagoon to approximately Oak Street (identical to RBSP I). The proposed beach fill would have a 135-foot-wide berm at +12 feet MLLW. Approximately 225,000 cy of beach fill is proposed at North Carlsbad for Alternative 1.

The **South Carlsbad North** site is just north of Encinas Creek and identical to RBSP I for Alternative 1. Approximately 158,000 cy is proposed over a 2,100-foot-long beach fill. The proposed berm would be approximately 180 feet wide at +12 feet MLLW. The **South Carlsbad South** site is located just south of Encinas Creek. There is no beach fill proposed for Alternative 1 at this site.

There are four proposed sites in Encinitas: Batiquitos, Leucadia, Moonlight Beach, and Cardiff. For Alternative 1, these sites are the same as RBSP I. The **Batiquitos** fill area would be approximately 1,490 feet long, with a 180-foot-wide berm at +12 feet MLLW, and is located south of the Batiquitos Lagoon inlet. Approximately 118,000 cy of beach fill is proposed. At **Leucadia**, approximately 117,000 cy of sand is proposed to be placed along a narrow 2,700-foot-long reach with a 120-foot-wide berm at +12 feet MLLW. **Moonlight Beach** is located at the end of B and C streets. It is a small site and only extends approximately 770 feet in length with a 180-foot-wide berm, and would result in just over 100,000 cy of beach fill. The **Cardiff** site is located just south of the San Elijo Lagoon inlet. This site is also small, with just over 100,000 cy proposed over a 780-foot length with a 150-foot-wide berm.

The **Solana Beach** site for Alternative 1 is at Fletcher Cove and is the same location as RBSP I. The site extends 1,900 feet south from the access at Fletcher Cove and would place approximately 146,000 cy of sand. The berm width would be 70 feet at an elevation of +13 feet MLLW.

The City of San Diego includes the Torrey Pines receiver site, which is the same site as that for RBSP I. The **Torrey Pines** site is located at Torrey Pines State Beach. Approximately 245,000 cy of sand is proposed at this site in a 1620-foot-long beach fill with a 160-foot-wide beach berm at +12 feet MLLW.



Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

750 375 0 750 Feet

Scale: 1 = 9,000; 1 inch = 750 feet

Figure 2-4
Oceanside Beach Receiver Site Alternatives

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

500 250 0 500 Feet

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

Figure 2-5

North Carlsbad Beach Receiver Site Alternatives

Path: P:\2008\08080112 RBSP II EIR\6.0 GIS\6.3 Layout\RBSP_DetailMaps\Rev_Sept2010\NCbadDetail.mxd, 01/18/11, SteinB

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

Figure 2-6
South Carlsbad Beach North and South Receiver Site Alternatives

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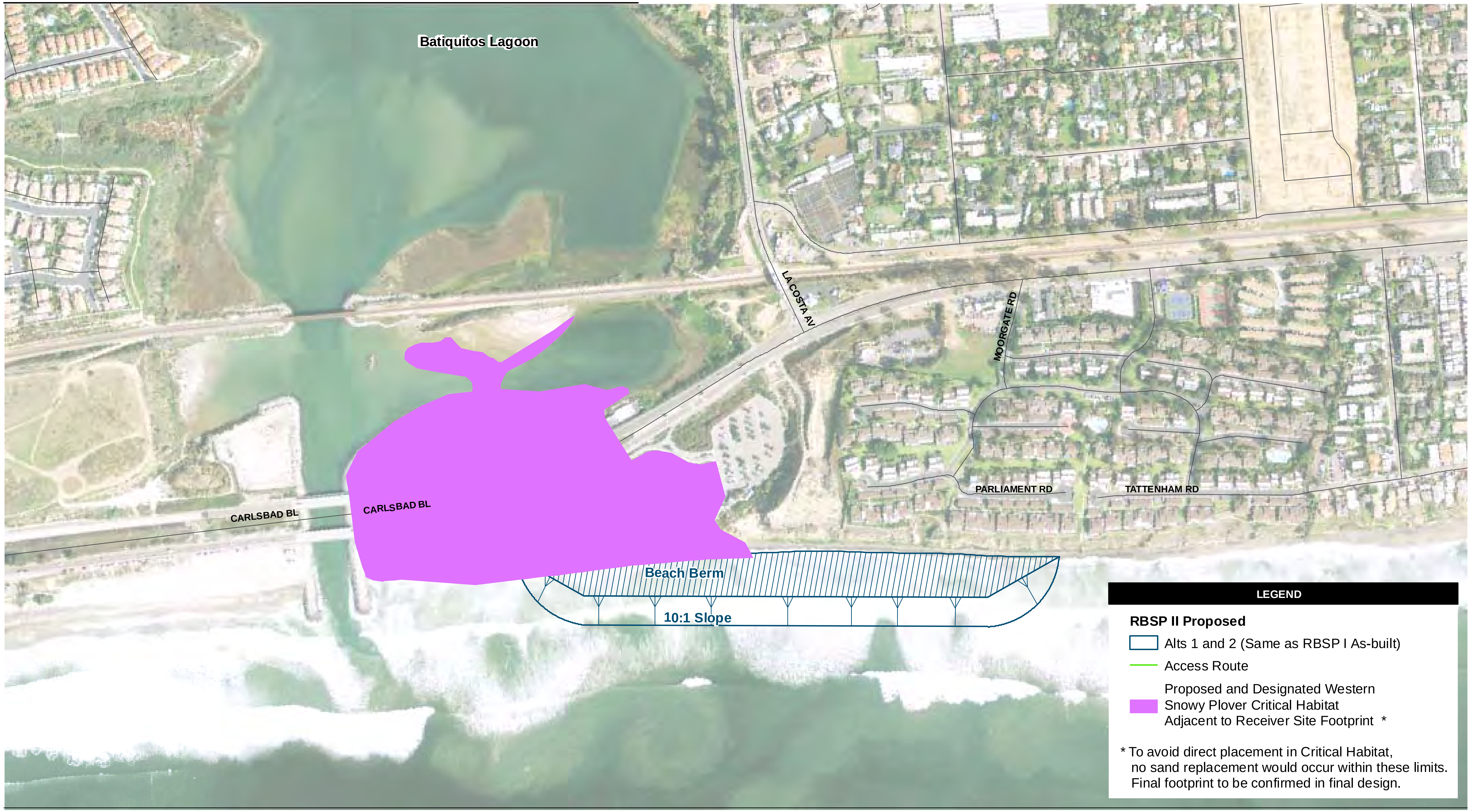

Source: USGS; SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

400 200 0 400 Feet

Scale: 1 = 4,800; 1 inch = 400 feet

Figure 2-7
Batiquitos Beach Receiver Site Alternatives

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Figure 2-8
Leucadia Beach Receiver Site Alternatives

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

500 250 0 500 Feet

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

Figure 2-9
Moonlight Beach Receiver Site Alternatives

Path: P:\2008\08080112 RBSP II EIR\6.0 GIS\6.3 Layout\RBSP_DetailMaps\Rev_Sept2010\MoonlightDetail.mxd, 01/18/11, SteinB

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

500 250 0 500 Feet

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

Figure 2-10
Cardiff Beach Receiver Site Alternatives

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Figure 2-11
Solana Beach Receiver Site Alternatives

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Source: SanGIS 2009; DigitalGlobe 2008; MoffattNichol 2009

500 250 0 500 Feet

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

Figure 2-12
Torrey Pines Beach Receiver Site Alternatives

Path: P:\2008\08080112 RBSP II EIR\6.0 GIS\6.3 Layout\RBSP_DetailMaps\Rev_Sept2010\TorreyPinesDetail.mxd, 01/18/11, SteinB

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Figure 2-13
Imperial Beach Receiver Site Alternatives

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The final receiver site is the **Imperial Beach** site. Under Alternative 1, this site has been relocated approximately 1,300 feet north compared to RBSP I. This shift would result in sand placement closer to the pier to improve the economic cost-benefit ratio at this site. Approximately 120,000 cy of fill is proposed along a 2,310-foot-long beach fill. The beach berm would be 120 feet wide at +12 feet MLLW.

Alternative 2

Alternative 2 would be similar to Alternative 1, with larger volumes at South Carlsbad North, Solana Beach, and Imperial Beach, and an additional site at South Carlsbad South. The total volume proposed for Alternative 2 is up to 2.7 mcy.

South Carlsbad North and South Carlsbad South are located north and south of Encinas Creek, respectively. For Alternative 2, the beach fill length would be increased to 3,100 feet for **South Carlsbad North** and the volume would be increased to 220,000 cy. The berm width would be 180 feet at an elevation of +13 feet MLLW. At **South Carlsbad South**, approximately 142,000 cy of sand is proposed over a 1,830-foot beach fill length. The berm width would be 170 feet at an elevation of +13 feet MLLW. Both of these sites are separated by an approximately 200-foot buffer at Encinas Creek.

The **Solana Beach** fill would be lengthened to 4,700 feet with approximately 360,000 cy of sand proposed for placement. The beach fill would extend north and south of Fletcher Cove. The berm width would be 135 feet with an elevation of +13 feet MLLW. **Imperial Beach** would also be expanded for Alternative 2. At this site, the beach fill would be extended to 5,750 feet in length and 650,000 cy of sand is proposed with a 260-foot-wide berm. The footprint would be extended 1,750 feet north and 1,700 feet south compared to Alternative 1. The southern boundary would be similar to that of RBSP I.

2.4.3 Construction Methods/Design Features to Avoid Impacts

This information is intended to provide a clear understanding of how sand would be dredged, delivered to the receiver site, and then manipulated to be suitable for public use. It also identifies the design features/specific methods to be incorporated into final design or the contractor's specifications to avoid significant impacts and minimize potential adverse impacts.

Construction would consist of:

1. Dredging the offshore borrow sites with either a hopper dredge or cutterhead suction dredge
2. Pumping sand through floating/submerged discharge lines to the beach and through discharge lines placed along the higher portions of the beach to the receiver sites (use of booster pumps as necessary)
3. Discharging the sand at the appropriate receiving beach within training dikes
4. Redistributing the sand as needed with earthmoving equipment, such as scrapers, and grading the beach fills to required dimensions with bulldozers

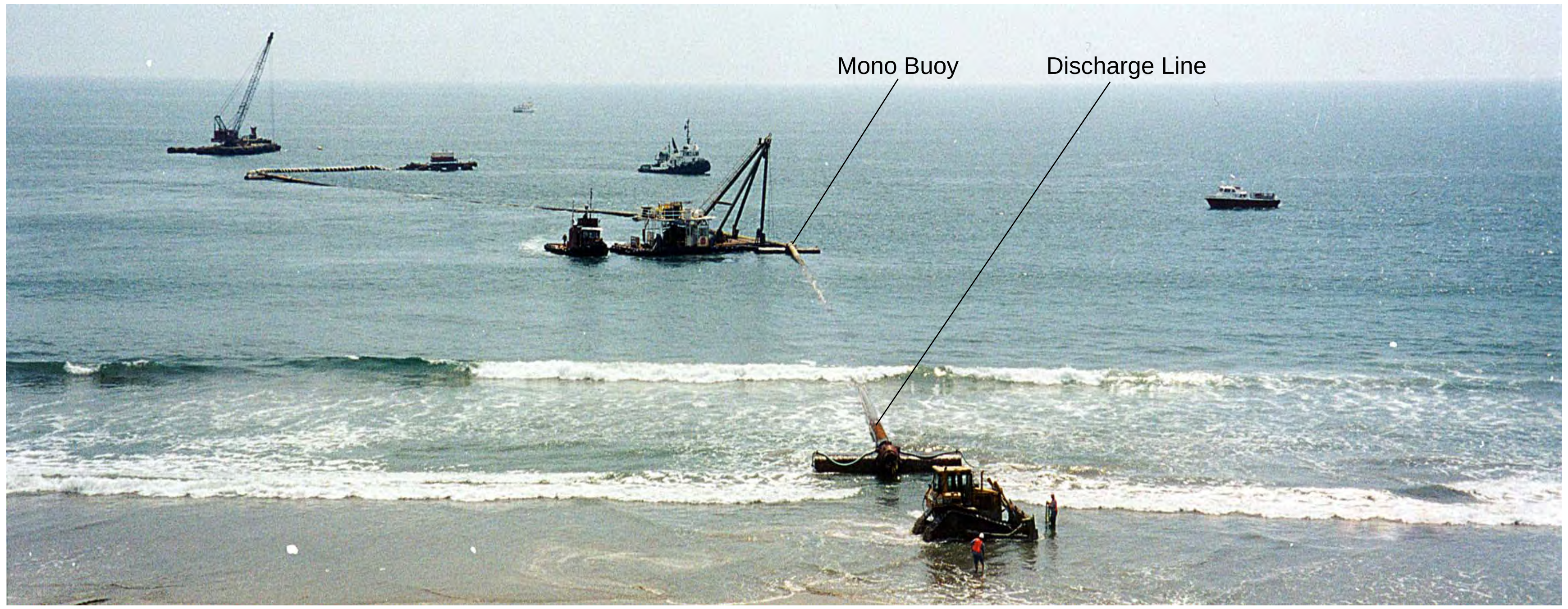
Dredging Operations

Beach replenishment operations would include the use of dredge vessels, which would dredge sediment from the offshore borrow sites and transfer the sediment to the proposed receiver sites. The contractors may use one of two types of dredge vessels, a hopper dredge or a cutterhead suction dredge; both are described below. Regardless of the dredge type, the U.S. Coast Guard would post a Notice to Mariners with the coordinates of dredging activity so that ocean users could avoid the activity. A hopper dredge was used for RBSP I and is anticipated for RBSP II. The cutterhead dredge alternative method is discussed to provide maximum flexibility for the contractor.

For both dredge vessels, discharge lines would have to be placed in the ocean. Some portions of these lines would be floating. The floating portion of the dredge discharge line would be marked and lighted for navigation safety and a Notice to Mariners would be issued through the U.S. Coast Guard. The discharge line would be trucked or floated in segments to the appropriate placement locations and assembled using cranes and other equipment. The line may be a combination of plastic high density polyethylene (HDPE) and steel materials, depending on need and availability, and would be approximately 30 inches in diameter. Figure 2-14 shows construction methods implemented during construction of RBSP I. Photo A depicts a dredge vessel and discharge line in the ocean.

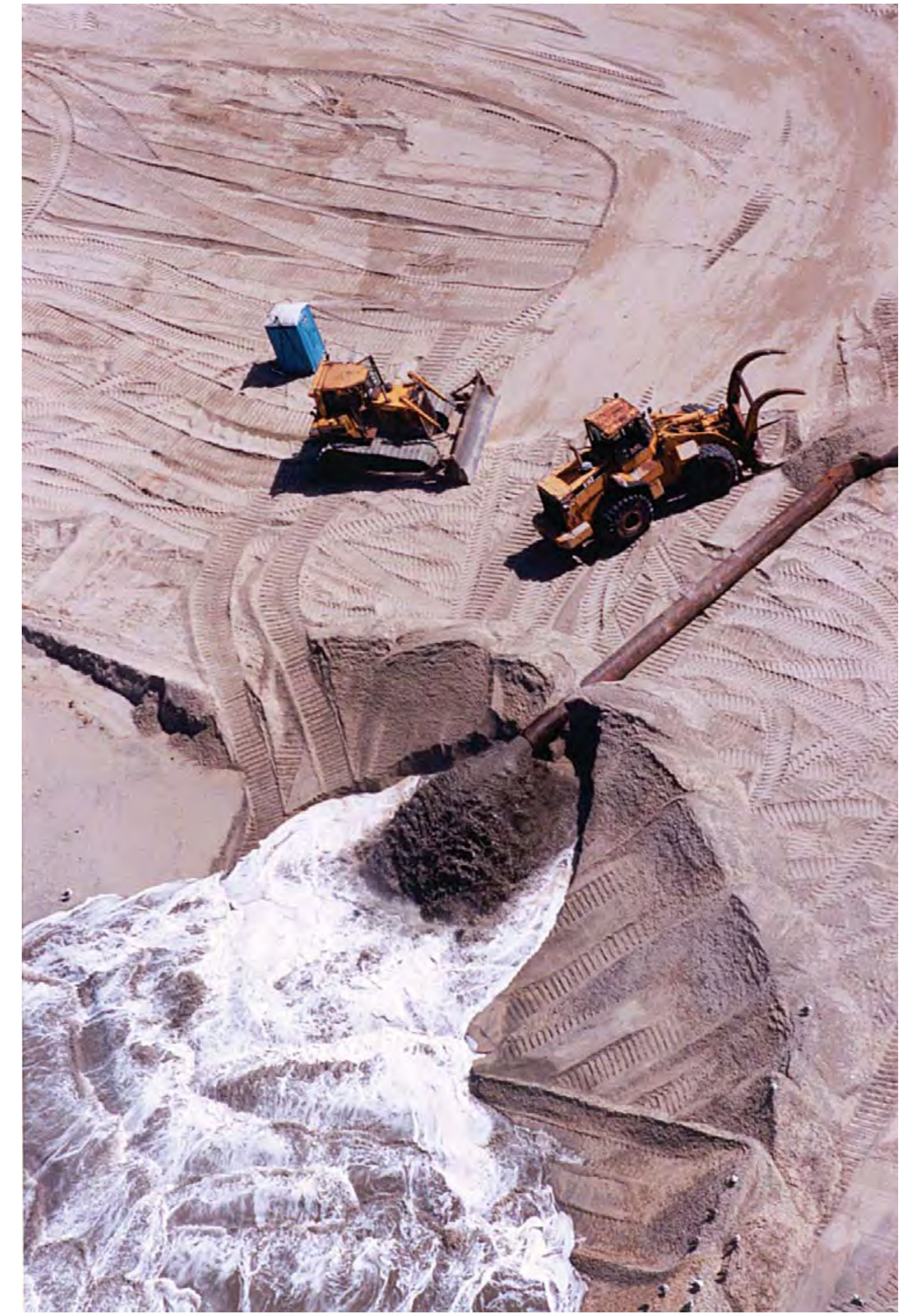
<u>Hopper Dredge</u>

The hopper dredge is a self-contained vessel that loads sediment from an offshore borrow site, then moves to a receiver site for sand placement. The hopper dredge contains two large arms that have the ability to drag along the ocean floor and collect sediment. The drag heads are about



Photograph A: Dredge Vessel and Discharge Line

Photograph B: Slurry Discharge and Training Dike



Photograph C: Slurry Discharge and Training Dike - View from Above

Source: Great Lakes Dredging and Dock Company

Figure 2-14
RBSP I Implementation Photographs

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10 feet square. The hopper dredge moves along the ocean surface with its arms extended, making passes back and forth until its hull is fully loaded with sediment. The vessel can hold approximately 2,000 to 5,000 cy of sediment per load.

The hopper dredge can be located just offshore of each site, as it can generally reach within approximately 0.5 mile of shore to offload. No booster pumps are needed as the hopper dredge connects to a floating or submerged pump line from shore. The vessel then pumps a slurry of sediment and sea water onto the receiver site.

The hopper dredge can also connect to a floating platform called a mono buoy, which is used to interconnect the floating pump line with a steel sinker pipeline that would run the rest of the distance to the beach. The mono buoy is generally anchored to the seabed at an appropriate depth and location to serve the project needs, depending on locations of sensitive resources and engineering considerations. For this project, the mono buoy would be anchored in at least 25 feet of water. The permit would include conditions to avoid sensitive resources such as kelp, reefs, and structures such as outfalls. An anchor plan would be prepared for each mono buoy for submittal to the resource agencies prior to construction illustrating the relationship between anchors on the ocean floor and identifying any sensitive resources in the vicinity.

Cutterhead Suction Dredge

A cutterhead suction dredge is similar to a hopper dredge in that it uses a long arm that extends down to the seafloor to dredge sediment. A rotating head about 8 feet in diameter sweeps an area approximately 300 feet wide. However, a cutterhead dredge breaks up sediment material along the seafloor, then uses a vacuum mechanism to suck sediment into an intake line and pump it directly to shore through a discharge line. The cutterhead dredge anchors above a borrow site while its arm swings back and forth to dredge up sediment. It then pumps a mixture of sediment and sea water through a floating discharge line directly onto the receiver site. The discharge line would either be assembled afloat, connected to the cutterhead suction dredge, and pulled to land by tugboats, or assembled on land and dragged offshore to the dredge by tugboat. Unlike the hopper dredge, the cutterhead dredge typically remains at the dredge site for the entire operation while pipelines carry the material. For some receiver sites proposed for RBSP II, the cutterhead dredge would be required to transit to the site to offload.

Booster pumps would be required approximately every 4 miles if a cutterhead suction dredge was used. Discharge pipes would either be floating in the ocean or onshore along the beach. A booster pump would be necessary between SO-6 and the Oceanside receiver site, for example. The exact locations of pumps are not known at this time.

For all pipeline delivery routes, the floating and submerged portions of the dredge discharge line would be routed to avoid sensitive resources and commercial fishing activities to the maximum extent feasible. For instance, the discharge line would extend westward beyond kelp beds to prevent dredge vessels from traversing kelp beds. Assuming use of a cutterhead suction dredge, the discharge line would require management and maintenance activities during the construction period. After replenishment was complete, all pipelines would be removed.

The dredge discharge line would either be floating or placed on the beach. During the operation, floating pipeline segments would be subject to weather and wave conditions. If substantial wave action was anticipated, any floating pipe would be temporarily dismantled until suitable wave conditions returned. The pipeline could then be temporarily staged along the beach and reconstructed once wave conditions allow. Given appropriate weather conditions, floating pipelines could be used at any of the borrow and receiver sites. Coordination with the U.S. Coast Guard, as described above, would be a critical component of floating pipeline placement.

Onshore pipeline segments would be placed along the back of the beach (i.e., eastward) to minimize exposure to wave forces. At locations with no existing shore protection, the discharge line would lie along the highest landward portion of the existing beach or cobble berm. These locations include much of North County. Beaches with no shore protection include most of North Oceanside, Buccaneer Beach, Batiquitos Beach, Moonlight Beach, and portions of Imperial Beach. At locations with bluffs behind the beach, the discharge line would lie along the bluff toe. Beaches with bluffs include South Carlsbad North, South Carlsbad South, Leucadia, and Solana Beach, and along south Torrey Pines. Some sites fall into both categories, depending on what specific point along their coast is being considered for pipeline placement. At locations with existing shore protection (revetment or seawalls), the line would be placed along the toe of the protective device. Sites with reaches of shore protection include Oceanside, North Carlsbad, certain sites at Leucadia and Solana Beach, and portions of Imperial Beach.

The discharge line would be placed on top of the existing sand or cobbles and buried at intervals to provide for pipe anchoring and for beach access to the public. Areas of active construction, i.e., where sand is being emitted from the pipe and redistributed by earthmoving equipment, would be cordoned off from the public with signs. Construction crews would also be on-site to monitor the construction site to prohibit public access. All other areas of the discharge line would be open to public use.

Maintenance of the discharge line would occur as necessary. The line may be affected by waves and tides and may periodically require added support, protection, or relocation. Earthmoving equipment and cranes may be used to maintain onshore portions of pipeline. More frequent line maintenance may be required along areas with a narrow existing beach backed by bluffs such as South Carlsbad North, Leucadia, Solana Beach, and Torrey Pines. Little room exists for line placement and protection at these sites. The line may be more exposed to waves and may be affected during high tides or waves. If floating, the line would be subject to weather and would need to be taken down 2 to 3 days prior to a predicted weather event. While this is a time-intensive process, the intent of maintenance is to provide safety and security for these temporary features.

Training Dikes

Training dikes would be constructed to reduce turbidity and aid in the retention of pumped sand at receiving beaches. The material coming from the dredge material discharge pipeline is a slurry mix of sand and water. Once the water flows back to the ocean, the heavier sand settles onto the beach. The training dike system consist of two dikes—one that is perpendicular to the beach connected to one that is parallel to the beach, forming an “L” with the long end parallel to shore. The dikes would be constructed using two bulldozers. Sand would be placed at a single discharge point behind (i.e., landward of) the dikes. The dikes would be used to direct the flow of the discharge and slow the velocity of the slurry effluent, thereby allowing more sediment to settle onto the beach instead of remaining in suspension and being transported back into the surf zone. The slurry discharge and training dike operation is illustrated in Photos B and C in Figure 2-14. Where sand is not present on the existing beach (e.g., Cardiff), an initial quantity of sand would be discharged on the highest portion of the beach at low tide for use in building a dike.

Beach Building

Beaches would be formed by deposition of sand from the dredge discharge line within the training dikes. Sand would be graded and spread along the beach to the dimensions of the beach fill plan using two bulldozers. One crane may be used to progressively move the discharge pipeline line along the beach as the fill is placed and the beach fill is lengthened. A maximum of 12 crew members would help to distribute the sand during beach building operations. Prior to beach building activities, SANDAG would notify the local jurisdiction and the local print media of the activity. Those entities would publicize the upcoming activity. SANDAG would also maintain a project website with current information regarding ongoing and soon-to-be-initiated project events (http://www.sandag.org/shoreline).

Sand placement around stationary lifeguard towers would occur without removing the towers. The line-of-sight would not be blocked as sand would be excavated to preserve lifeguard views if the fill is placed higher than the tower. This scenario is not anticipated as the towers are typically elevated sufficiently above the beach to avoid obstruction. Sand placement around storm drain outlets would be designed to allow proper drainage.

Equipment Management/Personnel Parking

Because beach replenishment activities would occur on a constant basis at the site and use only the fewest machines necessary, there would be minimal need for equipment storage. During replenishment activities, the vehicles would either be active or temporarily idle on the receiver site itself. Any fueling or maintenance activities would optimally occur at the nearest public street or parking lot, but there may be the need to set up limited staging areas at strategic locations. Optimally, construction personnel would also park near the receiver sites in public parking areas, but some limited parking areas may be required in staging areas.

Schedule

Sand placement operations for the proposed action are scheduled to begin in spring 2012. The exact timing for particular receiver sites would depend on the contractor selected to implement the dredging and disposal activities, the alternative selected for implementation, and construction work windows that may be required at receiver sites in proximity to sensitive species nesting sites. However, scheduling would be coordinated to the maximum extent possible to avoid conflicts with national holidays and scheduled major beach events.

Public Safety/Beach Closures

Due to construction activities associated with beach replenishment operations (e.g., pumping sand onto the beach, grading, and line moving and maintenance), portions of receiver sites directly affected by active replenishment and construction activities would be temporarily closed to public access. The entire reach of beach within receiver sites would not be closed for the entire duration of construction. Table 2-6 shows the approximate length within each receiver site that would be closed to the public per day, depending on the unique beach site characteristics as known at this time (e.g., width of existing beach, presence of bluffs, riprap) of each receiver site. Closure areas would shift as replenishment activities move along the shoreline and would be maintained on a 24-hour basis within immediately affected portions of the receiver site. Beach areas would be immediately reopened to public access once sand placement is completed.

Horizontal access along the back beach or adjacent public corridors would be maintained to either side of the active sand placement area at most of the receiver sties. Some sites may require temporarily restricted horizontal access if sand placement must extend to the back beach and no alternative horizontal access exists (e.g., where a wet beach directly abuts bluffs). In these locations, existing vertical access would be maintained.

Table 2-6
Receiver Site Closures during Construction

Receiver Site	Approximate Length of Receiver Site Closed per Day (feet)
Oceanside	175
North Carlsbad	250
South Carlsbad North	200
South Carlsbad South[1]	200
Batiquitos	175
Leucadia	325
Moonlight Beach	150
Cardiff	125
Solana Beach	200
Torrey Pines	100
Imperial Beach	300

[1] Receiver site under Alternative 2 only

During beach replenishment activities, staging areas and portions of each receiver site with active construction would be fenced for safety and security purposes. The contractor selected to perform the beach building operations would provide and maintain safety measures in the vicinity of the receiver sites, including fencing, barricades, and flag personnel as necessary.

Offshore Closures/Coordination with Commercial Fishermen

Highly productive fishing areas change from year to year, so it is difficult to anticipate specific areas that may be affected by the proposed project. Based on feedback regarding the implementation of RBSP I from fishermen during a stakeholder meeting process during project planning, a series of measures have been developed to reduce impacts to fishermen and commercial fishing associated with RBSP II. These include barge and work-boat transportation safeguards and closure areas meant to reduce gear conflicts, and sand dredging/placement guidelines.

A prime concern of fishermen with regard to RBSP II is the potential for gear loss associated with sediment removal and subsequent transport of sand to receiver sites. As part of the proposed project, borrow sites were designed to be outside of areas of concern to fishermen and would be clearly communicated to fishermen and fishermen associations via a Notice to Mariners prior to construction. This notification would occur 1 month prior to dredging operations. The location of floating/submerged discharge lines would also be communicated to fishermen and fishermen associations via a Notice to Mariners 1 month prior to operations so that gear conflicts could be minimized. In addition, project-specific notification would be distributed to fishing stakeholders regarding planned dredge and placement activity times and locations. The discharge lines would also be marked and lighted for navigation safety.

In addition to onshore restricted access, an offshore area would be restricted to allow proper anchoring of the dredge and pumping operations and to protect public safety. Each of the dredge locations would be publicized via a U.S. Coast Guard Notice to Mariners. Within that larger area, the Notice to Mariners would identify that a 500-foot buffer must be maintained around the active dredge equipment. That 500-foot buffer would vary throughout the day as the active dredge location shifted within the overall dredge area. A 300-foot restricted buffer would also be provided around the mono buoy where the hopper dredge (if used) would connect to the discharge line. The area would be restricted from nonconstruction activity to allow free movements of tug boats and crew boats to work within the immediate area. The area where the dredge pipeline is located would also be off-limits to nonconstruction activity to allow for uninhibited access to the dredge discharge line throughout construction. Tug and crew boats would have to remain within the restricted area, the area of the dredge discharge line, and the area between the mono buoy and offshore borrow site to limit possible entanglement with fishing gear. The Notice to Mariners would also identify the radio frequency used by the dredge operator to allow other boat operators to coordinate directly with the operator. A positioning device would be required on all tug and crew boats to record vessel position throughout the project to verify the location of contractor vessels during any instances of conflicts with commercial fishing gear.

A proactive effort would be made to coordinate with commercial fishermen in advance of dredging and during dredge operations to avoid conflicts and fishing gear loss. In addition to the required Notice to Mariners, written notices would be distributed to local fishing representatives. Notices would be posted in local harbors, and would be incorporated into the project website. The website would include a current overall project schedule with ongoing and soon-to-be-initiated project events. This website would serve the general public as well.

The Notice to Mariners would be issued 2 weeks before the initiation of dredge activities so that gear may be removed from the restricted area. At the initiation of dredge activities, a third-party observer would be aboard the dredging vessel to document any fishing gear in the restricted areas. Combining this documentation with Global Positioning System (GPS) logs of all contractor vessel movement within designated lanes, gear that is damaged or destroyed within the restricted area would not require compensation by the contractor. If gear outside the restricted areas is damaged or destroyed by the contractor's vessels, then compensation would be the responsibility of the contractor.

In an effort to reduce the impact on commercial fishing, sand placement would occur between March 25 and September 15, to the extent feasible, so as to not adversely affect lobster season. The lobster season generally runs from mid-October to mid-March. Addressing concerns regarding fisheries other than lobster (e.g., crab, urchin, and white sea bass) would also require coordination, but these fisheries do not involve the number of traps utilized by the lobster fishery, and coordination would be accordingly reduced during non-lobster season.

2.4.4 No Project/No Federal Action Alternative

The proposed beach nourishment is water dependent and must be conducted within USACE jurisdiction to be effectively implemented. Because a federal permit must be issued for any activities within USACE jurisdiction, the *no federal action* alternative is equivalent to the *no project* alternative.

Under the No Project Alternative, no dredging or beach replenishment activities would occur, and erosion at the region's beaches would continue without intervention. This alternative would not serve to enhance property protection, recreational opportunities, or the tourism value at specific receiver sites. In addition, if no sand is placed at specific receiver sites through sand replenishment activities, then no additional sand would be available for transport in the three littoral cells along the San Diego coastline. This could indirectly preclude the enhancement of other beach locations. Therefore, the regionwide benefit would also remain unaddressed under this alternative.

The No Project Alternative would have specific ramifications to the potential receiver sites, and some indirect relationships to the littoral cells, but would also not satisfy the regional goals of beach replenishment promulgated by the Working Group.

2.5 MONITORING AND MITIGATION FRAMEWORK

As part of the permits issued for RBSP I, a monitoring program was devised and implemented with elements occurring during the preconstruction, construction, and postconstruction phases. That program was identified in some detail in the *Operations Procedures, Mitigation Monitoring and Contingency Measures Plan* (KEA Environmental 2001) and it reflected very specific project characteristics associated with the selected alternative, the known contractor, the specific type of dredge (hopper instead of cutterhead), and specific conditions associated with permits issued by numerous regulatory agencies. While a detailed monitoring plan for RBSP II cannot be prepared until permit conditions are known, like RBSP I it is appropriate for the EA/EIR to describe the framework of the monitoring program that would be implemented for RBSP II based on the information available at this time and lessons learned from RBSP I monitoring. Postconstruction monitoring for RBSP I was primarily conducted to confirm that modeling predictions were accurate in anticipating that no significant impacts would occur. It is anticipated that the modeling approach for RBSP II, which is similar to RBSP I but uses updated information and more precise baseline data, would provide similar certainty in sand transport predictions. In general, where RBSP I monitoring confirmed no impacts occurred and receiver sites and volumes are similar for RBSP II, no postconstruction monitoring is proposed. The intent of project monitoring would be to verify that:

1. the project is carried out consistent with project design features as well as permit conditions, and
2. there are no long-term, significant impacts to sensitive biological resources in specific locations under Alternative 2 where there is greater risk of deposition and modeling uncertainty. If significant impacts are identified through monitoring, then mitigation would be required.

This section describes the framework for monitoring and mitigation for RBSP II. The final details would be determined upon selection of an alternative and negotiation of permit conditions with the resource agencies. Items such as exact monitoring locations would depend on the alternative to be implemented. Monitoring can be divided into three distinct phases:

1. preconstruction (initiated approximately 6 months prior to construction),
2. during construction (approximately 6–9 month duration), and
3. postconstruction (proposed 4 years after construction is complete).

Preconstruction monitoring would focus on verification of environmental constraints prior to construction, and also to establish a pre-project baseline for physical and biological conditions that would be subject to construction or postconstruction monitoring. Monitoring during construction would be required to ensure compliance with specific permit conditions and that site-specific resources are not significantly impacted (e.g., cultural resources). Because of the highly dynamic ocean system, focused postconstruction monitoring would be conducted for 4 years after implementation of RBSP II to understand project performance and to confirm no significant impacts occur to resources as a result of project implementation. Table 2-7 summarizes the monitoring that would be performed during each of the three construction phases by element.

Table 2-7
Summary of Monitoring Elements and Timing Requirements for RBSP II

Monitoring Element	EA/EIR Analysis Section	Monitoring Phase		
		Preconstruction	During Construction	Postconstruction
Beach Conditions	Various	✓		✓
Lagoon Conditions	4.2	✓		✓
Water Quality (Turbidity)	4.3		✓	
Biological Site Constraints	4.4	✓		
Nearshore Biological Resources	4.4	✓		✓
Threatened and Endangered Species	4.4		✓	
Grunion	4.4	✓	✓	
Marine Mammal and Turtle	4.4	✓	✓	
Pismo Clam	4.4	✓		
Cultural Resources	4.5	✓	✓	

2.5.1 Preconstruction Monitoring

In this phase, monitoring would be primarily conducted to support finalization of construction details, (e.g., anchor plans, pipeline routes) and to establish baseline existing conditions at long-term monitoring locations. Preconstruction monitoring tasks for RBSP II would establish baseline data at physical profile locations, lagoon mouths, and long-term biological monitoring locations. Assessment of receiver sites for potential habitat suitability to support spawning by California grunion would be conducted, depending on construction periods relative to spawning runs, to minimize adverse impacts. In addition, the presence of established Pismo clam beds would be determined by conducting preconstruction surveys at focused sites. Contractor educational efforts would also be initiated to alert workers to measures included in the Marine

Mammal and Turtle Contingency Plan and to potential sensitive resources and impact minimization measures to be implemented during construction.

Beach Conditions

SANDAG currently funds a regional shoreline monitoring program. This program has been ongoing since 1996 and includes fall and spring surveys at a number of transects located within and adjacent to proposed RBSP II receiver sites. This program provided coastal monitoring data before and after implementation of RBSP I and has continued to document regional coastline conditions. After monitoring specific to RBSP I was completed in 2005, the program was continued at a reduced level of effort. The program would be enhanced as part of RBSP II, similar to what was conducted for RBSP I, to provide additional monitoring information. The enhanced program would add transects at a number of locations as follows:

1. Select historical transects previously monitored for 4 years after RBSP I but discontinued since 2005 would be added back into the program to provide a long-term view of beach profiles in the region.
2. In general, the goal of transect placement is to have at least one profile within each fill footprint, and at least one profile located both upcoast and downcoast of the fill. Because some footprints at Oceanside, Solana Beach, and Imperial Beach have shifted relative to RBSP I, new transects would be added to ensure adequate coverage of profile data at each receiver site and regionally.
3. New transects also may be added to provide additional data regarding sand movement near long-term biological monitoring locations, if transects above would not be in locations of model-predicted deposition.

Under the enhanced program, approximately 60 transects would be profiled. Fall 2011 and spring 2012 profiles for all 60 transects would provide preconstruction baseline information for RBSP II.

Nearshore Biological Resources

Surveys would be conducted for two purposes: (1) to verify sensitive habitat constraints for finalization of construction plans, and (2) to establish baseline conditions for long-term biological monitoring.

Sensitive Habitat Constraints

RBSP II, like RBSP I, is intended to be constructed without direct impacts to offshore hard substrate. RBSP I construction plans were used to identify preliminary design locations for nearshore equipment placement and corridors (e.g., mono buoys, discharge pipelines) for RBSP II. More precise locations of anchoring, equipment placement, and pipeline corridors would be included in the final construction plans. After preparation of detailed construction plans, preconstruction surveys would be conducted to verify that direct impacts to sensitive hard-bottom habitats would be avoided. Underwater surveys would be conducted by diving biologists to confirm that hard-bottom habitats with sensitive indicator species (surfgrass, giant kelp, feather boa kelp, sea fan, sea palms) are not present in the proposed anchoring, mono buoy, and pipeline routes. If sensitive hard-bottom habitats are identified, alternate locations would be identified and similarly surveyed, as necessary, to ensure that direct impacts to sensitive habitats are avoided.

Sensitive Hard-Bottom Habitats

Long-term monitoring of nearshore reefs was conducted for 4 years after implementation of RBSP I to confirm that no significant impacts occurred to sensitive marine habitats. It is anticipated that potential impacts would be similar with RBSP II for those receiver sites with the same sand volumes, placement locations, and similar sand transport modeling results as RBSP I. Alternative 1 would provide similar volumes of sand at many of the same receiver sites as RBSP I, and no additional monitoring would be required for this alternative.

Several receiver sites under Alternative 2 would receive more sand than RBSP I or Alternative 1. Although impacts are anticipated to be less than significant based on modeling predictions for RBSP II, monitoring at nearshore reefs would be conducted to confirm no significant impacts occur in areas where modeling predictions exceed those of RBSP I and have the potential to increase sedimentation on reefs with sensitive indicators. The majority of receiver sites would not require additional monitoring under Alternative 2, if volumes and placement locations are similar to those proposed under Alternative 1 and implemented under RBSP I. The areas that have been identified as having potentially greater risk for sedimentation and requiring long-term monitoring under Alternative 2 include those with sensitive nearshore reef that would receive additional sand compared to Alternative 1 and RBSP I, at South Carlsbad (encompassing both South Carlsbad North and South Carlsbad South receiver sites) and Solana Beach.

While the specifics of the monitoring program are not yet developed, it is anticipated that preconstruction monitoring would consist of diving biologist transect surveys supplemented with multispectral aerial photography. Transects would be surveyed at each of the identified reef transects, where diving biologists would record the occurrence of sensitive indicator species, sand cover, and reef heights. This is similar to RBSP I monitoring. Transects would be oriented along bathymetry parallel to shore similar to methodology used between 2006 and 2009 to assess local reef habitats.

Multispectral aerial photography would be used to develop an updated aquatic vegetation habitat map similar to that produced by the Nearshore Program in 2002. The photograph would be georectified and input into the project GIS to support calculation of updated baseline acreages by habitat categories (surfgrass, kelp beds, understory algae). In addition, control site(s) may be used to assess any potential project-related impact.

Grunion

California grunion are managed as a game species by CDFG. They spawn on sandy beaches primarily from March to August, with their peak season falling between late March and early June. Potential habitat suitability of receiver sites to support grunion spawning would be assessed prior to finalizing the construction schedule to identify sites with more or less habitat suitability to support moderate to large grunion spawning runs. Habitat suitability would be assessed by a qualified biologist based on factors such as beach width, slope, and substrate conditions (e.g., sand depths, cobble, or riprap cover) relative to the high tide zone, and those sites with suitable habitat would be identified for monitoring during construction. Because habitat suitability may vary across seasons, an updated habitat suitability assessment would be conducted at least 2 weeks prior to construction at sites previously determined to be unsuitable to determine the need for grunion monitoring and other protective measures during construction. Results of the habitat suitability assessments would be submitted to the appropriate resources agencies (CDFG and NOAA).

Marine Mammal and Turtle

Marine mammals and turtles may be in the general vicinity of dredge and transit vessels during construction. A Marine Mammal and Turtle Contingency Plan would be prepared prior to construction to minimize potential interactions between project vessels and protected marine species. Preconstruction activities with respect to monitoring would focus on contractor education. A preconstruction contractor training would be conducted by a qualified biologist retained by SANDAG to educate workers with respect to protected marine species and avoidance measures required by the contingency plan. In addition, processes established in the plan if encounters between vessels and marine species occur will be reviewed.

Pismo Clam

At Imperial Beach, subadult-sized Pismo clams and relatively large, clam shells were observed north of the pier within the receiver site footprint (Alternative 2 only). The occurrence or extent of adult Pismo clams in the adjacent subtidal zone is not known. The location may or may not qualify as a clam bed. A preconstruction assessment of the minus tide zone north of the Imperial Beach Pier would be conducted to confirm the presence or absence of legal-sized adult Pismo clams (minimum of 4.5 inches) and their density if Alternative 2 is selected for implementation. If presence of a clam bed is confirmed (density greater than 0.07 individuals per square foot), measures such as a slow discharge rate or modification to the seaward edge of the fill, would be implemented to minimize impacts to that clam bed. Any minimization measures would be documented by the Environmental Coordinator, and the agencies notified.

Cultural Resources

Potential underwater cultural resources consist of archaeological resources and historic elements (e.g. shipwrecks) remaining at ancient river bed locations. The dredge areas at each borrow site have varying potential to affect such resources. Although the dredge areas have been located to avoid areas of high probability for underwater archaeological resources, there is the potential for such resources to be uncovered during dredging. Preconstruction activities with respect to monitoring focus on contractor education.

Similar to RBSP I, a preconstruction contractor training would be conducted to educate workers with respect to specific resource sensitivity and processes established if any resources are identified during construction activities. As part of the training effort, a constraints map and educational handout would be prepared and distributed to the contractor.

2.5.2 Monitoring during Construction

During the construction phase, monitoring would be conducted to comply with permit conditions and used to identify concerns and solutions in the immediate time frame, with the anticipation that adjustments could be made and significant impacts avoided. As with RBSP I, SANDAG would be committed to coordinating with commercial fishermen to avoid gear loss in the transit and dredge areas. Other specifics of the Notice to Mariners procedure prior to and during construction are discussed in Section 2.4.1.

Water Quality

Both RBSP I and RBSP II predict short-term localized turbidity due to construction. Construction monitoring for water quality would occur as directed by the Waste Discharge Requirements specified in the 401 Water Quality Certification. As with RBSP I, the 401 permit would likely establish parameters for water quality at specified distances from activity at the receiver sites and the borrow sites, and it would be necessary to perform verification that water quality is within those parameters. The 401 Certification requirements would establish the frequency and duration of monitoring, but it is anticipated that weekly monitoring would be required at both receiver sites and borrow areas during active construction. If monitoring identified water quality that exceeds permit thresholds, the Environmental Coordinator would inform the contractor so that immediate corrective actions can be taken to achieve compliance.

Threatened and Endangered Species

The endangered California least tern and threatened western snowy plover have the potential to occur in the vicinity of certain receiver sites during the breeding season. Least tern forage on fish in nearshore waters outside the surf zone during their breeding season, which extends from April 1 to September 15. Generally, least terns forage in waters close to nest sites (e.g., 1 mile) but may forage at greater distances if necessary. Snowy plovers forage on invertebrates and may occur at certain beaches, especially those close to nesting sites. Their breeding season extends from March 1 to September 15. Specific construction issues include water turbidity, which has the potential to affect the success of foraging, and construction activities in proximity to snowy plover nests and foraging areas, which have the potential to affect reproductive and foraging success.

During RBSP I, construction at the Batiquitos site, which is located less than 500 feet from least tern and snowy plover nest sites, was delayed until after August 1 and the cessation of nesting activities at the W-2 nesting site to minimize the potential to impact these species. A similar measure would be used for RBSP II to construct the Batiquitos receiver site. Sand placement at the Batiquitos receiver site would also occur outside of designated and proposed critical habitat for the western snowy plover. Prior to sand placement, a qualified biologist would flag the limits of critical habitat and all sand placement would occur outside of that limit. Other sites in proximity to snowy plover critical habitat or nest sites include Leucadia and Imperial Beach. The majority of these sites are located more than 1 mile from nest areas, and recent nesting activity has not been documented at either site.

Managing turbidity plumes was another measure used to minimize potential impacts to least terns during RBSP I. Training dikes, which were effective for controlling turbidity during RBSP I, are included as a project construction feature for RBSP II. Monitoring would be conducted in compliance with the 401 permit (see water quality above) to confirm that turbidity plumes remain localized. At sites in close proximity to least tern nesting locations, monitoring of turbidity plumes would be conducted if construction occurs within the breeding season. If monitoring identifies turbidity to exceed permitted thresholds, the Environmental Coordinator would inform the contractor so that immediate corrective actions may be taken to reduce the extent of turbidity plumes.

There is a historical nesting site at Los Peñasquitos Lagoon that could potentially be impacted during construction. Prior to construction of the Torrey Pines site, potential habitat suitability or use of historical nest sites at Los Peñasquitos Lagoon by least terns would be determined by coordination with the State Parks Service and confirmed with USFWS. If nesting activity is confirmed at that lagoon, turbidity monitoring in compliance with the 401 permit would be conducted at that site to ensure that plumes remain localized. Other receiver sites are located more than 1 mile from least tern nesting sites and would not require extra turbidity monitoring beyond that required by the 401 permit.

Grunion

Grunion monitoring would occur if construction coincided with the spawning season at those receiver sites with suitable grunion habitat. Monitoring would be initiated during grunion run dates specified by CDFG in their annual pamphlet *Expected Grunion Runs* immediately prior to construction starting (2 weeks or less) (CDFG 2010a). Grunion runs have a very specific 2-hour window each night, extending over 3 to 4 days. Monitoring would generally occur 30 minutes before the predicted run and terminate at the end of the predicted run.

If grunion spawning is observed, the vertical and horizontal area of the run would be flagged and mapped, and the nature of the run would be classified according to the Walker scale to determine the nature of the run. SANDAG would then coordinate with CDFG, USACE, CCC, and the National Marine Fisheries Service (NMFS) and proceed based on their direction. If the sand replenishment event were to occur over more than 2 weeks, grunion monitoring would occur for all predicted runs within the period of construction with similar coordination and implementation of protective measures, as necessary. Details of the specific grunion monitoring program and protective measures for RBSP II would be defined via the permitting process in coordination with the resource agencies.

Marine Mammal and Turtle

The Marine Mammal and Turtle Contingency Plan prepared for the project would be implemented by the contractor during construction of the project. Monitoring would include marine mammal observers on project vessels who would notify the vessel operator if a protected marine species is in the vicinity. Vessel operators and/or crew may also serve as observers, if they have received proper training. Vessel operators would comply with the plan components, which could include measures such as speed and course restrictions to minimize project vessel encounters with protected marine species.

Cultural Resources

As noted in Section 2.5.1, dredging at each borrow site has low to moderate potential to affect underwater cultural resources. High sensitivity areas would be avoided. To avoid significant archaeology impacts, monitoring would be required to review material that is dredged from each borrow site as it is discharged onto each receiver site.

The monitoring program would be guided by the probability for occurrence of archaeological resources. Where there is a low probability of occurrence, the monitor would be present during dredging of the borrow sites (cutterhead dredge) or when material is being pumped to the receiver site (hopper dredge) on average 2 days per week. This applies to SO-6 at depths up to 8 feet, all of SO-5, and MB-1 at depths up to 2 feet. Where the probability is moderate, the monitor would be present on average 3 days per week. This applies to SO-6 at depths between 8 and 20 feet and MB-1 at depths greater than 2 feet.

Monitoring would include intermittent presence of a qualified archeologist while material is being placed on receiver sites to observe discharged material. Presence and specific monitoring times would be based on consistent communication with the contractor regarding planned dredge depths and areas for each day. Appropriate communication equipment (two-way radios or cellular telephones) would allow for communication with dredge personnel. Daily ship logs would also be maintained regarding dredge position, time, and sediment depth of dredge activities. If the monitor observes cultural material suggesting that dredging has entered an archaeological site, then the dredging operation would be permanently relocated away from that site and a 250-foot-wide buffer would be established around the site. Site information would be recorded and filed at the South Coastal Information Center of the California Historical Resources Information System.

2.5.3 Postconstruction Monitoring

Postconstruction monitoring would be primarily focused on confirming the absence of significant impacts to sensitive nearshore biological resources that may occur as a result of sediment transport. As noted above, RBSP I had a broad spectrum of monitoring that covered nearshore biological resources for all of the receiver sites, as the processes and impacts associated with large-scale regional sand placement were relatively unknown. Monitoring from RBSP I did not identify significant long-term impacts to nearshore biological resources. Assessment of lagoon conditions in the post-RBSP I period indicated that the impact of the nourishment program was modest and short lived at Agua Hedionda, San Elijo, San Dieguito, and Los Peñasquitos. The findings at Batiquitos were inconclusive due to insufficient baseline information and ongoing basin configuration changes during the post-RBSP I period. To be cautious, SANDAG contributed financial resources to ongoing inlet maintenance after implementation of RBSP I. Based on biological monitoring results from RBSP I, SANDAG proposes to refine postconstruction monitoring locations and methodologies for RBSP II, as described below.

Beach Conditions

As noted in Section 2.5.1, SANDAG currently funds a regional shoreline monitoring program. This program would be expanded to include additional locations to be determined based on the alternative selected and long-term biological monitoring needs, if any. In addition to preconstruction baseline profiles in fall 2011 and spring 2012, each of the transects would be profiled twice a year for 4 years after project implementation (through fall 2016). As currently envisioned, the program would be similar to that implemented for RBSP I and include approximately 60 transects. This monitoring would provide information on fill performance and sand transport.

Lagoon Conditions

As noted previously, SANDAG has committed funds to individual lagoon entities to offset incremental shoaling anticipated as a result of RBSP II implementation. SANDAG would continue to implement an existing lagoon observation and analysis program that documents lagoon inlet conditions. The program relies primarily on an assessment of lagoon closure and maintenance records as a proxy for a change in sedimentation or lagoon performance relative to the historical condition. Direct observations in the form of semi-annual aerial photography and monthly ground photographs would also be obtained.

Nearshore Biological Resources

Sensitive Hard-Bottom Habitats

Postconstruction biological monitoring would be consistent with the preconstruction baseline monitoring locations and methodologies, and include reef transects and update of the nearshore habitat map using multispectral aerial photography. Monitoring is anticipated under Alternative 2 at specific locations associated with receiver sites with sensitive nearshore reef habitat proposed to receive larger volumes of sand and have higher rates of predicted sedimentation than Alternative 1 or RBSP I. Diver transects would be conducted for 4 years to enable distinction of short-term variability versus longer-term impacts; aerial photography would be conducted once at year 2 following construction to provide information on short-term habitat variability and again at year 4 for the final comparison of habitat conditions at the end of the monitoring period. A substantial reduction (to be defined through coordination with natural resource agencies based on monitoring results) in sensitive habitat indicators over the 4-year monitoring period compared to the baseline condition and relative to variations at control sites would be used to assess any potential project-related impacts. If a significant project-related impact is identified, as agreed upon by the resource agencies, at the end of the monitoring period, the habitat map would be used to estimate acreage of impact and SANDAG would coordinate with the resource agencies to provide mitigation, as required. Mitigation would be restoration of like habitat at a minimum 2:1 ratio unless the USACE receives and approves a functional assessment model and mitigation plan that restores the functions impacted.

2.5.4 Summary of Project Elements to Avoid Significant Impacts

Possible Mitigation Measures

Section 2.4.3 identifies numerous project design features and conditions that would be implemented by the contractor to avoid significant impacts. The design features, monitoring components, and mitigation commitments are considered in the determination of impact significance in Chapter 4. Table 2-8 provides a summary table of these features and commitments, identifying the purpose, timing, and entity responsible for implementation. No significant impacts are anticipated as a result of implementation of RBSP II. However, focused monitoring of specific sensitive biological habitats at Solana Beach is proposed to confirm no significant impacts occur as

Table 2-8
Summary of Design Features/Monitoring Commitments and Mitigation Measures (If Necessary)

Design Features	Purpose	Timing	Implementation Responsibility
Construct longitudinal training dikes at all receiver sites	Reduce nearshore turbidity	During beach-building	Construction contractor
Maintain project web site with current construction schedule	Timely public notification	At present and continuing through construction	SANDAG
Issue Notice to Mariners and maintain 300-foot buffer around mono buoy	Warn boaters/fishermen of dredging activities to ensure avoidance	Before and during dredging activities	Coast Guard (via construction contractor)
Restrict public access at receiver sites and 300 feet around mono-buoy	Public safety during construction	During beach-building activities	Construction contractor, in coordination with local lifeguards
Relocation of temporary lifeguard towers	Public safety during construction	During beach-building activities	Construction contractor, in coordination with local lifeguards
Sand placement to avoid blocking line-of-sight at permanent lifeguard towers	Public safety during construction	During beach-building activities	Construction contractor, in coordination with local lifeguards
Shield and direct night lighting toward the ocean and away from residences and habitat	Minimize effects on residents and sensitive species	During beach-building activities	Construction contractor
Contain fill material during sand placement near storm drain outlets	Continue proper drainage	During beach-building activities	Construction contractor, in coordination with City Engineer
Generate plan for hazardous spill containment	Ensure minimal contamination from fuel leak, if any	During beach building	Construction contractor
Coordination with commercial fishermen; issue Notice to Mariners; incorporate notices into SANDAG website	Avoid gear conflicts and provide for compensation if loss occurs	Before and during dredging operations	Coast Guard (via construction contractor) and SANDAG

Design Features	Purpose	Timing	Implementation Responsibility
Batiquitos receiver site to be constructed after September 15 (or August 1 with verification of cessation of least tern and snowy plover nesting at the W-2 nest site)	Avoid potential impacts to least tern and snowy plover nesting activities	Final engineering	Construction contractor
Flag limits of designated and proposed snowy plover critical habitat. Avoid sand placement within those limits.	Avoid direct impacts to critical habitat.	Prior to sand placement at Batiquitos and during construction.	Qualified biological consultant retained by SANDAG and construction contractor
Provide funds to remove potential predicted project-related sand accumulation to individual lagoon management entities or agencies	Maintain inlet conditions at potentially affected lagoons	Completion of construction	SANDAG
Condition contractor to avoid traversing CDFG artificial reef areas near MB-1 by hopper dredge	Avoid direct impacts and minimize indirect impacts to artificial reefs	Final engineering	Construction contractor
Condition contractor to avoid traversing kelp beds	Avoid direct impacts and minimize indirect impacts to kelp beds	Final engineering	Construction contractor
Condition contractor to avoid landfall of discharge pipeline north of the jetties of the Los Peñasquitos Lagoon jetties and south of Seacoast Boulevard in Imperial Beach	Avoid direct impact to critical habitat of western snowy plover	Final engineering	Construction contractor
Condition contractor to make landfall with discharge pipeline, or place mono buoy, north of Seacoast Boulevard in Imperial Beach	Avoid direct impacts to Tijuana Slough National Wildlife Refuge	Final engineering	Construction contractor
Design borrow sites to maintain 500 ft distance from artificial reefs, kelp, and other hard-bottom features	Avoid direct impacts to artificial reefs and kelp	Final engineering and during construction	Engineering contractor and construction contractor

Monitoring Commitments	Purpose	Timing	Implementation Responsibility
Conduct underwater survey of proposed anchoring, mono buoy, and routes of sinker discharge pipeline to verify absence of sensitive hard-bottom habitat; if found, relocate	Avoid direct impacts to sensitive hard-bottom habitats	Prior to construction	Qualified biological consultant retained by SANDAG
For Alternative 2, monitor rocky subtidal sensitive habitats in focused risk areas. Preconstruction and two postconstruction (years 2, 4) habitat maps	Verify no long-term adverse impacts to sensitive habitats due to sediment transport	Prior to construction and for four years, with bi-annual reports and one final report	Qualified biological consultant retained by SANDAG
Turbidity plume monitoring at receiver sites in close proximity of least tern nesting sites during the breeding season; if outside parameters then implement operational controls or halt dredging and discharge, as necessary until turbidity is within permitted parameters	Minimize potential indirect impacts to least tern foraging in vicinity of nesting sites	April 1 through September 15	Qualified biological consultant retained by SANDAG
Assess habitat suitability for grunion spawning prior to construction. Monitor for grunion spawning in construction area if suitable habitat present. If spawning observed, document extent and coordinate with CDFG, USACE, CCC, and NMFS and implement protective measures, as appropriate	Minimize impacts to grunion	March through August and per CDFG annual pamphlet *Expected Grunion Runs* (CDFG 2010a)	Qualified biological consultant retained by SANDAG

Monitoring Commitments	Purpose	Timing	Implementation Responsibility
Conduct a preconstruction assessment of the minus tide zone north of the Imperial Beach Pier to confirm presence/absence of Pismo clam beds. If present, implement and document impact minimization measures (e.g., slow discharge rate or modification to the seaward edge of the fill), as warranted, and notify regulatory agencies	Minimize impacts to Pismo clam beds	Prior to initiation of construction (Alternative 2 only)	Qualified biological consultant retained by SANDAG
Implement a Marine Mammal and Turtle Contingency Plan	Reduce interactions between vessels and protected marine species	Prior to initiation of construction and during construction	Qualified biological consultant retained by SANDAG
Monitor for possible underwater historic and archaeological resources. If resources found, establish a 250-foot buffer around receiver site and record with appropriate clearinghouse	Identify any significant archaeological resources (if present) to map and avoid	During project construction	Qualified cultural resource consultant retained by SANDAG
Monitor water quality per RWQCB 401 Certification, if outside parameters then implement operational controls or halt dredging and discharge, as necessary	Verify permit compliance	During beach building as per RWQCB 401 Certification	Qualified biological consultant retained by SANDAG

a result of project implementation (only if Alternative 2 is implemented). If significant impacts are identified via that monitoring, SANDAG (funded by the city in which monitoring had occurred) would provide mitigation through habitat restoration of sensitive marine habitats at a 2:1 ratio. Mitigation would be restoration of like habitat as a first priority, then out-of-kind artificial reef restoration if like habitat restoration is found not to be feasible, unless a functional assessment is approved as noted above. Feasibility of surfgrass restoration must be determined by implementation of an experimental pilot program.

Similar to RBSP I, SANDAG would try to negotiate a "not-to-exceed" cap on mitigation costs as a key part of the permit conditions related to mitigation. The potential worst-case acreage for 2:1 enhancement/replacement would be based on the acreage of sensitive habitat potentially subject to partial burial. If monitoring identifies significant long-term impacts, SANDAG, in cooperation with the city in which impacts occur, would prepare a mitigation plan in coordination with the agencies and implement required mitigation. As noted above, that mitigation would involve restoration of like habitat as a first priority. In the case of surfgrass mitigation, feasibility would be determined by an experimental 5-year pilot project of at least 25% of the area confirmed to have been impacted, or not less than 0.1 acre, or some minimum size otherwise acceptable to the resource agencies. If that experimental project was determined not to be successful or full areal mitigation not likely to be feasible, then 2:1 mitigation of out-of-kind habitat would be implemented via augmenting an existing natural reef. The decision regarding implementating out-of-kind mitigation would be done in consultation with the regulatory and resource agencies. For context, as part of RBSP I permit negotiations, SANDAG committed to funding mitigation for significant impacts confirmed through monitoring at a 1:1 ratio. Mitigation would have been restoration of like habitat as a first priority, with consideration given to the construction of artificial reefs if like habitat restoration efforts were determined to not be feasible. No experimental pilot program was required for surfgrass. No mitigation was ultimately required, however, since monitoring confirmed no significant impacts occurred with implementation of the project.

2.6 ALTERNATIVES COMPARISON

The intent of both NEPA and CEQA is to ensure that information about the scope of a project and its potential environmental effects are made available to public officials and citizens before decisions are made and actions undertaken. Accordingly, this EA/EIR evaluates two potential alternatives for implementation of RBSP II and the No Project Alternative. CEQA requires an EIR to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison. NEPA requires that each alternative be evaluated at an equal level of detail.

A comparison of the two action alternatives reveals no issue areas where one alternative is anticipated to have a significant impact that another alternative would lessen or avoid. In fact, given project design features and the monitoring and implementation commitments described in Sections 2.4 and 2.5, neither action alternative would result in significant impacts. There would be only minor differences in terms of potential impacts. For the issue areas of geology and soils, coastal wetlands, water resources, cultural resources, land and water use, aesthetics, socioeconomics, public health and safety, structures and utilities, traffic, air quality, and noise, the relative difference would be very minor. For the issue area of biological resources, there would be incrementally variable impacts.

For the issue area of biology, the incremental difference between the two project alternatives would be related to potential indirect sedimentation impacts. Alternative 1 essentially replicates RBSP I, which was successfully implemented in 2001. Monitoring was conducted for 4 years after construction to confirm no significant impacts occurred due to project implementation. While some of the receiver sites have been slightly shifted in location up or down the beach, these shifts have reduced potential effects to nearshore resources by moving the footprints further from hard bottom areas. No significant impacts to sensitive biological resources have been identified under Alternative 2 either, however there are some additional areas of risk for sedimentation of reef and resources due to additional volumes proposed for placement at some receiver sites compared to RBSP I and Alternative 1. Under Alternative 1, there is a risk for partial sedimentation of up to 0.1 acre of surfgrass and 1.1 acres of reef with sensitive indicators. Under Alternative 2, a risk for partial sedimentation of up to 0.9 acre of surfgrass and 3.0 acres of reef with sensitive indicators is identified. Burial of up to 2.5 acres of reef with sensitive acres is also possible. These potential impacts are identified as less than significant based on monitoring from RBSP I and model predictions. While the relative difference between alternatives could be approximately 5 acres, since both estimates are based on predictions of an inherently dynamic system with variable weather and wave conditions, the level of uncertainty would suggest these different values may not be great enough to discriminate between the two alternatives. In order to confirm no significant impacts occur to areas of higher risk, focused monitoring at these sites is recommended if Alternative 2 is selected.

Based on the above analysis, there may be less indirect sedimentation impacts with implementation of Alternative 1. Impacts anticipated with both alternatives would be less than significant, however, and the difference between the alternatives may not be large enough to discriminate between the two with the level of uncertainty in predicting seasonal and annual wave climate and weather patterns that could affect sand transport in the system.

Another method of comparing the two action alternatives is their effectiveness at satisfying the project purpose and need. Following the guidance provided in the *Guidelines for the Implementation of CEQA* (Cal. Code Regs. Title 14 § 15126.6(D)), Table 2-9 has been developed to compare the alternatives in this function. (The No Project Alternative fails to meet the purpose and need and therefore is not analyzed in this table.) As shown, both alternatives would replenish beaches in accordance with the SPS and RSM Plan; however, Alternative 2 would replenish more receiver sites, create more total beach area (postconstruction), and provide a buffer between wave action and structures at a greater number of locations adjacent to bluffs.

Table 2-9
Effectiveness of Alternatives at Satisfying the Purpose and Need

Project Purpose and Need	Alternative 1	Alternative 2	Alternative That Best Meets Purpose and Need
Replenish Eroded Beaches in Accordance with SPS and RSM Plan	Satisfies Need	Satisfies Need	Both alternatives meet need of replenishing eroded beaches but Alternative 2 replenishes one additional eroded beaches.
Replenish Littoral Cells and Receiver Sites	Replenishes 2 Littoral Cells and 10 Receiver Sites	Replenishes 2 Littoral Cells and 11 Receiver Sites	Alternative 2 has maximum number of receiver sites.
Enhance Recreational Opportunities and Access	New recreational beach area would be created at more sites along the coastline to create a postconstruction total beach area of 225 acres; access correspondingly improved.	New recreational beach area would be created at fewer sites to create a postconstruction total beach area of 244 acres; access correspondingly improved.	Alternative 2 has greatest amount of postconstruction total beach area and improved access.
Enhance Tourism Potential	Tourism potential is directly related to area of recreational beach created.	Tourism potential is directly related to area of recreational beach created.	Alternative 2 has greatest acreage of recreational beach added.
Protect Public Property and Infrastructure	Total of 10 receiver sites where additional sand would temporarily increase the buffer between wave activity and structures. Four of the 10 receiver sites are located entirely or partially in front of bluffs.	Total of 11 receiver sites where additional sand would temporarily increase the buffer between wave activity and structures. Five of the 11 receiver sites are located entirely or partially in front of bluffs.	Alternative 2 has greater number of sites overall in front of bluffs.

CEQA requires disclosure of the environmentally superior alternative and, if the No Project Alternative is environmentally superior, it requires identification of a superior alternative among the other alternatives (§15126.6(e)(2)). As described above, neither Alternative 1 nor Alternative 2 would result in long-term significant impacts to any issue area. For the issue area of biological resources, there would be an incrementally higher risk of sedimentation to a greater area of sensitive marine habitats under Alternative 2. However, these impacts would be considered less than significant, and Alternative 2 would better satisfy the project purpose and need. Therefore, neither alternative is clearly environmentally superior to the other.

2.7 PERMITS REQUIRED

Various approvals and permits would be necessary for implementation of the proposed action. The project as a whole would need various federal and state permits. Individual receiver sites within the seven jurisdictions would need appropriate local approvals. Table 2-10 lists the permits and approvals required for each site, excluding the permits to be issued by individual jurisdictions that may vary by receiver site. Site-specific approvals from local jurisdictions are listed in Table 2-11. Agencies that may issue permits or approvals may use information presented in this EA/EIR to assist in the decision-making process.

As shown in Tables 2-10 and 2-11, the types of permits can vary widely by jurisdiction and by the type of applicant. One key variation is the permitting/approval process in the coastal zone. Some background is useful to understand this process.

The federal Coastal Zone Management Act of 1972, as amended, requires that federal actions within a state's coastal zone be consistent with the federally approved coastal zone management plan for that state (if one exists). The California Coastal Act of 1976 (Cal. Code Regs. Title 14 § 30000) led to the adoption of a federally approved coastal zone management program for California. Federal consistency with the California coastal zone management program is based on the coastal resource planning and management policies contained in Chapter 3 of the California Coastal Act. The policies in Chapter 3 generally relate to public access, recreation, the marine environment, land resources, development, and industrial uses. Within California, the federal proponent of an action must prepare a Coastal Consistency Determination (CCD) evaluating the consistency of that action with Chapter 3 of the California Coastal Act. The federal entity must obtain concurrence from the California Coastal Commission (CCC) prior to proceeding with the action.

Table 2-10
Matrix of Key Project Approvals and Discretionary Actions

	SANDAG Board of Directors	U.S. Army Corps of Engineers	U.S. Fish and Wildlife Service	U.S. Environmental Protection Agency	National Marine Fisheries Service	California Dept. of Fish and Game	Regional Water Quality Control Board	State Water Resources Control Board	California Coastal Commission	State Lands Commission	San Diego Air Pollution Control District	California Dept. of Parks and Recreation	State Mining and Geology Board
EIR Certification	•												
Issue Finding of No Significant Impact (FONSI)		•											
404 Permit		•	❍	❍	❍		❍						
401 Certification Order				❍	❍		•	❍					
Stormwater Pollution Prevention Plan (SWPPP)				❍	❍		•	❍					
Coastal Consistency Determination/ Coastal Development Permit		❍							•				
Lease Agreement for Utilization of Sovereign Lands										•			
Authority to Construct/Permit to Operate											•		
Letter of Non-Objection						•						•	
Reclamation Plan and Mining Permit													•

• = Permitting/Approval Agency
❍ = Reviewing/Participating Agency

Table 2-11
List of Approvals/Permits to Be Issued by Local Jurisdictions

Name of Jurisdiction	Applicable Receiver Sites	Approval/Permit
City of Oceanside	Oceanside	Local coastal development permit; noise variance; local authorization to utilize sovereign lands
City of Carlsbad	North Carlsbad, South Carlsbad North, South Carlsbad South	Noise variance issued by City Engineer (North Carlsbad)
City of Encinitas	Batiquitos, Leucadia, Moonlight Beach, Cardiff	Local coastal development permit; noise variance
City of Solana Beach	Solana Beach	Noise variance
City San Diego	Torrey Pines	Local authorization to utilize sovereign lands (includes receiver site and borrow site MB-1)
City of Imperial Beach	Imperial Beach	Local coastal development permit; noise variance
Port of San Diego	Imperial Beach	Local coastal development permit for sovereign lands; Board of Commissioners authorizes sand placement

At the state level, the California Coastal Act requires each local jurisdiction along the coast to prepare and submit for state certification a Local Coastal Program (LCP) for that portion of its area located within a specified coastal zone. The LCP consists of two parts. The first is a Land Use Plan with goals and regulatory policies, and the second is a set of Implementing Ordinances. Once the CCC certifies both elements, the local jurisdiction is granted permitting authority. However, the CCC retains direct permitting authority over some lands within the agency's original jurisdiction that are not within the purview of the local jurisdiction. In addition, the CCC retains permitting authority over submerged lands seaward of the mean high tide line. Therefore, the responsibility for issuing coastal development permits for an action proposed by a nonfederal entity is project specific with regard to original jurisdiction lands and the mean high tide line.

The location of the mean high tide line varies substantially by season and depends on prior beach replenishment actions. For example, the history of harbor dredging and beach replenishment at Oceanside and nearby beaches to the south has resulted in a change in the historic mean high tide line. Mapping from 1960 and 1972 identifies a more landward mean high tide line in many locations, typically located at the base of small bluffs or locations of shoreline protection such as riprap. The California State Lands Commission (CSLC) would provide direction to the CCC and local jurisdictions regarding this boundary for purposes of this project.

Because the intent of both the federal CCD and the state/local coastal development permit process is to ensure consistency with the California Coastal Act, where a project is jointly proposed by a federal and local entity, one concurrence by the CCC may satisfy both requirements. For purposes of this project, the state and local coastal development permits would be obtained for individual receiver sites depending on the status of the local permitting authority, and these would serve to satisfy the federal CCD requirement.

The cities of Oceanside, Encinitas, and Imperial Beach have an LCP effectively certified for all segments of their respective coastlines, which grants each jurisdiction the authority to issue local coastal development permits. The cities of Carlsbad and San Diego have permitting authority for portions of their coastlines. However, San Diego does not have permitting authority for the certain segments encompassed by the project. In Carlsbad, all sand placement would occur seaward of the mean high tide line, which remains in CCC jurisdiction, so no local permit would be required from Carlsbad. The City of Solana Beach does not have an approved LCP yet but does issue other discretionary project permits. Therefore, the CCC would issue the coastal development permit for the entire action within each receiver site in the jurisdictions of Carlsbad, San Diego, and Solana Beach. In Oceanside and Encinitas, which have been granted authority to issue local coastal development permits, the proposed project may place sand both seaward and landward of the mean high tide line. If sand placement occurs landward of the mean high tideline, permits would be necessary from both the local jurisdiction and the CCC.

In the City of Solana Beach, once the LCP is certified, the City would have jurisdiction to issue coastal development permits for projects landward of the mean high tide line. Both before and after certification of the LCP, the CCC retains original jurisdiction with respect to projects seaward of the mean high tide line (i.e., on tidelands, submerged lands, filled and unfilled public trust lands) and any areas within the coastal zone for which the LCP has not yet been certified.

In the City of Imperial Beach, the project could be both seaward and landward of the mean high tide line. The City has an approved LCP and would issue the local permit, but the CCC has granted sovereign lands to the Port of San Diego in this location so the Port would therefore issue a permit for that area seaward of the mean high tide line (as necessary).

All permits issued for developments within an area appealable to the CCC must be approved through a public hearing process. Appeal jurisdiction for the CCC includes geographic areas between the sea and the first public road paralleling the sea or within 300 feet of the inland extent of any beach or the mean high tide line where there is no beach, whichever is the greater distance; and any areas located within 300 feet landward of the top of the seaward face of any coastal bluff, or within 100 feet landward of any wetland, estuary, or stream; and any major public works project or major energy facility costing more than $100,000 within the coastal zone. In cases where proposed development is bisected by the coastal development permit jurisdiction boundary line, an applicant may, if all parties are in agreement (i.e., the City, the CCC, and the property owner), apply for a consolidated coastal development permit from the CCC without needing to obtain a coastal development permit from the City. The Chapter 3 policies of the California Coastal Act are the standard of review for such permits, with the City's certified LCP used for guidance.

California has nearly 4 million acres of “sovereign lands” that includes the beds of (1) more than 120 rivers, streams, and sloughs; (2) nearly 40 nontidal navigable lakes, such as Lake Tahoe and Clear Lake; (3) the tidal navigable bays and lagoons; and (4) the tide and submerged lands adjacent to the entire coast and offshore islands of California from the mean high tide line to 3 nautical miles offshore. This watery domain is managed by the CSLC. The sovereign lands can only be used for public purpose consistent with provisions of the Public Trust such as fishing, water-dependent commerce and navigation, ecological preservation, and scientific study (CSLC 2010a). The use of these lands would require an application to the CSLC for leases or permits (CSLC 2010b).

Table 2-11 also identifies two cities that have been granted sovereign land by the CSLC (San Diego and Oceanside) who may issue authorization for utilization of those lands. The Port of San Diego has similar permit authority in Imperial Beach and would authorize sand placement at that site. This is similar to the lease agreement issued by the CSLC for receiver sites in other cities.

In some cases, Table 2-11 also indicates the need for issuance of noise variances. A variance would be required, where the local noise ordinance is applicable, to operate 7 days a week within a 24-hour period. Such nighttime operations would be outside the limitations of the pertinent noise ordinance. More discussion of this topic is provided Sections 3.13 and 4.13 (Noise).

The State Mining and Geology Board issued an exemption from the requirements of the Surface Mining and Reclamation Act (SMARA) for RBSP I. It is anticipated that a similar exemption would be issued for RBSP II.

CDFG adopted final Marine Preserve Area (MPA) regulations under the Marine Life Protection Act (MLPA) for the South Coast Study Region in December 2010. The regulations restrict specific activities within designated preserves but identify exceptions within specific MPA boundaries, including dredging and sand replenishment. In addition, documents published by CDFG describing the new regulations state that these exceptions are included because MPA designation is not intended to interfere with permitted activities and that these activities are regulated by other federal, state, and local agencies whose jurisdictions cannot be pre-empted through designation of MPAs under the MLPA. Therefore, no additional permitting requirements are anticipated as a result of new MPA regulations.

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CHAPTER 3.0
AFFECTED ENVIRONMENT

Chapter 3 details the Affected Environment of the proposed project study area. The Affected Environment describes baseline existing conditions within the area of the proposed action, which is defined as the coastal San Diego region. This is the area in which resources may be directly or indirectly affected by the proposed action.

Specific receiver site footprints vary by width and length under the different project alternatives. In the Affected Environment discussion, the largest alternative footprint is used to define the project boundary. Chapter 4 details the impacts associated with each of the receiver sites, where necessary, to fully address potential environmental effects of the different alternative footprints.

As noted above, this section of the EA/EIR describes the baseline existing conditions for each environmental resource against which the potential impacts of the proposed action will be compared. Generally, the project baseline under CEQA or NEPA is defined as existing conditions at the time the EA/EIR is initiated, in this case with the issuance of the NOP. The baseline year for this project is therefore 2010, which is the year the NOP was issued and the spring after most of the offshore and beach survey work and modeling were performed.

Determining a baseline condition for most projects is relatively straightforward, since many resources remain relatively static or change slowly over time. The coastal littoral process is a dynamic process, however, as discussed in Section 1.1. The coastal sand cycle is both annual and seasonal; as a result, the baseline is not a static condition, as illustrated in Figure 2-1. Because of this cyclical nature, defining the baseline for the project must take into account this fluctuation in "existing conditions." The baseline for this project therefore varies depending on the resource being evaluated. For example, site visits were conducted for the aesthetic analysis in both fall and summer to capture variability on receiver sites to the extent possible. Noise levels at beaches, however, are predominantly determined by surf breaking on beaches, and are not expected to vary substantially over time. Updated measurements were therefore taken at each receiver site to confirm RBSP I measurements.

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3.1 GEOLOGY AND SOILS

This section of the EA/EIR provides general information and a regional perspective on coastal geology, beaches and shoreline configuration, tides and sea level changes, wave processes, and littoral processes. Existing geologic conditions were based on several reports and documents, including Appendix B of this EA/EIR, *San Diego Regional Beach Sand Project II Final Phase 1 Report* (Moffatt & Nichol 2009a); *Geotechnical Assessment Offshore Sand Sources Report* (URS 2009); *Vibracore Sampling Final Report* (Alpine Ocean Seismic Survey, Inc. 2008); *Sampling Results for Offshore Borrow Site Sediments Memorandum* (Moffatt & Nichol 2010a); and the previous *RBSP I EIR/EA* (SCH No. 1999041104) (SANDAG 1999).

For purposes of this report, geology and soils include coastal geology and littoral processes of the receiver sites and the composition of the offshore borrow sites. Coastal geology and beach configuration are determined primarily by wave forces acting on the geologic framework. These factors account for the area's rugged undersea and land topography, including the narrow continental shelf, the rocky substrate under most beach areas, and the thin layer of sediment, as well as coastal marine terraces, sea cliffs, and lagoons.

The following subsections focus on the existing geologic conditions and littoral processes that make up the individual receiver sites, and the composition of the proposed borrow sites. More information regarding turbidity issues can be found in Sections 3.3 and 4.3 (Water Resources), while more detailed lagoon information is found in Sections 3.2 and 4.2 (Coastal Wetlands).

3.1.1 Littoral Processes of the Three Littoral Cells

Oceanside Littoral Cell

The Oceanside Littoral Cell extends from Dana Point, in Orange County, south to the Scripps–La Jolla Submarine Canyon system at La Jolla Shores, near the foot of Mount Soledad (Figure 1-3). Oceanside Harbor is located approximately in the middle of this littoral cell. The harbor jetties interrupt the natural flow of sand and to a large extent divide the cell into subcells north and south of Oceanside Harbor. Ten of the proposed 11 receiver sites for the proposed project are located along the southern half of the Oceanside Littoral Cell, excluding the Imperial Beach receiver site. Two of the proposed three borrow sites, SO-5 and SO-6, are located within the Oceanside Littoral Cell.

Historical longshore transport rates and shoreline changes are well documented in the CCSTWS (USACE 1991). This study 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. In addition, the CCSTWS concluded that the most critical reach in terms of susceptibility to future erosion in the San Diego region is the 12-mile stretch of beach from Oceanside Harbor south to Encinitas (page xi). The shoreline immediately south of the harbor retreated at a rate of approximately 40 feet per year (1980 to 1989). The size of retreat decreased with distance from the harbor, and averaged only 1 foot per year at the southern end of the reach near Encinitas. Factors contributing to the trend in this reach include the cluster storms of in 1982–1983 and the reduced rate of artificial nourishment (USACE 1991).

Extensive studies of longshore transport rates have been conducted on the Oceanside Littoral Cell. Table 3.1-1 summarizes potential sediment transport rates, as identified by previous researchers. Results indicate a net southerly sediment transport at rates ranging between approximately 0 to 550,000 cy per year, with the average being approximately 250,000 cy per year (Moffatt & Nichol 2000).

Table 3.1-1
Potential Longshore Sediment Transport Rate Estimates for the Oceanside Littoral Cell

Study	Northerly cy/yr	Southerly cy/yr	Net cy/yr
Marine Advisors (1961)	545,000	760,000	215,000
Hales (1978)	541,000	643,000	102,000
Inman and Jenkins (1983)	553,000	807,000	254,000

Source: FRH 1997

Historical sources of sediment for Oceanside Littoral Cell beaches include 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 increased the rate of sedimentation in lagoons. Thus, current sources of onshore littoral material primarily include rivers, bluffs, and artificial fills.

Several other elements also contribute to the decline of sediments within the littoral cell. Storms carry sediment away from the nearshore area and deposit it on the continental slope. The Oceanside Littoral Cell slope is steep; therefore, littoral material can be permanently lost from the littoral zone because it is moved to beyond the depth of closure. Additionally, littoral transport between Oceanside and La Jolla is affected by two submarine canyons located at Carlsbad and La Jolla. La Jolla acts as a substantial sediment sink for littoral material. As a result of a reduction in littoral material sources, coupled with the loss of material from storms into submarine canyons, a net reduction in available natural sources of beach replenishment is occurring.

Mission Bay Littoral Cell

The Mission Bay Littoral Cell is a 16.5-mile-long coastal segment bounded on the north by Point La Jolla and on the south by Point Loma, at the entrance to San Diego Bay (refer to Figure 1-3). The north and south portions of this littoral cell are composed of high rocky bluffs containing pocket beaches of small areal extent. The central 4-mile-long part of this cell contains sandy beaches including Pacific Beach, Mission Beach, and Ocean Beach. The coast between Mission Beach and Ocean Beach is divided by the jettied entrance to Mission Bay and the San Diego River outlet.

Within the Mission Bay Littoral Cell, longshore shifts in sediment volume occur frequently in response to changing wave conditions. Typically, northerly shifts of sediment are experienced during the winter, while this pattern reverses in the summer. One study suggested that an annual net northerly sediment transport rate of 20,000 cy exists along the Mission Bay Littoral Cell (Hales 1979); the USACE estimates a net longshore sediment transport between 20,000 to 90,000 cy per year to the south (USACE 1991).

None of the proposed receiver site locations for the proposed project are located within the Mission Bay Littoral Cell. However, one of the borrow sites, MB-1, is located within the Mission Bay Littoral Cell, offshore of Mission Beach and north of the Mission Bay jetties.

Silver Strand Littoral Cell

The Silver Strand Littoral Cell extends over a 17-mile-long coastal reach from the headland at the south end of the Playas de Tijuana, Mexico, to Zuniga Jetty located immediately east of the entrance to San Diego Bay (refer to Figure 1-3). The primary physical features of this littoral cell include the coastal bluffs of the Playa de Tijuana, the Tijuana River delta, and the broad sandy beaches of the Silver Strand. An effective sediment sink in this littoral cell is a shoal located adjacent to Zuniga Jetty, where beach sand transported north along the Silver Strand beaches becomes impounded in the lee of Point Loma. Historical beach recession has occurred south of Coronado and at Imperial Beach.

Sand transport along the beach in this littoral cell is generally in a net northward direction. Net longshore sediment transport to the north measures between 120,000 to 200,000 cy per year (Moffatt & Nichol 2000).

The proposed Imperial Beach receiver site for the proposed project is located within the Silver Strand Littoral Cell. No borrow sites are proposed within this littoral cell.

3.1.2 Receiver Sites

Offshore of all receiver sites, a naturally forming nearshore sandbar exists that typically receives sediment from the exposed beach during the winter season. The length and width of the nearshore bar vary by season, from effects of longshore current and sand transport, and by geography. Impacts to the nearshore sandbars as a result of sand replenishment activities are discussed in Section 4.1. All of the receiver sites are located in BECAs, as identified in the RSM Plan and CSMW Survey.

For all receiver sites, seismic activity associated with the Rose Canyon fault and other nearby faults may lead to liquefaction, ground failure, sand volcanoes, and seaward slumping of beach material. The Rose Canyon fault is an active fault that roughly parallels the San Diego region coastline from north to south, crisscrossing from the ocean to land near La Jolla.

Oceanside

The Oceanside receiver site was previously utilized for RBSP I, although the location of the site has been shifted 1,800 feet north toward the Oceanside Pier. The Oceanside receiver site was formed from sand and rocks that originated from upland erosion. The receiver site is a predominantly flat, sandy beach that consists of a relatively thin sand and cobble layer varying in width on a shallow, rock platform. Unusually large waves can expose the rock layer by moving the sand offshore or down the coast. The receiver site is relatively wide, although beach widths decrease south of Wisconsin Avenue as the wave sheltering effect from Oceanside Harbor no longer plays a role. Beach widths south of Oceanside Harbor, however, are presently narrower than they were historically due to the net decrease of river sand inputs and the effect of the harbor, which prevents transport of sand from north to south. The Oceanside receiver site is located within the 12-mile stretch of beach defined in the CCSTWS as the most critical reach for future erosion.

Oceanside Harbor is dredged annually by the USACE to maintain sufficient depth for boat traffic. Dredged material is typically disposed of by placing it on Oceanside beaches south of Tyson Street and north to Wisconsin Avenue. The average amount of material placed on the beach is 175,000 cy. The most recent activity (spring 2010) placed an estimated 268,000 cy of sand between the San Luis Rey River and the Oceanside Pier.

North Carlsbad

The North Carlsbad receiver site is similar to RBSP I. The North Carlsbad receiver site was formed from the same process as Oceanside and has the same geology with a thin layer of sand and cobble atop bedrock. South of Buena Vista Lagoon, the existing receiver site is relatively narrow with an abundance of cobbles. The receiver site is backed by marine terraces that reach a height of approximately 30 feet. Beach widths from Oceanside Harbor to La Jolla are narrower than they were historically as a combined consequence of a net decrease of river sand inputs and the trapping effect of the Oceanside Harbor on the littoral transport of sand from the north. This site also lies within the 12-mile length of beach area with critical erosion problems per the CCSTWS.

South Carlsbad (North and South)

The South Carlsbad North receiver site is similar to RBSP I but extends an additional 1,000 feet to the north in the maximum length alternative. The South Carlsbad South receiver site was not included in RBSP I. The South Carlsbad receiver sites are located on a low tide terrace, which lies in front of coastal cliffs between Agua Hedionda and Batiquitos Lagoon. The steep coastal cliffs in this area 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 South Carlsbad South receiver site consists of eroded flat beach predominantly composed of cobbles. The existing receiver site composes the flat, rocky, shallow part of the shoreline and is part of the critical erosion area defined by CCSTWS.

Batiquitos

The Batiquitos receiver site would be similar to RBSP I. The Batiquitos receiver site is located on a low terrace, which lies in front of coastal cliffs south of Batiquitos Lagoon. The steep coastal cliffs in this area have been continually forming due to wave action cutting against the marine terrace. The existing receiver site composes the flat, mixed sand and rock shallow part of the shoreline visible during periods of low tide.

Batiquitos Lagoon was formed in the geologic past when the sea level was at a lower level, the shoreline was located farther to the west, and existing streams quickly eroded the exposed marine terraces. This led to the formation of steep canyons and, as the sea level rose (approximately 18,000 years ago), sediments quickly filled the lower reaches of the channels that created the lagoon. Batiquitos Lagoon is currently a tidal lagoon due to an enhancement project completed in early 1997 that opened the inlet channel to tidal flows. As a result of the Batiquitos Lagoon Enhancement Project completed in 1997, continued dredging and sand placement occur every 2 years to maintain the lagoon (the last performed in 2006). Dredging and sand placement have occurred periodically over the last 10 years, yielding approximately 110,000 cy of dredged materials, which have historically been placed on local beaches north and south of the inlet channel. Additional placement as discussed in Chapter 5 has also occurred historically (e.g., Pacific Station). Future dredging is projected to provide up to 165,000 cy, anticipated to be placed on City of Carlsbad and Encinitas beaches in fall 2011.

The Batiquitos receiver site is located within the Oceanside Littoral Cell and is subject to similar transport processes as those described for the Oceanside receiver site. The receiver site is located within a critical erosional area (USACE 1991).

Leucadia

The Leucadia receiver site is similar to RBSP I and 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 have been continually forming due to wave action cutting against the marine terrace. The existing receiver site comprises the flat, rocky, shallow part of the shoreline visible during periods of low tide.

The Leucadia receiver site is located within the Oceanside Littoral Cell and is subject to similar transport processes as those described for the Oceanside receiver site. The Leucadia receiver site is located within a critical erosional area (USACE 1991).

Moonlight Beach

The Moonlight Beach receiver site is similar to RBSP I. The Moonlight Beach receiver site was formed from sand and rocks that originated from upland erosion. The receiver site consists of a relatively thin sand layer, which varies in width and lies on a shallow rock platform. The receiver site is relatively wide although beach widths decrease to the north and south, where coastal bluffs line the coast. Riprap is located at the northern extent of the receiver site to protect residential uses.

Since 2000, 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 spring from inland sand-borrow areas for placement on the upland portion of the beach. In addition, in March 2010, approximately 5,000 cy of sand was dispersed at intertidal portions of Moonlight Beach with the construction of a multistory parking garage at Scripps Memorial Hospital. This sand placement project was authorized under the City's SCOUP program.

The Moonlight Beach receiver site is located within the Oceanside Littoral Cell and is subject to similar transport processes as those described for the Oceanside receiver site. The Moonlight Beach receiver site is located within a critical erosional area (USACE 1991).

Cardiff

The Cardiff receiver site is similar to RBSP I. The Cardiff receiver site consists of a rocky (cobble) beach that lies on a shallow, wave cut platform. The beach area has been stripped of most of its sand from large waves that typically occur during the winter months. Riprap extends along the northern extent of the receiver site to protect existing restaurants.

The receiver site is located directly seaward of San Elijo Lagoon and south of the lagoon mouth. The lagoon was formed during lower stands of sea level, when the shoreline was farther to the west and existing streams quickly eroded the exposed marine terraces. This formed steep canyons and, as the sea level rose (approximately 18,000 years ago), sediments quickly filled the lower reaches of the channels and created the lagoon (FRH 1997). San Elijo is still currently a tidal lagoon because the channels are not completely full of sediments. The San Elijo Lagoon Mouth Opening 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. Opening occurs twice annually on an as-needed basis. An average of 20,000 cy is bypassed from the lagoon to the beach to the south per event.

The Cardiff receiver site is within the Oceanside Littoral Cell and is subject to similar transport processes as described for the Oceanside receiver site. The Cardiff receiver site is not located within the critical erosional area south of Oceanside Harbor (as identified by the CCSTWS).

Solana Beach

The Solana Beach receiver site is similar to RBSP I but would extend an additional 1,000 feet to the north and 1,800 feet to the south under the maximum length alternative, for a total length of 4,700 feet. The Solana Beach receiver 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 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 existing receiver site consists of scattered rocks and cobbles and comprises the flat, rocky, shallow part of the shoreline visible during low tide.

The Solana Beach receiver site is within the Oceanside Littoral Cell and is subject to similar transport processes as described for the Oceanside receiver site. This receiver site is located within the critical beach erosion area (as identified by the CSMW [2010]).

Torrey Pines

The Torrey Pines receiver site is similar to RBSP I. The Torrey Pines receiver 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 receiver site comprises the flat, rocky, shallow part of the shoreline visible during low tide.

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.

The Torrey Pines receiver site is situated within the Oceanside Littoral Cell and is subject to similar transport processes as described for the Oceanside receiver site. According to the CCSTWS, the Torrey Pines receiver site is not located within a critical erosional area.

Imperial Beach

The Imperial Beach receiver site is similar to RBSP I but has been shifted or extended north, past the pier. Under Alternative 1, this site has been relocated approximately 1,300 feet north compared to RBSP I. Under Alternative 2, the footprint would be similar to that proposed in Alternative 1 but would be extended 1,750 feet north and 1,700 feet south. The southern boundary would be similar to that of RBSP I.

The Imperial Beach receiver site is located on a low tide terrace. The existing receiver site comprises the flat, shallow part of the shoreline visible during high and low tides. The receiver site is a depositional area of sediment from the Tijuana River. The Imperial Beach receiver site is located within the Silver Strand Littoral Cell.

3.1.3 Borrow Sites

Marine geophysical surveys and vibracore investigations were conducted along the San Diego coastline to map the horizontal and vertical extent, and compute the volume, of beach-quality sand at numerous possible borrow sites. The marine geophysical surveys included the use of subbottom profiling to produce maps that show the type and extent of the surface (e.g., silt, sand, gravel, cobble) and natural (e.g., bedrock exposures) or cultural features (e.g., boats, pipelines) on the seafloor. Sediment layers were mapped at 10 feet and 30 feet below the seabed. The borrow sites were defined originally in large rectangles or other polygons for purposes of investigation. Over time, dredge areas have been defined within the original borrow sites. The description below pertains to the original site so the dredge area shown in Figures 2-1 to 2-3 represent a smaller subset of the described area.

Sediment core samples (approximately 20 feet deep) were taken at 57 locations within eight work areas between Imperial Beach and Oceanside in October 2008 (Alpine Ocean Seismic Survey, Inc. 2008). Subsamples from the sediment cores were later studied in a laboratory to determine grain size and chemical make-up for evaluating compatibility between borrow site material and sand at the receiver sites.

Tables 2-1 and 2-3 show various construction characteristics of the borrow sites. The discussion below includes additional information about the dredge sites regarding geology and soils, including the volume and thickness of silt overburden and the thickness of the sand layer. The dredge areas shown in Figures 2-1 through 2-3 are based on as-built maps from 2001 and geophysical surveys from 2008. The RBSP I dredge areas are moderately changed from their original depth. Because they are outside the depth of closure, sand movement is minimal. It is unknown when the dredge areas would return to their original topographic condition. However, as confirmed in 2009 biological surveys, the habitat is recovered and conditions are similar to offshore areas within similar depth that have not been dredged (Section 4.4). Further, approximately 1 foot of sedimentation was observed in the RBSP I borrow sites.

SO-6

Site SO-6 is located in the Swami's SMCA offshore of San Elijo Lagoon and south of the RBSP I SO-6 borrow site, on the south side of the San Elijo wastewater outfall pipeline (see Figure 2-1). The previous SO-6 borrow site yielded good-quality coarse sand; however, continued dredging encountered hard-bottom areas as well as refusal on bedrock. Based on the geophysical surveys, a southerly expansion of the previous SO-6 borrow site was deemed more likely to provide an adequate volume of suitable beach material.

The project dredge area covers approximately 44 acres of surface area and contains approximately 700,000 cy of sand. The results of the grain size analysis indicate that most, if not all, of the sediment within SO-6 is acceptable for beach replenishment purposes. The SO-6 borrow site consists of medium-grain sand with an average grain size of 0.35 millimeter (mm). Overall, the sand is a mix of medium-grain sand (55.51%), fine-grain sand (38.55%), and silt/clay (5.94%). There is no silt overburden at this borrow site.

SO-5

Site SO-5 is located offshore of San Dieguito Lagoon. The borrow site has been shifted closer to shore and to the north to intersect the offshore paleochannel of the San Dieguito River, as compared to RBSP I (see Figure 2-2). The previous SO-5 borrow site yielded some fine-grained material. The marine surveys indicated that the deepest portion of the paleochannel appears to be in the northern portion of the survey area, with the seafloor texture appearing to be sandy.

The project dredge area covers a surface area of approximately 124 acres and contains almost 2,000,000 cy of sand. The results of the grain size analysis indicate that most, if not all, of the sediment within SO-5 is acceptable for beach replenishment purposes. The SO-5 borrow site consists of fine-grain sand with an average grain size of 0.59 mm. Overall, the sand is a mix of fine-grain sand (76.74%), silt/clay (17.97%), and medium-grain sand (5.29%). There is no silt overburden at this borrow site.

MB-1

Site MB-1 is located offshore of Mission Beach and north of the Mission Bay jetties, as shown in Figure 2-3, and is immediately adjacent to the south and east boundaries of the borrow site identified for RBSP I. This borrow site is located within the offshore paleochannel of the San Diego River. The previous dredge site provided good-quality coarse sand; hard-bottom conditions were not encountered. For the proposed project, potential geologic constraints include shallow bedrock indicated along the margins of the study area. The proposed MB-1 borrow site was selected to avoid the shallow bedrock areas, as well as a number of shipwrecks and other cultural features that are known to exist in the area.

The project dredge area covers a surface area of approximately 107 acres and contains almost 1,600,000 cy of sand. The results of the grain size analysis indicate that most, if not all, of the sediment within MB-1 is acceptable for beach replenishment purposes. The MB-1 borrow site consists of medium-grain sand with an average grain size of 0.51 mm. Overall, the sand is a mix of medium-grain sand (89.43%), fine-grain sand (9.85%), and silt/clay (0.72%). There is no silt overburden at this borrow site. Of all the proposed borrow sites, this site contains the largest overall volume of suitable sand for beach replenishment.

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3.2 COASTAL WETLANDS

Coastal wetlands discussed in this section include estuaries and streams that occur in the vicinity of the proposed receiver sites or borrow sites. Coastal wetlands in the vicinity of the proposed receiver sites include the San Luis Rey River, Loma Alta Creek, Buena Vista Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Peñasquitos Lagoon, and Tijuana Estuary. Proposed borrow sites are located in the offshore vicinity of San Elijo Lagoon, San Dieguito Lagoon, and Mission Bay.

Several of the wetlands are ecological reserves, as listed below. State Marine Parks or Marine Reserve designations refer to waters below the mean high tide line within the larger ecological reserves.

- Buena Vista Lagoon – State Marine Park (Ecological Reserve)
- Aqua Hedionda Lagoon – State Marine Reserve (Ecological Reserve)
- Batiquitos Lagoon – State Marine Park (Ecological Reserve)
- San Elijo Lagoon – State Marine Park (Ecological Reserve)
- San Dieguito Lagoon – State Marine Park (Ecological Reserve)
- Tijuana Estuary – Tijuana Slough National Wildlife Refuge, Tijuana River National Estuarine Research Reserve

Three of the above-listed wetlands are also designated as State Marine Conservation Areas (SMCA) under the California MLPA, including Batiquitos Lagoon, San Elijo Lagoon, and the Tijuana River Mouth.

Coastal wetlands include some combination of open water, channels, mudflats, salt marsh, and upland habitats. Creeks and rivers with outlets to the ocean provide long corridors of open water including transition from salt freshwater and stream banks, and often include adjacent riparian (freshwater influenced shrubs and trees) habitats. Due to their diversity of habitats, coastal wetlands are sensitive areas that support primary living, foraging, and reproductive habitat for hundreds of species of invertebrates, fish, birds, and plants (CCC 1987). San Diego coastal wetlands with open inlets to the ocean are important nursery habitats for marine fish and all are important foraging and stopover locations for migratory birds along the Pacific Flyway. In addition, the coastal wetlands support several endangered and threatened animal and plant species.

Habitat quality and ecosystem functions of estuaries and lagoons are highly influenced by their surrounding watershed and connection to the ocean. Erosion and runoff may lead to habitat degradation associated with sediment buildup and reduced tidal exchange. Estuaries and lagoons also are sediment sinks for sands moving along the coastline and may require periodic dredging or excavation to maintain an open inlet to tidal exchange.

Ecological restoration was conducted at Batiquitos Lagoon to remove sedimentation, maintain tidal exchange, increase aquatic habitats, and provide nesting locations for endangered California least terns (*Sterna antillarum browni*) and threatened snowy plovers (*Chardrius alexandrinus nivosus*). San Dieguito Lagoon is currently in the process of being restored. Restoration projects are planned at Buena Vista and San Elijo lagoons.

The following are brief descriptions of the coastal wetlands within the project area.

San Luis Rey River

The San Luis Rey River outlet is approximately 2 miles north of the proposed Oceanside receiver site alternatives. The ocean mouth is open intermittently due to the presence of a sand barrier and low freshwater flows. The San Luis Rey River wetland excluding the river corridor covers approximately 294 acres and has a watershed area of 560 square miles. The watershed is located below Henshaw Dam, which has reduced the average sediment yield of the river to the coast by approximately 32% (Slagel and Griggs 2006). The effects of sediment trapping by Henshaw Dam have been exacerbated with other effects such as channelization and instream sand and gravel mining (Kondolf 1997). In addition, water from the San Luis Rey River is diverted approximately 10 miles downstream of Henshaw Dam to serve the municipal drinking water needs of customers in Escondido and Vista (City of Oceanside Clean Water Program 2010a). The river is listed as an impaired water body with chloride and total dissolved solids. Riparian habitat is the dominant habitat type followed by estuarine open water. Endangered California least terns forage near the mouth of the river and nest farther north at U.S. Marine Corps Base Camp Pendleton (MCBCP). Upstream riparian areas support other endangered species such as the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*). The draft Southern California Steelhead Recovery Plan designates the San Luis Rey River wetland as a high priority watershed (NMFS 2009).

Loma Alta Creek/Slough

The proposed Oceanside receiver site alternatives are located on the beach directly in front of the creek. The Loma Alta Creek (or slough) is a seasonal freshwater creek that discharges into the ocean near Buccaneer Beach Park. The creek is just over 7 miles long and is urbanized along most of its length (City of Oceanside Clean Water Program 2010b). It is listed as an impaired water body with high levels of bacteria and nutrients. The creek flows under Pacific Street through a cement culvert. The outlet area crosses a small steep sand beach that is confined by riprap on both sides. A small freshwater marsh is located east of the outlet area. During the dry season, the creek outlet to the ocean is closed by a sand berm.

Buena Vista Lagoon

Buena Vista Lagoon is located approximately 1,000 feet downcoast of the proposed Oceanside receiver site alternatives and is adjacent to the North Carlsbad receiver site alternatives. Buena Vista Lagoon is a State Ecological Reserve managed by the California Department of Fish and Game (CDFG). Historically, it was a tidal lagoon; however, since 1940 the inlet has been closed by a man-made weir (a dam used to raise the lagoon's water level and control flow at the mouth). The lagoon covers approximately 223 acres with the primary habitats being freshwater/brackish water and marsh, although there is a small remnant coastal saltmarsh. The lagoon historically received discharges of secondary treated wastewater and has experienced sewage spills. Accumulated sludge, plant detritus, excess nutrients, and contained basin combine to cause eutrophic conditions. The lagoon is considered an impaired water body with high levels of bacteria, nutrients, and sediment. Over 82 species of wildlife have been documented at the lagoon (Coastal Environments 2000). The lagoon is a migratory bird stopover point and general habitat for herons, egrets, and dabbling and diving ducks. The lagoon supports endangered species such as the light-footed clapper rail (*Rallus longirostris*) and Belding's savannah sparrows (*Ammodramus sandwichensis beldingi*). Endangered California least tern and fully protected California brown pelican (*Pelecanus occidentalis*) may forage in the lagoon. Although proposed as critical habitat for the tidewater goby (*Eucyclogobius newberryi*) in 2000, Buena Vista Lagoon was excluded in the final designation of critical habitat for the species (USFWS 2008).

Agua Hedionda Lagoon

The ocean inlet to Agua Hedionda Lagoon is located approximately 4,000 feet south of the proposed North Carlsbad receiver site alternatives and approximately 1.5 miles north of the proposed South Carlsbad North receiver site alternatives. Aqua Hedionda has been a tidal lagoon since 1954 when San Diego Gas and Electric completed a large-scale dredging project to provide a deep water basin and cooling water for the Encina Power Plant, which is now owned and operated by NRG Energy. The lagoon is approximately 400 acres in size and consists primarily of open water habitat. Tidal mudflats occur along the shore and eelgrass occurs subtidally along the shoreline. A coastal salt marsh occurs at the eastern end of the lagoon. These habitats support approximately 70 species of fish, 175 species of benthic invertebrates, 192 species of birds, and 100 species of plants (Agua Hedionda Lagoon Foundation 2010). The salt marsh supports endangered Belding’s savannah sparrow and light-footed clapper rails. California brown pelican feed and roost at the lagoon, and endangered California least tern forage on small fish. Although proposed as critical habitat for the tidewater goby in 2000, Aqua Hedionda Lagoon was excluded in the final designation of critical habitat for the species (USFWS 2008). The outer lagoon supports a commercial aquaculture facility, Carlsbad Aquafarm, which uses the outer lagoon for growing abalone, clams, mussels, oysters, and red seaweed. Hubbs Sea World Research Institute operates a fish hatchery for white seabass for ocean enhancement. A portion of the inner lagoon is considered an impaired water body with high levels of coliform bacteria and sediment. Two pair of jetties maintain tidal flow and power plant circulation; the northern jetties serve as an ocean inlet to the lagoon and the southern jetties serve as the warm water discharge from the power plant. Maintenance dredging of the lagoon basin is typically undertaken biannually. Dredge materials are used to replenish beaches north, between, and south of the inlet and discharge jetties.

Batiquitos Lagoon

The Batiquitos Lagoon inlet is located approximately 700 feet north of the proposed Batiquitos receiver site alternatives. The lagoon is 610 acres in size and managed as a State Ecological Reserve by the CDFG. A major wetlands enhancement project that involved dredging the entire lagoon was completed in January 1997, which substantially increased open water habitat and created a stabilized ocean entrance. Eelgrass habitat was established as part of the project and coastal salt marsh was enhanced. The lagoon supports over 150 bird species, 65 fish species, and a diverse variety of marsh plants (Batiquitos Lagoon Foundation 2010). Nesting islands support endangered California least terns and threatened western snowy plover. The ocean inlet to the lagoon is protected by two jetties that enable sustained tidal flushing. The lagoon traps littoral sands and requires periodic maintenance dredging. Dredge materials have been used to create nesting sites and nourish adjacent breaches.

San Elijo Lagoon

The inlet to San Elijo Lagoon is located approximately 800 feet north of the proposed Cardiff receiver site alternatives. San Elijo Lagoon is composed of approximately 900 acres and includes the 590-acre San Elijo Ecological Reserve, which is managed by the CDFG and the San Diego County Department of Parks and Recreation. Historically, it was intermittently open to tidal flushing due to its relatively small tidal prism and frequent blockage by a substantial volume of sand and cobbles. The San Elijo Lagoon Conservancy experimented with different types of inlet openings between 1994 and 1999, and in 2001 a long-term financial endowment was established to maintain the inlet open to tidal flushing (San Elijo Lagoon Conservancy 2010). The mosaic of aquatic, marsh, riparian, and upland habitats supports more than 23 species of fish, 20 species of reptiles and amphibians, 24 species of mammals, and 296 species of birds. Endangered Belding’s savannah sparrow, least Bell’s vireo, light-footed clapper rail, and threatened coastal California gnatcatcher (*Polioptila californica californica*) nest at the lagoon. Historically, endangered California least tern and threatened snowy plover have nested at the lagoon, although no recent records of successful nesting have occurred in the last 5 years. Fully protected California brown pelicans use the open water to rest and feed. The cities of Encinitas and Solana Beach are working with the San Elijo Lagoon Conservancy; the California Coastal Conservancy; SANDAG; the California Department of Transportation (Caltrans); and other regional, state, and federal stakeholders to develop the San Elijo Lagoon Restoration Project (SELRP). Over the past several decades, the ecological system has degraded due to urban development that has altered the hydrology and increased sedimentation within the lagoon. The goal of the SELRP is to enhance and restore the biological functions and values of the San Elijo Ecological Reserve with a balance of habitat types.

San Dieguito Lagoon

The inlet to San Dieguito Lagoon is located approximately 1,700 to 3,500 feet south of the proposed Solana Beach receiver site alternatives. The lagoon is part of the San Dieguito River Park System. The lagoon spans 520 acres with about half consisting of disturbed and agricultural habitat. Wetland habitat comprises 267 acres. Historically, the lagoon has been intermittently open to tidal flushing and required mechanical openings to keep the inlet open. The lagoon is the location of a 150-acre restoration project currently being implemented by Southern California Edison in partnership with the San Dieguito River Park Joint Powers Authority. Construction grading was completed in 2009 with the exception of the inlet excavation. The goal of the project is to increase biodiversity of marine life within the area. Four new nesting sites (two east and two west of Interstate 5 [I-5]) and one deteriorated nesting site (on the west side of I-5), will be created to provide habitat for endangered Belding's savannah sparrow, California least tern, light-footed clapper rail, and threatened western snowy plover. Inlet excavation will include beneficial reuse of sands on adjacent beaches. The lagoon entrance will require annual maintenance of up to 25,000 cy with the dredged sand placed on the adjacent beach (San Dieguito Lagoon Wetlands Restoration Project Lagoon Facts 2010).

Los Peñasquitos Lagoon

The ocean inlet to Los Peñasquitos Lagoon is located approximately 1,200 feet north of the proposed Torrey Pines receiver site alternatives. The majority of this lagoon is set aside as a state preserve and part of Torrey Pines State Natural Reserve. The primary habitat type is coastal salt marsh, which at 271 acres is one of the largest in San Diego County. The lagoon also has alkali flat habitat, freshwater marsh, and over 100 acres of riparian scrub. The endangered Belding's savannah sparrow and light-footed clapper rail use the salt marsh habitat for nesting and foraging. Critical habitat is designated for western snowy plover within the lagoon and on the beach fronting the lagoon. Historically, snowy plovers nested at the lagoon, although nesting has not been documented since the 1980s (Los Peñasquitos Lagoon Foundation 2010). The lagoon is listed as an impaired water body due to excessive sedimentation. Historically, the lagoon has been intermittently open to tidal flushing. The Los Peñasquitos Lagoon Foundation maintains an open lagoon mouth through the use of mechanical openings (Los Peñasquitos Lagoon Foundation 2010). These mechanical openings involve the excavation of cobbles and breaching of the sand berm that blocks ocean water from entering the lagoon. Some mouth openings also involve excavating the lagoon channels, which increases tidal flushing and circulation. The amount of excavated material varies between 2,000 and 15,000 cy, which is placed on the adjacent beach (SCC 2008).

Mission Bay

The MB-1 borrow site is located offshore the 2,470-acre Mission Bay complex, which includes the Kendall-Frost Preserve, Famosa Slough, and the San Diego River Channel. It is the second largest embayment in San Diego County. Marine open water is the dominant habitat (1,916 acres). Eelgrass beds and mudflats are found throughout the bay, and there are about 125 acres of coastal salt marsh. Coastal brackish/freshwater marsh and riparian habitats occur along the San Diego River. Endangered Belding's savannah sparrow and light-footed clapper rail nest and forage in the Kendall-Frost Preserve. Endangered California least terns nest at several locations in the bay. Threatened western snowy plover have previously nested at Mariners Point; however, no recent records of successful nesting have occurred in the last 5 years.

Tijuana Estuary

The ocean inlet of the Tijuana Estuary is approximately 4,000 feet downcoast of proposed Imperial Beach receiver site alternatives. The Tijuana River National Estuarine Research Reserve (NERR) follows the Pacific Ocean shoreline from the southern tip of Seacoast Drive to the United States–Mexico border. Tijuana Slough National Wildlife Refuge (NWR) comprises the northern portion of the Reserve, and Border Field State Park occurs at the southern end of the Reserve. The 2,531-acre Reserve includes beach, dune, open water, marsh, coastal scrub and chaparral, riparian, ruderal, and disturbed habitats; and tidal and nontidal estuarine flats, and vernal pools (Tijuana River National Estuarine Research Reserve 2010). The dune habitat occurs just south of the proposed receiver site and separates the coastal shoreline from the wetland habitat. Normally the estuary is open to tidal flushing.

The Tijuana River NERR was designated as a “wetland of international importance” by the Ramsar Convention in 2005. The estuary provides feeding, breeding, and nesting ground for over 370 species of migratory and native birds and is a key stopover point on the Pacific Flyway. The estuary is home to at least 29 species of fish, including gobies, California killifish, longjaw mudsucker, northern anchovy, staghorn sculpin, and topsmelt. Several sensitive species of birds nest at the estuary, including the endangered Belding’s savannah sparrow, California least tern, least Bell’s vireo, light-footed clapper rail, and the threatened western snowy plover. One endangered plant, the salt marsh bird’s beak (*Cordylanthus maritimus*), also occurs. Tijuana Estuary is unique in that it is entirely in California, but three-fourths of its watershed is in Mexico. The estuary is listed as an impaired water body due to coliform bacteria, eutrophic conditions, low dissolved oxygen, pollutants, and turbidity. The ocean mouth of the river is unstable and experiences channel migration associated with river flows. The river mouth migrated more than 1,500 feet in less than 10 years following 1994 (Jacobs et al. 2010).

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3.3 WATER RESOURCES

Water quality is affected by a variety of natural physical, chemical, and biological processes, including general ocean circulation processes, as well as human influences such as municipal wastewater and industrial effluent discharges, commercial and recreational vessel traffic, and non-point source runoff. This section summarizes the physical and chemical processes influencing the proposed project area that are discussed in more detail in the Biological Resources Technical Report (Appendix C). Biological processes are addressed in more detail in Section 3.4 (Biological Resources) and littoral cell processes are discussed in Section 3.1 (Geology and Soils).

3.3.1 Physical Processes

Oceanographic conditions within the Southern California Bight (SCB) are influenced by the Southern California Countercurrent, which is a large-scale eddy of the California Current, and the California Undercurrent, which is a northward-flowing current that occurs inshore and beneath the California Current (Hickey 1993). Local-scale current patterns are complex and also reflect the effects of local winds, tidal circulation, regional climatic events, and seasonal cycles in seawater properties and stratification (Winant 1991).

There are four primary sources for nearshore currents: (1) wave-driven currents, (2) wind-driven surface currents moving approximately in the direction of the wind, (3) tidal currents that trend parallel to shore and switch direction with the falling or rising tide, and (4) currents near the mouth of coastal lagoons that result from river flow and/or tidal exchange within coastal wetlands. There are two types of surf zone currents: longshore currents and onshore/offshore currents.

Longshore currents move sands along the shoreline, typically in a direction determined by the angle of approaching waves (USACE 1991). The strength of the longshore current increases with wave height. Surf zone currents perpendicular to the shoreline are associated with rip currents, discharges from coastal wetlands and streams, and internal tidal motions. Currents offshore of the surf zone are primarily tidal-driven and weak (velocities of several centimeters per second) compared to typical surf zone currents. Wind-driven surface currents within the surf zone are also small when compared to wave-driven currents. River currents and tidal currents can be the dominant currents at the inlets to coastal wetlands. For low flow conditions, the river currents are dissipated within the surf zone. During flood flows the river currents can extend out beyond the surf zone, forming a plume with the fine grain sediment-laden waters.

Waves provide the primary energy responsible for driving coastal processes. There are two classifications of waves, sea and swell. Sea waves are generated by local winds and have a short period (less than 7 seconds between successive waves) and a low height (usually less than 3 feet). Swell waves are generated by distant storms and travel hundreds to thousands of miles. The period of swell waves is longer (7 to 20 seconds), with swell wave heights ranging from 1 to 20 feet. Wave heights tend to be greater during winter and spring due to storms from the North Pacific. The nearshore wave climate is complex due to the various effects of island sheltering, diffraction, refraction, and wave shoaling (Guza and O'Reilly 1991). In shallow water, turbulence produced by the passage of waves can resuspend bottom sediments. Higher wave energy also promotes rip currents, which can cause elevated turbidity in nearshore water.

3.3.2 Water Quality

Water quality within the project area reflects natural seasonal patterns. During late spring through fall, solar heating preferentially warms the ocean surface, resulting in depth-related gradients in water temperature (thermocline). Strong density gradients (pycnocline), related primarily to the water temperature changes with depth, restrict vertical mixing of the water column, which strongly affects the depth distribution of most water quality parameters (Jackson 1986). During winter and early spring, the strength of the vertical stratification decreases in response to weaker solar heating, mixing by winter storms, and upwelling.

Upwelling is initiated when northern winds displace surface waters offshore, resulting in replacement by colder, deeper waters with lower dissolved oxygen concentrations, and higher salinity and nutrient concentrations. Upwelling is generally present from late March though July in the San Diego County area. Downwelling occurs when southern winds push offshore waters toward the shore, thus pushing nearshore surface waters down and causing warmer waters and lower salinity than are typical for deeper waters (Mann and Lazier 1991). Seasonal upwelling and downwelling affect marine water quality along the San Diego coast (Hickey 1993).

El Niño-Southern Oscillation (ENSO) is a major source of interannual climate variability in the SCB, characterized by a warming of the tropical east Pacific and a rise in sea level that propagates northward into the SCB. The ENSO cycle in the Pacific is not regular because of the complex feedback mechanisms between the tropical ocean and the atmosphere, but it occurs on average about every 4 years and can last a year or more.

Additionally, stormwater runoff from coastal rivers and streams adds freshwater that can cause large turbidity plumes and reductions in near-surface salinity up to several miles from shore.

River and stream discharges also add suspended sediments, nutrients, bacteria and other pathogens, and chemical contaminants to nearshore waters.

Publicly-owned treatment works discharge treated sewage effluent to the ocean through subsurface wastewater outfalls, which introduces a low-salinity plume containing suspended solids and pollutants to the marine environment. There are five wastewater dischargers in the project vicinity. The largest is the Point Loma Treatment Plant, which discharges approximately 190 million gallons per day (mgd) of advanced primary treated effluent through an ocean outfall located about 4.5 miles offshore Point Loma at a discharge depth of 320 feet. Smaller effluent discharges with different treatment levels occur offshore south Oceanside at a depth of 105 feet, offshore south Carlsbad at a depth of 180 feet, offshore Cardiff at a depth of 148 feet, and offshore Imperial Beach (advanced primary) at a depth of about 90 feet.

Beneficial uses of nearshore and shoreline areas within the project area are defined in the Water Quality Control Plan for the San Diego Region (Basin Plan) and may vary in relevance to the proposed project depending on receiver site location. A number of shoreline segments within the general project area are on the current 303(d) list primarily as impacted by fecal indicator bacteria (Enterococcus, total or fecal coliforms). Several coastal wetlands in the project area also are on the 303(d) list for bacteria, sediment/silt, and/or nutrients (Aqua Hedionda Lagoon, Buena Vista Lagoon, Loma Alta Slough, San Elijo Lagoon, Los Peñasquitos Lagoon). The San Luis Rey River is 303(d)-listed for chloride and total dissolved solids. Tijuana Estuary is listed for a variety of pollutants and stressors, including bacteria, low dissolved oxygen, pesticides, organics, trace elements, trash, and turbidity.

Temperature

Temperatures of surface waters along the coast of the SCB vary seasonally in association with solar heating, upwelling, and climatic conditions and range from about 53.6 degrees Fahrenheit (°F) in the winter to about 69.8°F during summer. Temperatures of bottom waters in the project area range from about 48.2°F to 60.8°F. During the June 1999 survey of borrow sites SO-5 and SO-7, surface waters (approximately 66.2ºF) were 3.6 to 7.2ºF warmer than bottom waters (59 to 62.6ºF) (Table 3.3-1). Waters typically 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. Vertical density stratification limits the mixing of surface and bottom waters. Water temperatures closer to the coast tend to be more uniform throughout the water column due to turbulent mixing and shallower depths (Hickey 1993).

Table 3.3-1
Water Quality at Borrow Sites SO-5 (offshore Del Mar) and SO-7 (Offshore Batiquitos), June 1999

Station	Depth	Water Quality					
		Temperature		Salinity PPT	Dissolved Oxygen (mg/L)	pH	Transmissivity (%)
		(^{o}C)	(^{o}F)				
SO-5 (65 feet)	Surface	19.1	66	33.7	8.3	8.1	83.9
	Bottom	15.0	59	33.7	8.6	8.1	64.0
SO-7 (66 feet)	Surface	19.2	67	33.4	7.8	8.1	84.3
	Bottom	17.0	63	33.5	8.6	8.1	69.6

Salinity

Salinity in nearshore portions of the SCB is fairly uniform, ranging from approximately 32 to 34 parts per thousand (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 (Hickey 1993). The salinity at borrow sites SO-5 and SO-7 during June 1999 showed little variance between surface and bottom waters, with values ranging from 33.4 to 33.7 PPT (Table 3.3-1).

Dissolved Oxygen

Dissolved oxygen concentrations in surface waters of the SCB typically range from 5.0 to 11.6 micrograms per liter (mg/L) (Hickey 1993). Natural variations in dissolved oxygen concentrations result from a combination of factors, including intrusions of water masses, primary production (algal photosynthesis), and upwelling/downwelling events. Surface water dissolved oxygen concentrations at borrow sites SO-5 and SO-7 were 8.3 mg/L and 7.8 mg/L, respectively, during June 1999 (Table 3.3-1). These concentrations are typical for surface waters with 100% oxygen saturation. The bottom water dissolved oxygen concentration at both sites was 8.6 mg/L. Nearshore waters generally have higher dissolved oxygen concentrations than offshore areas due to shallow water depths and continuous wave action that promotes mixing.

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. During June 1999, pH values at borrow sites SO-5 and SO-7 were 8.1 (Table 3.3-1).

Water Clarity/Turbidity

The clarity of nearshore coastal waters is subject to localized and temporal variability due to the effects of sediment resuspension, discharges from coastal lagoons, 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 interannual 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 (Continental Shelf Associates 1984). 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. Total suspended solid (TSS) concentrations of more than 1,000 mg/L were measured in rip currents off Imperial Beach (Warrick 2010). 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. Transmissivity levels typically range from 40 to 90% at the depths of the borrow sites (City of San Diego 1993; MEC 1997). In June 1999, transmissivity in surface waters ranged from 83.9 to 84.3%, and transmissivity in bottom waters ranged from 64.0 to 69.6% at borrow sites SO-5 and SO-7 (Table 3.3-1).

Similar to transmissivity values, TSS concentrations typically are relatively lower offshore than nearshore. TSS concentrations ranged from <1 to 47 mg/L offshore Carlsbad over a 13-year monitoring period, with highest concentrations recorded after storm events or occasionally in the summer (probably due to phytoplankton blooms) (MEC 1997).

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 (Sherman et al. 1998).

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 (BLM 1978).

Contaminants

With some exceptions, the quality of nearshore ocean water within the project area is good, and contaminant levels are below Basin Plan limits. However, conditions in some areas are affected by local runoff and stormdrain discharges, outflow from San Diego Bay, and discharges to the ocean of treated wastewaters. In particular, bacterial levels along the beaches in south San Diego County (Imperial Beach to Coronado) are affected occasionally by discharges from the Tijuana River. These discharges typically occur in winter months (December to May) (U.S. Navy 2009).

3.3.3 Sediment Quality

Sediment quality typically varies in relation to grain size and proximity to input sources. Trace metal and organic contaminants in coastal waters typically have strong affinities for suspended particulates that eventually settle to the bottom where they become incorporated into the bottom sediment. Because of their high surface-to-volume ratio, finer sediments (silts and clays) generally have higher contaminant concentrations than coarser sediments (sands). Once incorporated into bottom sediments, contaminants may be remobilized through current- or storm-induced resuspension, bioturbation, or mechanical disturbance such as dredging. Within the project area, sediment texture varies from primarily sandy materials in shallow nearshore waters to finer-grained materials in deeper waters farther from shore. Relict sand deposits also occur offshore, particularly in locations of historical river outflows (URS 2009). Thus, grain size characteristics and sediment contaminant concentrations at the borrow sites are important to the evaluation of the potential for contaminant release and turbidity during dredging. They also are important considerations for determining compatibility with beach receiver sites.

Borrow Sites

Two of the proposed borrow sites are located miles from wastewater outfalls and several thousand feet from non-point source river discharges, which represent the major sources of contaminant input to the study area. Specifically, MB-1 is over 3 miles upcoast and inshore of wastewater outfalls and a mile or more from rivers or bays, and SO-5 is more than 2 miles downcoast and inshore of wastewater outfalls and 4,500 feet offshore of lagoons. SO-6, located off Cardiff, is 0.8 mile (4,000 feet) upcoast and inshore of the San Elijo Wastewater Treatment Plant outfall and 0.85 mile (4,500 feet) from San Elijo Lagoon. Water depths at the SO-5, SO-6, and MB-1 borrow sites range from -34 to -49 feet, -42 to -56 feet, and -60 to -74 feet, respectively (see Table 2-3).

Sediments were collected from the proposed borrow sites to depths of -20 feet using vibracore in November 2008. A total of 6 to 12 vibracore samples were collected at each site and composite samples across each core length were analyzed for grain size characteristics using standard methods (URS 2009). Additional 2-foot cores were collected at the proposed borrow sites in November 2009 and composited for analysis of grain size, total organic carbon (TOC), moisture content, and chemical constituents in accordance with standard methods. Descriptions of sediment quality at each of the three borrow sites are provided below based on results from analyses of samples collected in November 2008 and October–November 2009.

SO-6

The 20-foot vibracore samples consisted of poorly graded fine to medium sand with a median grain size ranging between 0.26 mm and 0.35 mm within the proposed borrow site area. The weighted average grain size distribution for the borrow area was calculated as having a median grain size of about 0.35 mm and a fines content of about 5% (see Table 2-1).

The 2-foot core composite sediment sample consisted of medium sand with a median grain size of 0.429 mm, with approximately 56% medium sand, 39% fine sand, and 6% silt + clay (Table 3.3-2). For the six individual cores from this site, the fine plus medium sands and silt + clay contents ranged from 64 to 99% and from less than 1 to 23%, respectively; one sample also contained 35% coarse sand and gravel. Sediments contained TOC and total volatile solids concentrations of 0.18% and 0.56%, respectively. The total sulfides concentration was 0.36 mg/kg, and dissolved sulfides were nondetectable. The SO-6 sediments contained background concentrations of trace metals and low or nondetectable concentrations of trace organic compounds (polycyclic aromatic hydrocarbons, phenols, phthalates, polychlorinated biphenyls, chlorinated pesticides, dioxins/furans, and butyltins) (Moffatt & Nichol 2010a). Concentrations of oil and grease and total recoverable petroleum hydrocarbons were 23 mg/kg and 34 mg/kg, respectively. All contaminant concentrations were below the corresponding ER-L and ER-M values, and consistent with background conditions for near-coastal SCB sediments.

Table 3.3-2
Sediment Grain Size at Borrow Sites, October–November 2010

Transect (Sample)	Core Depth (feet)	Description	Median Grain Size (mm)	Particle Size Distribution (%)				
				Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt/Clay
SO-6	~1.5	Medium Sand	0.429	0.00	0.00	55.51	38.55	5.94
SO-5	~1.5	Fine Sand	0.115	0.00	0.00	5.29	76.74	17.97
MB-1	~1.5	Medium Sand	0.726	0.00	0.00	89.43	9.85	0.72

<u>SO-5</u>

The 20-foot vibracore samples consisted of poorly graded fine to medium sand with a median grain size ranging between 0.43 mm and 0.71 mm within the proposed borrow site area. The weighted average grain size distribution for the borrow area was calculated as having a median grain size of about 0.59 mm and a fines content of about 2% (see Table 2-1).

The 2-foot core composite sediment sample consisted of fine sand with a median grain size of 0.115 mm, with approximately 5% medium sand, 77% fine sand, and 18% silt + clay (Table 3.3-2). For the 10 individual cores from this site, the fine sand and silt + clay contents ranged from 60 to 85% and from 13 to 39%, respectively. Sediments contained TOC and total volatile solids concentrations of 0.27% and 0.82%, respectively. The total sulfides concentration was 1.1 milligrams per kilogram (mg/kg), and dissolved sulfides were nondetectable. The SO-5 sediments contained background concentrations of trace metals and low or nondetectable concentrations of trace organic compounds (polycyclic aromatic hydrocarbons, phenols, phthalates, polychlorinated biphenyls, chlorinated pesticides, dioxins/furans, and butyltins) (Moffatt & Nichol 2010a). Concentrations of oil and grease and total recoverable petroleum hydrocarbons were 23 milligrams per kilogram (mg/kg) and 59 mg/kg, respectively. All contaminant concentrations were below the corresponding effects range low (ER-L) and effects range median (ER-M) screening values, and consistent with background conditions for near-coastal SCB sediments.

MB-1

The 20-foot vibracore samples consisted of poorly graded fine to medium sand with a median grain size ranging between 0.34 mm and 0.62 mm within the proposed borrow site area. The weighted average grain size distribution for the borrow area was calculated as having a median grain size of about 0.51 mm and a fines content of about 2% (see Table 2-1).

The 2-foot core composite sample from MB-1 consisted of medium sand, with a median grain size of 0.726 mm, with approximately 89% medium sand, 10% fine sand, and 1% silt + clay (Table 3.3-2). All but two of the eight individual cores from this site consisted of 99% fine plus medium sands; the other cores consisted of 60 to 66% fine sand and 33 to 39% silt + clay. Sediments contained TOC and total volatile solids concentrations of 0.12% and 0.38%, respectively. Total and dissolved sulfides were nondetectable. The MB-1 sediments contained background concentrations of trace metals and low or nondetectable concentrations of trace organic compounds (polycyclic aromatic hydrocarbons, phenols, phthalates, polychlorinated biphenyls, chlorinated pesticides, dioxins/furans, and butyltins) (Moffatt & Nichol 2010a). Concentrations of oil and grease and total recoverable petroleum hydrocarbons were 24 mg/kg and 33 mg/kg, respectively. All contaminant concentrations were below the corresponding ER-L and ER-M values, and consistent with background conditions for near-coastal SCB sediments.

Receiver Beaches

Sediment grain size along transects at each of the receiver sites is presented in Table 3.3-3 and described for individual beaches below.

Oceanside

Oceanside Beach sediments above mean lower low water (i.e., 0 feet MLLW) contain 96% or greater sands and less than 3% fines (silt + clay). Sediments in subtidal depths between -6 and -30 feet MLLW contain progressively smaller sand fractions, ranging from 94% at -6 feet to 65% at -30 feet. The fines fraction shows corresponding increases with depth.

Table 3.3-3
Receiver Beach Sediment Grain Size, 2010

Receiver Beach	Transect	Size Fraction	Elevation (feet MLLW)							
			12	6	0	-6	-12	-18	-24	-30
Oceanside	OS-1000	Gravel (%)	0.4	0.0	0.0	0.0	0.3	0.8	0.0	0.0
		Sand (%)	96.7	98.9	98.9	94.1	89.4	82.3	74.2	64.7
		Fines (%)	2.9	1.1	1.1	5.9	10.3	16.9	25.8	35.3
North Carlsbad	CB-0865	Gravel (%)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	5.2
		Sand (%)	99.2	97.5	98.3	97.2	95.1	86.5	81.7	93.6
		Fines (%)	0.6	2.5	1.7	2.8	4.9	13.5	18.3	1.2
South Carlsbad	CB-0760	Gravel (%)	32.6	0.0	0.0	0.3	0.0	0.0	0.1	0.3
		Sand (%)	60.9	99.3	97.6	96.6	95.9	90.2	87.5	83.9
		Fines (%)	6.5	0.7	2.4	3.1	4.1	9.8	12.4	15.8
Leucadia	SD-0690	Gravel (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
		Sand (%)	99.6	98.8	98.3	95.5	93.1	94.3	88.0	86.9
		Fines (%)	0.4	1.2	1.7	4.5	6.9	5.7	12.0	4.6
Cardiff	SD-0630	Gravel (%)	12.3	0.0	0.0	0.1	0.0	0.3	0.0	0.0
		Sand (%)	87.1	99.4	98.8	97.9	95.4	92.6	92.8	86.8
		Fines (%)	0.6	0.6	1.2	2.0	4.6	7.1	7.2	13.2
	SD-0625	Gravel (%)	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.1
		Sand (%)	99.2	98.7	98.6	98.2	96.5	88.0	90.8	97.6
		Fines (%)	0.8	1.3	1.4	1.8	3.3	11.4	9.2	2.3
Torrey Pines	TP-0520	Gravel (%)	0.0	0.0	0.0	0.0	0.3	3.3	0.1	0.0
		Sand (%)	98.9	99.1	98.8	97.8	96.5	89.0	91.5	92.9
		Fines (%)	1.1	0.9	1.2	2.2	3.2	7.7	8.4	7.1
Imperial Beach	SS-0050	Gravel (%)	0.0	0.0	0.5	0.5	0.5	1.6	0.0	0.0
		Sand (%)	98.2	98.6	98.3	97.5	91.1	80.0	67.2	72.1
		Fines (%)	1.8	1.4	1.2	2.0	8.4	18.4	32.8	27.9

North Carlsbad

North Carlsbad Beach sediments at elevations between +12 to -12 feet MLLW contain 95% or greater sand fractions and less than 5% fines. At depths between -12 and -30 feet, sediments contain from 82 to 94% sands and from 1 to 18% fines.

South Carlsbad

South Carlsbad Beach sediments at elevations between +6 to -12 feet MLLW contain 95% or greater sand fractions and less than 5% fines, whereas the sediments at +12 feet MLLW contain relatively smaller sand fraction (61%) but proportionally larger gravel fraction (33%). At depths from -12 to -30 feet, sediments contain from 84 to 90% sands and 10 to 16% fines.

Leucadia

Leucadia Beach sediments at elevations between +12 to -6 feet MLLW contain 95% or greater sand fractions and less than 5% fines. At depths from -6 to -30 feet, sediments contain comparatively smaller sand fractions (87 to 93%) with slightly higher fines fraction (5 to 12%).

Cardiff

Along Transect SD-0630, Cardiff beach sediments from +6 to -12 feet MLLW contain 95% or greater sand fractions and less than 5% fines fraction. Sediments at +12 feet MLLW contain comparatively smaller (87%) sand fraction but larger gravel fraction (12%) and less than 1% fines. At depths from -12 to -30 feet, sediments contain from 87 to 93% sands and 7 to 13% fines. For Transect SD-0625, beach sediments from +12 to -12 feet MLLW contain 95% or greater sand fractions and less than 5% fines fraction. At depths from -12 to -24 feet, sediments contain from 88 to 91% sands, whereas sediments at -30 feet contain 98% sands.

Torrey Pines

Torrey Pines Beach sediments at elevations between +12 to -12 feet MLLW contain 95% or greater sand fractions and less than 5% fines. At depths from -12 to -30 feet, sediments contain comparatively smaller sand fractions (89 to 93%) with slightly higher fines fraction (7.1 to 8.4%).

Imperial Beach

Imperial Beach sediments at elevations between +12 to -6 feet MLLW contain 95% or greater sand fractions and less than 5% fines. At depths from -12 to -30 feet, sediments contain comparatively smaller sand fractions (67 to 91%) with higher fines fraction (8 to 33%).

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3.4 BIOLOGICAL RESOURCES

This section provides a summary of the biological resources technical report included in Appendix C. Habitats and biological resources are described based on recent surveys and relevant historical information. Data collection methods are described in Section 3.4.1. A regional overview of marine habitats and species is presented in Section 3.4.2. Essential fish habitat is summarized in Section 3.4.3. Threatened and endangered wildlife species are identified in Section 3.4.4. Specific details on habitat characteristics and resources at the proposed receiver sites, including alternative footprints and nearby sensitive resources, are presented in Subsection 3.4.5. Section 3.4.6 presents near-surface sediment characteristics and types of biological resources at the borrow sites. Marine resources subject to commercial fisheries are described in Section 3.8.

3.4.1 Data Collection Methods

The technical approach included coordination with regulatory and resource agency personnel, offshore surveys at selected borrow sites, surveys of the beach receiver sites, consultation with local fishing organizations, and literature and data review. This effort occurred primarily in 2009 and 2010, with inclusion of some data collected in 2006 and 2008 (SAIC 2007, 2009). The survey designs were coordinated in advance of fieldwork with resource agency staff (CDFG, NMFS, and U.S. Fish and Wildlife Service [USFWS]), who concurred in 2009 that surveys for this project should focus on filling data gaps rather than repeating surveys for which there were recent data. The types of data collected during the 2006 through 2010 surveys include:

- Beach Surveys: November 2008, July 2009, January through March 2010
- Intertidal Hard-Bottom Surfgrass Surveys: June 2006, January 2010
- Nearshore Hard-Bottom Reef Surveys: May through June 2006, January through February 2009, October through November 2009
- Nearshore Soft-Bottom Surveys: January through February 2009
- Borrow Site Surveys: October through November 2009

An overview of survey methodology is provided below and additional detail is given in Appendix C.

Beach Receiver Site Surveys

Beach surveys were conducted during very low (minus) tides so that the entire boundary of the proposed receiver site alternatives was exposed. Habitat characteristics and resources were characterized within three areas of the beach corresponding to different intertidal zones (upper, middle, and lower), which differ in the amount of time the sand is uncovered by tides. The active wave wash area (swash zone) also was characterized. Habitat quality of beach sites to support biological functions (e.g., invertebrate animals, shorebird foraging, grunion spawning) was characterized based on consideration of substrate type (e.g., sand, cobble, rock), beach width above the upper tide zone, sand depth measurements to a maximum depth of 4 feet (or rock), and biological resources. Because some beaches are underlain with rock, and sand moves on- and offshore on a seasonal basis, the sand thickness measurements indicate the potential for sandy habitat persistence across seasons.

Samples of sand were collected and sieved through a 1-mm screen to characterize invertebrate resources living in the intertidal sands (e.g., clams, sand crabs, worms, etc.). In addition, sampling for Pismo clams (*Tivela stultorum*) was conducted at each location of invertebrate sampling using a “clam fork” along 60-foot transect lines running from the moist sand interface to the low tide zone. The samples and transects were within locations representative of the northern, middle, and southern portions of the proposed receiver sites. The swash zone was searched for sign of Pismo clam beds (large dead shells [*Emerita analoga*], siphons with tufts of commensal hydroids on the sand surface), concentrations of sand crabs, or other notable resources. The occurrence of kelp or surfgrass (*Phyllospadix* spp.) wrack (leaves and other parts of dislodged aquatic vegetation) on the beach was noted. In addition, birds observed within the site boundaries were counted and any observations of sensitive species while accessing the beach site were noted.

Beach sites were surveyed for the above-described conditions in November 2008 or July 2009. Because of that time difference and the dynamic nature of beach sand processes (described in Section 1.1), sites that had been surveyed in November 2008 were revisited in July 2009 to confirm similar characteristics or to note changed condition. Pismo clam transects were surveyed at all sites in July 2009. Most sites also were revisited between January and March 2010 to note changes, if any, after a major storm episode. At the time of the 2010 visits, substantial sand loss and exposure of underlying base rock or cobbles were noted at several of the beaches within the project area. Representative photographs of the beach habitats were taken during all beach surveys and visits.

Intertidal and Subtidal Hard-bottom Surveys

Inshore surfgrass beds located between Oceanside and Torrey Pines were surveyed during minus tides (-0.8 to -1.1 feet MLLW in June 2006; -1.8 to -2.1 MLLW in January 2010). Differential Global Positioning System (DGPS) coordinates were taken in line with the upcoast-downcoast edges of exposed surfgrass beds.

Nearshore reefs were surveyed by SCUBA diving biologists from outside the wave break zone to water depths of 30 feet in 2006, 2008, and 2009. The focus of the surveys was to evaluate habitat quality based on reef heights and presence or absence of reef indicator species along underwater transects or at discrete bounce dive locations. The indicator species were selected in consultation with the resource and regulatory agencies to be consistent with previous resource mapping in the project area and RBSP I (U.S. Navy 1997a, 1997b; MEC 2000).

Indicator species included surfgrass (*Phyllospadix* spp.), giant kelp (*Macrocystis pyrifera*), feather boa kelp (*Egregia menziesii*), sea palms (*Eisenia arborea*), and sea fans (*Muricea* spp.). All of these species are long-lived perennial species, although feather boa kelp is opportunistic and may function as an annual species close to shore where there is greater sand scour and wave disturbance. Additionally, nonvegetated rock or rock with only low-growing algal turf or coralline algal crusts was noted. Characteristics of relatively higher quality reefs include dominance or common occurrence of long-lived indicator species (surfgrass, giant kelp, sea palm, sea fans). Relatively lower quality hard-bottom was characterized by a predominance of rocks with poorly developed vegetation (crusts, turfs) or lacking any vegetation or marine life. Such conditions are found in areas subject to frequent disturbance or sand scour.

Underwater transects, the locations of which were preselected based on known locations of hard-bottom, were located using DGPS, and start and end points were marked with buoys from a boat. Weighted nylon line was used to set the transects, which varied from approximately 330 to 1,000 feet in length. Most transects were oriented parallel to shore according to water depth, although several transects also were oriented in the onshore-offshore direction. Divers followed the established transect line and systematically recorded reef heights, indicator species occurrence, and other notable observations within distance intervals of 33 feet. The relative abundance of indicator species was noted as abundant, common, or sparse. Bounce dives on smaller hard-bottom areas also were conducted and resources were similarly noted.

Subtidal Soft-Bottom Surveys

Surveys of the nearshore soft-bottom habitat were conducted by diving biologists January through February 2009 (SAIC 2009). Transects were oriented in the onshore-offshore direction and were approximately 650 feet in length. Similar to hard-bottom transects, divers systematically recorded relative abundance (dense, common, sparse) of bottom-dwelling (demersal) fish and invertebrate species within distance intervals of 33 feet. Invertebrates were recorded according to type, such as clams (e.g., *Ensis* spp.), brittle stars (*Amphiodia* spp.), burrowing anemones (*Harenactis attemuata*, *Zaolutus actius*), crabs, sand dollars (*Dendraster excentricus*), sea cucumbers (*Holothuroidea* spp.), sea pansies (*Renilla koelikeri*), sea pens (*Acanthoptilum* spp.), sea stars (*Astropecten armatus*), sea urchins (e.g., *Stronglylocentrotus purpuratus*), snails (*Polinices* spp.) and tube worms (*Diopatra* spp.). The presence or absence of dense beds of Pismo clam, which is a state-managed species, was noted.

Borrow Site Surveys

Offshore reconnaissance-level surveys were conducted between October and November 2009 at proposed borrow sites SO-5, SO-7, and MB-1 to characterize biological resources living within and above the sediment. In addition, nearby borrow sites used for RBSP I were surveyed so that comparisons could be made between areas with and without prior dredging. The RBSP I dredge areas remain visible on the ocean floor. Additional samples were collected outside the RBSP I and proposed RBSP II borrow sites to facilitate comparisons of habitat and resources at similar depths within and outside previously dredged areas.

Fish and macroinvertebrates were collected using a 25-foot headrope otter trawl. Trawl samples (5- to 10-minute tows) were collected at each borrow site or reference area. Diving biologists swam transects at each of the stations and recorded observations of fish and benthic macroinvertebrates. In addition, hand cores were used to collect sediment samples for analysis of benthic infaunal invertebrates (animals living within the sediment). The samples were sieved with a 1-mm screen, preserved, and analyzed in the laboratory where the number and types of organisms were counted (e.g., clams, sand crabs, worms, etc.). Sediment samples also were collected with hand cores for laboratory analysis of grain size and TOC, which were used to characterize habitat conditions in the near-surface sediment layer where most animals live.

Literature and Data Review

Several data sources and literature were used to augment the description of existing conditions. Geographic Information System (GIS) data sources included 2005 and 2008 kelp bed mapping by the CDFG and MBC Applied Environmental Sciences (MBC 2009); marine resource and nesting site maps produced by SAIC for the SANDAG Coastal RSM Plan (Moffatt & Nichol and SAIC 2010); 2004 Light Detection and Ranging (LiDAR) bathymetric survey data obtained from Scripps Institution of Oceanography; and the 2002 Nearshore Program Habitat Inventory maps of substrate and aquatic vegetation (kelp, surfgrass, understory algae).

Other important data sources included results of regional monitoring surveys in the SCB from 2003 (SCCWRP 2003), which were compared with prior regional surveys considered for RBSP I (SCCWRP 1994, 1998). While regional data were collected in 2008 (SCCWRP 2008), data were not available at the time of preparation of this document. Regional monitoring by CDFG of California least tern breeding and data compiled by the USFWS on breeding window and winter surveys of snowy plover were also considered.

Important document sources included physical and chemical characterization of borrow site sediments conducted for this project (Moffatt & Nichol 2010a; URS 2009). In addition, reports were reviewed of biological resource monitoring of receiver sites and nearby sensitive habitats before, during, and after RBSP I (AMEC 2002, 2003, 2004, 2005; MEC 2000; SAIC 2007). Historical marine resource mapping was also reviewed (U.S. Navy 1997a, 1997b).

3.4.2 Regional Overview

The marine environment off San Diego County is within the larger zoogeographic zone known as the warm temperate or SCB, whose boundaries span from Point Conception, California, to Punta Eugenia, Baja California. The distributions of species within the SCB are related to the complex hydrography and geology of the region. The mainland shelf, which extends from shore to approximately -650 feet MLLW, comprises 6% of the 40,000-square-mile SCB.

Marine ecosystems and habitats off San Diego County include sandy beach, rocky reefs, sandy or soft ocean bottoms, kelp forests, seagrass beds, and submarine canyons. The coastal study area for this project includes the shoreline and nearshore habitats to a depth of approximately 100 feet in the vicinity of the receiver and borrow sites. Deeper water habitats would not be influenced by the project and are not discussed further.

Sandy beach habitat supports shorebirds, including the threatened western snowy plover (*Charadrius alexandrines nivosus*), and provides spawning habitat for the state-managed California grunion (*Leuresthes tenuis*). Pismo clam beds occur in sandy substrate in localized areas extending from intertidal to nearshore depths. Nearshore reefs and kelp beds harbor a variety of macroalgae, invertebrate, and fish populations. Soft-bottom habitats also support diverse invertebrate populations that are preyed upon by demersal fish living on or near the bottom. Marine mammals forage on invertebrates and fish throughout the water column over hard or soft bottoms and within kelp beds. Marine biological resources also support important commercial fisheries, are the target of recreational fishing and diving, and are the subject of educational research.

Marine habitats provide important linkages to adjacent coastal wetland and terrestrial ecosystems. Several ecologically valuable coastal wetlands occur within the region (Section 3.2). Migratory marine fish such as California halibut (*Paralichthys californicus*) use coastal wetlands as nursery habitats. Endangered California least tern (*Sterna antillarum browni*), which seasonally breed and nest at several coastal lagoons in the region, forage on small fish in the ocean as well as within coastal wetlands. Threatened snowy plover, which may be found at certain beaches, nest at several of the coastal wetlands within the region.

In many areas there is an abrupt transition to coastal bluffs or urbanized landscapes where beaches are backed by revetment or seawalls, or are adjacent to roads and other development. Several species of terrestrial insects, birds, and mammals live or forage within marine habitats. Vegetated dune or coastal strand habitats are limited and have only localized occurrence in the region.

As noted in Section 3.2, several of the coastal wetlands within the study area are ecological preserves or reserves, and three are SMCA's protected under the MLPA. Similarly, two receiver sites and one burrow site are located within an MLPA boundary.

Soft-Bottom Habitats

<u>Sandy Beach</u>

Soft-bottom habitats include sandy beaches and nearshore sandy or silty-sand bottoms. These are the predominant habitats in the region with sandy beaches covering approximately 80% of the shoreline in the SCB (CCC 1987). Sandy beaches are unstable habitats due to daily sand movement associated with waves and currents and larger-scale seasonal cycles of sand movement. Biological resource development on sandy beaches varies seasonally, generally being greater in spring to summer and less in fall to winter associated with seasonal sand erosion and accretion as well as reproduction and recruitment. Most sandy beach invertebrates are mobile and move up and down the beach with changes in tide level and some, such as the sand crab (*Emerita analoga*) migrate to the shallow nearshore during high tides and seasonal periods of beach erosion.

Common invertebrates observed on San Diego County sandy beaches include sand crabs, beach hoppers (*Megalorchestia* spp, *Orchestodea* spp.), amphipods (e.g., *Eohaustorius* spp.), isopods (e.g., *Excirolana* spp.), and other crustaceans; bean clam (e.g., *Donax gouldii*), Pismo clam, and olive snail (*Olivella biplicata*) mollusks; bloodworm (*Euzonus mucronata*) and other polychaete worms (e.g., *Hemipodus borealis.*, *Lumbrineris* spp., *Nephtys californiensis*, *Scololepis* spp.); and nemertean ribbon worms (Straughan 1981; SAIC 2006, 2007). Terrestrial insects are an important ecological component of the sandy beach and help break down washed ashore kelp and seagrass wrack. The wrack may harbor a variety of insects and invertebrates that are important prey items for gulls and shorebirds.

Pismo clams live in sandy areas from the intertidal zone to depths of 80 feet and may concentrate in beds in certain areas. Pismo clam beds may be persistent features due to the short benthic phase of their planktonic larvae (60 to 62 hours). Pismo clams are capable of rapid movement in the sediment due to their well-developed foot; they normally bury to a depth of 2 to 6 inches. The minimum legal size of 4.5 inches is reached at about the age of 5 years.

The California grunion, which is a nearshore species that feeds on plankton, comes to shore to spawn on sandy beaches. Their spawning generally extends from March through August although start and end dates may vary earlier or later between years. The peak of spawning occurs April through June (Martin 2006). Grunion spawn at night on any or all of the 3 to 4 nights after the highest tide associated with each full or new moon and then only for a 1- to 3-hour period. Eggs incubate in the sand for approximately 10 days until the next tide series is high enough to reach them, when exposure to wave action triggers their hatching and the baby grunion are washed back into the sea. Grunion are managed as a game species by the CDFG, who post predicted spawning runs on the internet (www.dfg.ca.gov/marine/grunionschedule.asp).

Sandy beach invertebrates are an important prey base for fish and birds. Nearshore fish forage on the invertebrates when high tides cover the beach (see below Sandy Subtidal). Various shorebirds probe the sand in search of worms, crustaceans, and small clams. Gulls are opportunistic feeders on invertebrates they pick from the swash zone or on wrack, as well as trash or debris left by humans. Beaches are important resting areas for shorebirds, gulls, and other seabirds such as terns and the California brown pelican (*Pelecanus occidentalis californicus*). Terrestrial birds also may forage along the back beach shoreline. Over 70 species of birds use beaches within the region (MEC 2000), although actual use at any beach varies according to site-specific conditions, human disturbance, and seasonal patterns of bird migration. During beach surveys at the proposed receiver sites, the number of observed bird species on any given survey ranged from three to eight per site (Appendix C). The most commonly observed birds at the receiver sites during the November 2008, July 2009, and January 2010 site visits included Heerman's gull (*Larus heermanni*), western gull (*Larus occidentalis*), black-bellied plover (*Pluvialis squatorola*), marbled godwit (*Limosa fedoa*), western sandpiper (*Calidris mauri*), whimbrel (*Numenius phaeopus*), and willet (*Tringa semipalmata*). The western snowy plover was observed on the wider beach adjacent to the Batiquitos receiver site and at the Cardiff receiver site.

Harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californicus*) haul out on sandy beaches, but haul-outs are localized or infrequent on beaches in the region. An established harbor seal haul-out area occurs at La Jolla, which is several miles from any of the proposed beaches in the study area. No established sea lion haul-out locations occur in the local region. Other marine mammals occur in nearshore waters (see Sandy Subtidal discussion below).

Common terrestrial mammal species with the potential to occur on the coastal bluffs or back-beach shoreline in the vicinity of the receiver sites include gopher (*Thomomys bottae sanctidiegi*), mice (e.g., *Mus musculus*), black rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), opossum (*Didelphis virginiana*), rabbits (*Sylvilagus* spp.), California ground squirrel (*Spermophilus beecheyi nudipes*), raccoon (*Procyon lotor psora*), and striped skunk (*Mephitismephitis holzneri*).

Sandy Subtidal

Soft-bottom nearshore communities have similar characteristics for a given water depth, sediment type, and wave energy. Thus, sandy nearshore communities off Oceanside are similar to those found at similar depths and bottom type off Imperial Beach. The subtidal zone is classified into general regions, including the shallow subtidal to a depth of about -30 feet MLLW (generally corresponds to littoral zone), an inner shelf zone from about -30 to -80 feet MLLW, middle shelf from about -80 to -300 feet MLLW, and outer shelf zone from about -300 to -600 feet MLLW. Thus, the study region encompasses the shallow, inner shelf, and a small portion of the middle shelf zones.

Bottom-dwelling invertebrate species in the shallow subtidal zone are well adapted to shifting sediments and turbidity, with suspension feeders being the dominant group. Many of the sandy beach invertebrates move between the intertidal and shallow subtidal depths and additional species live on and within sediments within increasing distance offshore as wave energy diminishes toward the seaward limit of the littoral zone. Common species in the shallow subtidal of the study region include burrowing anemones, sea pansy, sea pen, purple globe crab (*Randallia ornata*), clams, snails, sand dollar, sea star, and tube worms (U.S. Navy 1995; SAIC 2009).

Demersal fish commonly found on the bottom in shallow subtidal habitat (less than 30 feet) off San Diego County beaches include California halibut, speckled sanddab (*Citharichthys stigmaeus*), California bat ray (*Myliobatus californica*), and shovelnose guitarfish (*Rhinobatos productus*). Northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), and Pacific bonito (*Sarda chiliensis*) are commonly encountered in the water column just beyond the surf zone.

The proposed borrow sites fall within the inner shelf zone, which is influenced by oceanic swell. The number of species and abundances of bottom-dwelling macroinvertebrates is lower in the inner shelf compared to the middle and outer shelf depth zones. Polychaete worms and/or small, mobile crustaceans dominate the inner to middle shelf infaunal community. The most abundant species collected in sediment core samples at depths of -49 to -134 feet MLLW on the San Diego shelf include brittle stars, polychaete worms (e.g., *Aricidea* spp., *Diopatra* spp., *Mediomastus* spp., *Monticellina* spp., *Spiophanes* spp., *Sternaspis fossor*, and *Streblosoma crassibranchia*), and small crustaceans (*Heterophoxus oculatus*, *Photis* spp., and *Rhepoxynius* spp.) (SCCWRP 1994, 1998, 2003). Macroinvertebrate species living on or above the bottom comprising 80% or more of the abundance in trawls collected during the 2003 Regional Bight program included blackspotted shrimp (*Crangon nigromaculata*), California sand star (*Astropecten verrilli*), sea pens, and white sea urchin (*Lytechinus pictus*) (SCCWRP 2003).

Fish species comprising 80% or more of the abundance in trawls on the inner shelf during the 2003 Regional Bight program included English sole (*Pleuronectes vetulus*), Pacific sanddab (*Citharichthys sordidus*), pink seaperch (*Zalembius rosaceus*), speckled sanddab, yellochin sculpin (*Icelinus quadriseriatus*), and white croaker (*Genyonemus lineatus*) (SCCWRP 2003). The most abundant species of the middle shelf include Dover sole (*Microstomus pacificus*), longspine combfish (*Zaniolepis latipinnis*), Pacific sanddab, speckled sanddab, and rockfish (*Sebastes* spp.).

Seabirds that forage on fish in the nearshore zone include California brown pelican, cormorants (*Phalacrocorax* sp.), and terns. California brown pelican was commonly observed in flight overhead or over nearshore waters during the July 2009 beach surveys. The endangered California least tern (*Sternaantillarum browni*) and the elegant tern (*Thalasseus elegans*) were observed in flight near the jetties of Batiquitos Lagoon during beach surveys of the nearby Batiquitos receiver site.

Common dolphins (*Delphinus delphis*) and bottlenose dolphins (*Tursiops truncatus*) occur in the surf zone and in offshore waters. Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) and Risso's dolphins (*Grampus griseus*) also are known to occur seasonally in southern waters of the SCB.

California gray whales (*Eschrichtius robustus*) migrate through the study area. The southbound migration through the SCB begins in December and lasts through February; the northbound migration is February through May. Gray whales migrate up to 125 miles offshore along three pathways through the SCB. The project area lies within the nearshore migration path, which extends from the shoreline to approximately 12 miles offshore.

Hard-Bottom and Vegetated Habitats

Hard-bottom habitats are productive ecosystems that support a variety of plants and animals. They include rocky intertidal shores and nearshore reefs, and support vegetated habitats such as seagrass beds and kelp forests. Less than 15% of the coastline in San Diego County is estimated to be rocky. The species that associate with hard-bottoms differ greatly with depth, type of substratum (e.g., cobble, boulders, rocky outcrop, sandstone reef), and substrate relief height and complexity.

Rock or sandstone reefs provide hard substratum to which kelp and other algae can attach in the nearshore zone (<100 feet depth). In addition, many invertebrates such as sea anemones, sea fans, scallops, and sponges require hard substratum for attachment. The structural complexity of hard-bottom habitats shelter and provide foraging habitat for mobile invertebrates (e.g., lobster) and fish.

The proportion of hard substrate habitat at any given time relates to rock relief height and time of year, with lower relief substrate subject to exposure or burial by sand associated with seasonal on- and offshore sand movement or large waves associated with substantial storm events (e.g., El Niño).

Several physical factors influence the types and diversity of marine life associated with rocky habitats. Important substrate qualities include relief height (low, high), texture (smooth, pitted, cracked), size, and composition (sandstone, mudstone, basalt, granite). Substrates that are of higher relief, greater texture, and larger size generally have the richest assemblages of marine species.

In contrast, low-lying rocks or reefs subject to sand scour from seasonal burial and uncovering typically are unvegetated or colonized by opportunistic species with annual life cycles or sand-tolerant species. Cobbles on beaches, which get tumbled about by waves during the rise and fall of the tides, do not support plants or attached animals. However, cobbles in subtidal waters may support understory algae and kelp beds, although they are generally subject to greater annual variability due to their greater instability under storm surge and large wave conditions.

Estimated acreages of hard-bottom and vegetated habitats in the study region are given in Table 3.4-1. The acreage is based on the 2002 Nearshore Program Habitat Inventory GIS, which provides the most comprehensive dataset of the spatial extent of hard-bottom and vegetated habitats off San Diego County. In addition, recent kelp cover acreages are provided. The acreage estimates are summarized by city and were computed by extending the jurisdictional boundaries offshore.

Table 3.4-1
Estimated Hard-Bottom and Vegetated Habitat Acreage in the Study Region

Jurisdiction	Bedrock 2002	Cobble 2002	Surfgrass 2002	Under-story Kelp 2002	Kelp		
					2002	2005	2008
Oceanside	0.8	6.1	0	8.9	0	0	0
Carlsbad	239.2	157.0	23.4	330.8	42.0	4.8	152.7
Encinitas	751.0	0.9	81.9	469.2	225.5	10.4	355.2
Solana Beach	267.0	0	3.5	115.2	30.7	15.9	153.7
Del Mar	141.0	0	9.1	150.7	8.3	0	16.3
City of San Diego (Torrey Pines)*	102.7	4.0	10.7	84.7	0.3	0	0.3
City of San Diego (Mission Beach)*	173.3	0.0	0	94.2	0.5	0	0
Imperial Beach	0	2396.4	0	232.4	52.8	83.8	463.9
Total	1,674.9	2,564.4	128.6	1,486.2	360.1	114.9	1,142.1

* Estimate for City of San Diego was computed as within 1 mile of a receiver or borrow site.
Note: Vegetated habitats occur on hard-bottom and should not be added to hard-bottom acreage.

The data are valuable for identifying the general distribution and relative percentages of type of hard-bottom (rock, cobble) and different types of vegetated hard-bottom habitats (kelp, surfgrass, understory algae) within the local region. However, acreage calculations should be viewed as estimates relative to current conditions. This limitation applies to both the hard-bottom and vegetated habitat. Because hard-bottom varies from cobble to high-relief reefs (greater than 3 feet in height), there is potential for variability in the amount of hard-bottom at any given time due to natural sand movement patterns in the littoral zone. This applies to low-relief rock and cobble subject to burial and uncovering by sand. The term “ephemeral reefs” has been used to describe hard-bottom areas that experience this type of disturbance.

Vegetated habitats also experience variability in cover between years due to a number of factors. Surfgrass is a sand-tolerant, perennial species that may be subject to less interannual variability. However, it is slow to recover from die-back, particularly if its rhizomatous root mat becomes dislodged. Studies suggest it may be more vulnerable to variability along its inshore distribution limit in the lower intertidal, where wave action and sand movement are greater.

Kelp beds naturally die back and regrow each year, the extent of which is influenced by oceanographic and climate conditions. Key factors include water temperature, nutrient levels (tied to upwelling and current patterns), and storm-generated waves and sedimentation. Kelp (particularly juvenile plants) also may be affected by predation by sea urchins. The understory algae category mapped in 2002 includes perennial species as well as opportunistic species that may exhibit annual variability associated with rock exposure or burial.

Annual canopy cover of kelp beds off San Diego exhibited a general pattern of increase during colder water and decrease during warmer water oceanographic conditions over the past 10 years. Kelp canopy was low after the 1997 to 1998 El Nino, increased with the cooler La Nina conditions of 1999 to 2000, decreased again during a period of warmer than average temperatures and low nutrients, and rebounded in 2007. In addition, the San Diego Region has experienced changes in kelp harvesting patterns. Observed canopies in 2008 were one of the best seen in the last 50 years (MBC 2009).

Biological resources associated with intertidal and nearshore reefs, surfgrass beds, and kelp beds of the study region are summarized below.

Rocky Intertidal

Biological resource development on hard substrates in the intertidal varies with tide exposure, relief height and complexity, and oceanographic conditions. The upper intertidal or splash zone is characterized by simple green algae (*Chaetomorph*a spp., *Enteromorpha* spp., *Ulva* spp.), barnacles (*Cthamalus* spp.), limpets (*Collisella*, *Lottia*), and periwinkles (*Littorina* spp.).

Intertidal substrates less influenced by sand burial and abrasion often support California mussel (*Mytilus californus*), gooseneck barnacle (*Pollicipes polymerus*), aggregating sea anemones (*Anthopleura elegantissima*), hermit crabs (e.g., *Pagurus* spp.), lined shore crab (*Pachygrapsus crassipes*), a variety of snails (e.g., *Lithopoma* spp., *Kelletia kellitia*, *Tegula* spp.), chitons (e.g., *Mopalia mucosa*, *Nutallina* spp.), and annual species of algae.

Coralline algae, crusts, and red algal turf are common on low-relief substrate subject to sand influence. Feather boa kelp opportunistically recruits to exposed rock but rarely lives more than a year in the intertidal. Aggregating sea anemones may occur on rocks subject to shallow burial.

Persistent substrates in the low tidal zone and minus tide zone are characterized by a greater diversity of plants and animals including coralline algae, other red algae, brown algae, surfgrass, green sea anemones (*Anthopleura xanthogrammica*), purple sea urchins, California sea hares (*Aplysia californica*), snails, sponges, and starfish (*Asterina miniata*, *Pisaster* spp.). Wooly sculpin (*Clinocottus analis*) is one of the more commonly encountered fish in tidepools.

Marsh birds, including great blue heron (*Ardea herodias*) and snowy egret (*Egretta thula*), gulls, and shorebirds forage on invertebrates and fish on exposed reefs and in tidepools.

<u>Nearshore Reefs</u>

Subtidal reefs in the shallow nearshore also exhibit considerable variation in resource development associated with the seasonal onshore and offshore migration of sand. Similar to intertidal reefs, substrate factors such as relief height, texture, composition, and size largely determine resource development.

Understory algae are common on nearshore reefs. Feather boa kelp is conspicuous, growing up to 12 feet in length. The sea palm may co-occur with feather boa kelp at subtidal depths. Sea palms may live more than 10 years and grow to about 1 to 1.5 feet in height in areas of high surge, but may reach up to 3 feet in height in deeper water. Their shorter height and occurrence on higher relief reefs suggest they may be less tolerant of sand sedimentation than surfgrass and feather boa kelp. A variety of smaller red algae (*Corallina* spp., *Erythroglossum californicum*, *Gigartina* spp., *Gracillaria* spp., *Jania* spp., *Lithothrix* spp. *Rhodoymenia* spp.) and brown algae (*Cystoseira osmundacea*, dictyotales, *Zonaria farlowi*) may co-occur with feather boa kelp and/or sea palms on nearshore reefs. Persistent reefs support hundreds of species of invertebrates (e.g., crabs, nudibranchs, sea urchins, scallops, sea stars, snails, sponges, tunicates, worms) and attract a variety of fish such as garibaldi (*Hypsypops rubicunda*), blacksmith (*Chromis punctipinnis*), and black perch (*Embiotoca jacksoni*).

Surfgrass Beds

The most common type of seagrass along the open coast is surfgrass, which is a flowering plant that forms beds on rocky substrate in certain areas from the minus intertidal level to approximately -20 feet MLLW. Surfgrass provides important habitat for a variety of algae, invertebrates, lobsters, and fish. Up to 34 species of algae and 27 species of invertebrates may be associated with surfgrass on San Diego beaches (Stewart and Myers 1980). It is a nursery habitat for California spiny lobster (*Panuliris interruptus*).

Surfgrass is morphologically adapted to withstand shifting sand movement with long shoots (1 to 3 feet intertidal, 2 to 6.5 feet subtidal), which can extend above a variety of sand depths and are protected from sand abrasion by fibrous sheaths. Dense rhizomatous roots bind and enmesh with sand to form an effective anchor, and growth and colonization are by vegetative propagation of rhizomes and/or seasonal seed production. Surfgrass may recover relatively quickly from disturbance via regrowth if the rhizome mat remains intact, but recovery can take several years if the rhizome mat is removed.

Surfgrass and feather boa kelp with sand

Although surfgrass is adapted to sand accretion, the amount of sand affects its health and growth. The timing of sand cover also appears important. Pelchner (1996) found that the amount of carbohydrates stored in summer months from photosynthesis was important to the survival of plants over winter and early spring. Experimental manipulations showed that surfgrass was less healthy without any sand cover (more shoots, but less leaf biomass), whereas sand depths up to 2 inches optimized growth (more leaf biomass and productivity). However, sand depths of 5 inches resulted in less carbohydrate storage, which if it occurred during summer reduced plant biomass and potential survival over winter. Surfgrass normally experienced sand depths ranging from 1 to 10 inches at the study site, although deeper sand depths were not persistent. Critical thresholds of sand cover are not well understood and may vary depending on site-specific conditions related to factors such as exposure (e.g., tides, wave energy).

Kelp Forests/Beds

As one moves farther offshore to depths where seasonal sand movement is less, hard substrates do not need to have as high a relief to support perennial species. Kelp attaches to hard substrate by means of a holdfast, and fronds may grow to heights that exceed the water depth, forming leafy canopies at the water surface. Kelp forests are among the most productive marine habitats along the coast of California providing habitat, feeding grounds, and nursery areas for many species of fishes, invertebrates, and marine mammals. The kelp community in the study area is dominated by giant kelp, which ranges from water depths of about -20 feet to -120 feet MLLW. Invertebrates found in kelp beds include lobster, sea stars, sea urchins, and mollusks. Surfperch, rockfish (*Sebastes* spp.), cabezon (*Scorpaenichthys marmoratus*), lingcod (*Ophiodon elongatus*), and wrasses (senorita, rock wrasse, and sheephead) are common. Cormorants forage on fish in kelp beds, gulls commonly scavenge on the surface canopy, and pelicans and terns exploit schooling fish along the canopy’s edge. Mammals such as sea lions, seals, and whales use kelp beds as transitory foraging areas.

Kelp beds in Southern California commonly deteriorate to some degree during summer and fall when temperatures are higher and nutrient concentrations are lower. Giant kelp is adversely affected by sedimentation and turbidity. Large amounts of shifting sediment can bury small plants and prevent settling of microscopic spores, both of which can reduce kelp beds. El Niño conditions, which result in high waves, higher-than-average temperatures, and low nutrients, have been linked to periodic and widespread reductions in kelp canopy. Kelp canopy has substantially regrown in the region since the 1997 to 1998 El Niño.

3.4.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). This act protects waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). The entire coastal area ranging from the mean high tide level to offshore depths represents EFH within the study area. The Pacific Groundfish and Coastal Pelagic fishery management plans (FMPs) apply to EFH in the study region. The habitat designations associated with those plans are defined below.

EFH for species in the Pacific Groundfish FMP, which applies to 89 fish species (e.g., flatfish, rockfish, sharks) is identified as all waters and substrate within the following areas:

- depths less than or equal to 3,500 meters (1,914 fathoms) to mean higher high water level (MHHW) or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow;
- seamounts in depths greater than 3,500 meters as mapped in the EFH assessment GIS; and
- areas designated as Habitat Areas of Particular Concern (HAPCs) (e.g., seagrass, kelp canopy, estuaries, rocky reef).

EFH for species in the Pacific Groundfish FMP also is relevant to species designated in the Nearshore Fishery Management Plan (NFMP), which are generally managed by the state (CDFG 2002). For instance, 16 of the 19 species designated in the NFMP are officially designated in the Pacific Groundfish FMP, including 13 species of rockfishes (black, black-and-yellow, blue, brown, calico, China, copper, gopher, grass, kelp, olive, quillback, and treefish - *Sebastes* spp.), California scorpionfish (*Scorpaena gutatta*), Cabezon (*Scorpaenichthys marmoratus*), and kelp greenling (*Hexagrammos decagrammus*). Three species designated in the NFMP are not specifically designated in the Pacific Groundfish FMP (rock greenling - *Hexagrammous lagocephalus*, California sheephead - *Semicossyphus pulcher*, and monkeyface prickleback - *Cebidichthys violaceus*) and are actively managed by the state; however, designated groundfish EFH (including HAPC) generally is relevant because these three species are associated with rocky reef, kelp bed, or surfgrass habitats (CDFG 2002).

EFH for species in the Coastal Pelagic FMP, which applies to four fish and one invertebrate species (e.g., anchovy, sardine, Pacific mackerel, jack mackerel, and market squid) is identified as all waters and substrate within the following areas:

- all marine and estuarine waters from the shoreline to the limits of the Exclusive Economic Zone (EEZ), which extends approximately 200 nautical miles offshore; and
- water surface boundary, which is the water column between the thermoclines where temperatures range from 10 to 26 degrees Centigrade.

For RBSP II, EFH encompasses nearshore areas adjacent to the receiver sites, as well as the borrow sites. Nearshore areas characterized by reef, seagrass, estuaries, or kelp canopy are more specifically defined as HAPCs.

3.4.4 Threatened and Endangered Species

Federally listed and state-listed species under the federal and state endangered species acts (FESA and CESA, respectively) with the potential to occur in the project area primarily include two marine-associated birds (California least tern and western snowy plover). Both species are described in the following text. The following species were recently delisted and are not described further: American peregrine falcon (*Falco peregrinus*) (federally and state delisted), California brown pelican (federally and state delisted), and gray whale (federally delisted). Marine turtles occasionally are sighted in warm-water areas of estuaries and bays in the region, but they do not come to shore on beaches in the study area. Other sensitive species discussed in Appendix C but found not to have the potential for project impacts include the Belding's savannah sparrow, light-footed clapper rail, tidewater goby, and black or white abalone. Access routes to all receiver sites transition from urban roads directly to the beach or are at locations that are unvegetated. No dune, strand, marsh vegetation, or native plant communities occur within 200 feet of access routes.

California Least Tern

The California least tern is a federally listed and state-listed endangered species. This small tern is a seasonal migrant to San Diego and nests in colonies at constructed nest sites in coastal wetlands and on sandy beaches with sparse vegetation. It forages in shallow water (generally less than 3 feet deep) within 1 to 2 miles from shore, but foraging up to 5 miles from nest sites has been documented. The least tern nesting season is April 1 through September 15. San Diego County nesting sites are located near the Santa Margarita River on MCBCP, Batiquitos Lagoon, Mission Bay, the mouth of San Diego River, Silver Strand, San Diego Bay, and Tijuana Estuary NERR. Newly constructed nesting sites are located at San Dieguito Lagoon.

Western Snowy Plover

The western snowy plover is a federally listed and state-listed threatened species. This small shorebird is a resident in San Diego and nests at constructed nest sites in coastal wetlands, alkali flats at river mouths and salt evaporators, and on sandy beaches with sparse vegetation. It forages on marine-estuarine invertebrates and terrestrial and marine-associated insects, including those associated with kelp wrack washed ashore on sandy beaches. The nesting season extends from March 1 through September 15. Critical habitat occurs in proximity to three receiver sites: Batiquitos, Torrey Pines, and Imperial Beach. Proposed critical habitat has also been identified in proximity to the Cardiff receiver site. Nest sites are located near the Santa Margarita River on

MCBCP, Batiquitos Lagoon, San Diego Bay, Coronado Beach, Silver Strand, Naval Radio Receiving Facility, Tijuana Estuary/Tijuana Slough NWR, and Border Field State Park. Newly constructed sites are located at San Dieguito Lagoon. Snowy plovers have been observed at the Batiquitos and Cardiff receiver sites during recent beach surveys.

3.4.5 Receiver Sites

Each of the 11 proposed receiver sites is described below 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 receiver 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.

The closest distances to sensitive habitats from receiver site boundaries are summarized in Table 3.4-2. The closest distances to least tern and snowy plover nesting sites are summarized in Table 3.4-3. The types of habitats observed at the receiver sites and documented in the nearshore in their vicinities are summarized in Table 3.4-4. Hard-bottom and vegetated habitats in the vicinity of the receiver and borrow sites as well as locations of nesting sites are shown in Figures 3.4-1 through 3.4-5.

Oceanside

Within Receiver Site Boundaries

The intertidal habitat is predominantly sand. Sand depths measured in November 2008 ranged from 15 inches to greater than 48 inches and averaged more than 2 feet across tide zones. Cobbles occurred throughout the tide zone, ranging from sparse to common in the middle tide zone but were sparse in high and low tide zones.

Organisms observed in the sand habitat included sand crabs, bean clams, and polychaete worms. No Pismo clams were collected and no sign of established Pismo clam beds was observed in the low tide zone. Kelp and surfgrass wrack was sparse and localized on the beach. Potential habitat

Table 3.4-2
Estimated Closest Distances to Hard-Bottom and Vegetated Habitats from the Seaward Boundary of Proposed Receiver Site Alternatives

Proposed Receiver Sites	Distance (ft) from Receiver Site to Hard-Bottom or Vegetated Habitats									
	Hard-bottom (2002)		Intertidal Surfgrass (2002)		Subtidal Surfgrass (2002)		Understory Algae (2002)		Kelp Bed (2008)	
Alternative	***Alt 1***	***Alt 2***	***Alt 1***	***Alt 2***	***Alt 1***	***Alt 2***	***Alt 1***	***Alt 2***	***Alt 1***	***Alt 2***
Oceanside	1,600	1,600	>3 mi	>3 mi	>2 mi	>2 mi	1,600	1,600	6,700	6,700
North Carlsbad	200	200	>9,000	>9,000	450	450	200	200	1,400	1,400
South Carlsbad North	180	180	1,100	150	200	200	450	450	2,500	2,500
South Carlsbad South	NA	150	NA	1,100	NA	300	NA	140	NA	1,300
Batiquitos	200	200	1,400	1,400	240	240	240	240	1,500	1,500
Leucadia	150	150	150	150	150	190	290	330	1,000	1,100
Moonlight Beach	330	330	3,000	3,000	500	500	400	400	850	850
Cardiff	850	700	2,500	1,800	1,200	1,000	1,500	1,500	1,500	1,500
Solana Beach	120	120	2,400	1,500	480	240	200	200	2,500	2,500
Torrey Pines	150	150	200	200	200	200	1,000	1,000	>5,000	>5,000
Imperial Beach	540	540	>3 mi	>3 mi	>3 mi	>3 mi	540	540	1900	1,900

NA = not applicable

Table 3.4-3
Estimated Closest Distances to Least Tern and Snowy Plover Nesting Sites

Receiver Sites	Nearest Nest Site*	Least Tern		Snowy Plover	
		Alt 1	Alt 2	Alt 1	Alt 2
Oceanside	Camp Pendleton	3.1 mi	3.1 mi	3.1 mi	3.1 mi
North Carlsbad	Camp Pendleton	4.9 mi	4.9 mi	4.9 mi	4.9 mi
South Carlsbad North	Batiquitos	2.1 mi	2.1 mi	2.1 mi	2.1 mi
South Carlsbad South	Batiquitos	NA	1.6 mi	NA	1.6 mi
Batiquitos	Batiquitos	380 ft	380 ft	380 ft	380 ft
Leucadia	Batiquitos	0.8 mi	0.8 mi	0.8 mi	0.8 mi
Moonlight Beach	Batiquitos	2.6 mi	2.6 mi	2.6 mi	2.6 mi
Cardiff	San Elijo (historical)	1.1 mi	1.1 mi	1.1 mi	1.1 mi
Cardiff	San Dieguito (new)	3.2 mi	3.2 mi	3.2 mi	3.2 mi
Solana Beach	San Dieguito (new)	1.4 mi	1.3 mi	1.4 mi	1.3 mi
Torrey Pines	Los Peñasquitos (historical)	0.2 mi	0.2 mi	0.2 mi	0.2 mi
Torrey Pines	San Dieguito (new)	2.3 mi	2.3 mi	2.3 mi	2.3 mi
Imperial Beach	Tijuana River NERR	0.5 mi	0.2 mi	0.8 mi	0.5 mi
Imperial Beach	Naval RRF/South San Diego Bay	1.5 mi	1.3 mi	0.6 mi	0.3 mi

NA = not applicable
* Active nesting within last 5 years except at historical and new sites.

Table 3.4-4
Summary of Habitats at the Proposed
Receiver Sites and in the Nearshore Vicinity

Receiver Site	Intertidal	Subtidal to -10 ft MLLW	-11 to -20 ft MLLW	-20 to -30 ft MLLW
Oceanside	Sand, cobble variable, riprap revetment at back beach	Sand and localized rocks	Sand and localized rocks, sparse surfgrass, understory algae	Sand and localized rocks, understory algae, kelp
North Carlsbad	Sand	Sand and reef, understory algae	Sand and reef, sparse surfgrass, understory algae	Sand and reef, kelp, sea fans, understory algae
South Carlsbad North	Sand, cobble variable	Sand and reef, two patches of surfgrass, understory algae	Sand and reef, localized surfgrass, understory algae	Sand, understory algae, sea fan
South Carlsbad South	Sand, cobble variable	Sand and reef, sparse surfgrass, understory algae	Sand and reef, surfgrass, understory algae	Sand, understory algae
Batiquitos	Sand, cobble variable	Sand and sparse relief, sparse surfgrass, turf dominated	Sand and sparse reef, patchy surfgrass, understory algae	Sand and reef, understory algae
Leucadia	Sand	Sand and reef, surfgrass, understory algae	Sand and reef, surfgrass, understory algae	Sand and reef, understory algae, kelp
Moonlight Beach	Sand, cobble sparse	Sand and reef, patchy surfgrass, turf dominated	Sand and relief reef surfgrass, understory algae	Sand and reef, kelp, sea fans, understory algae
Cardiff	Sand, cobble variable	Sand and reef, surfgrass, understory algae	Sand and reef, surfgrass, understory algae	Sand and reef, kelp, understory algae
Solana Beach	Sand, cobble sparse	Sand and reef, surfgrass, understory algae	Sand and reef, surfgrass, understory algae	Sand and reef, sea fans, kelp
Torrey Pines	Sand, cobble sparse	Sand and reef, surfgrass, understory algae	Sand and reef, surfgrass, understory algae	Sand and reef, understory algae
Imperial Beach	Sand, cobble sparse	Sand	Sand and cobble, understory algae	Sand and cobble, kelp, understory algae

suitability for grunion spawning may be limited due to wave run-up to riprap under spring high tide conditions, but suitability may vary over the course of the grunion season with seasonal migration of sand.

Riprap shore protection occurs along the back beach of the site; the wetted sand line indicated wave run-up to the riprap zone. Green algae, acorn barnacles, limpets, and gray littorine snails occurred in localized areas where the revetment was in the high tide splash zone. No surfgrass was observed on hard substrates.

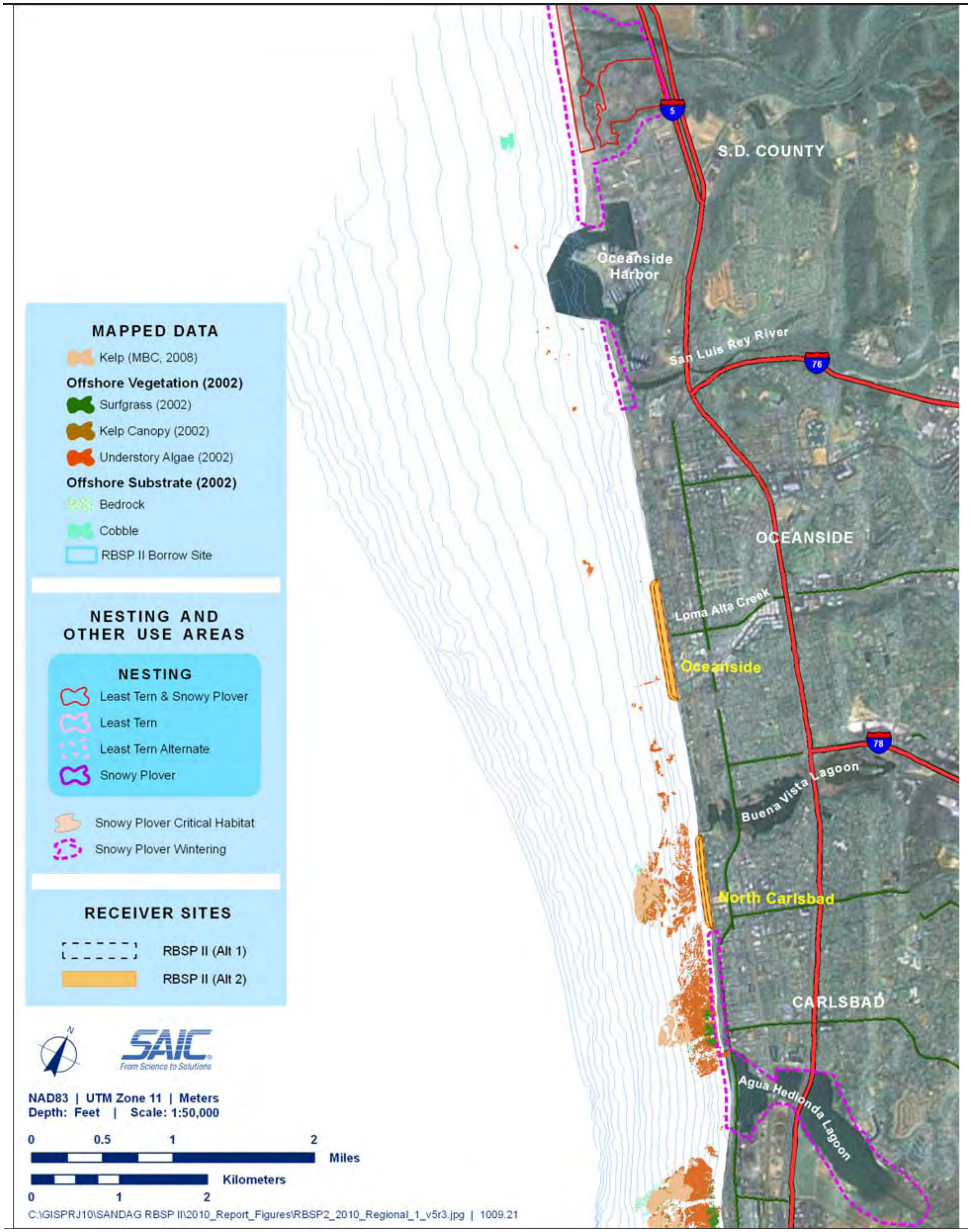

Figure 3.4-1
Sensitive Habitats in the Vicinity of Oceanside and North Carlsbad Receiver Sites

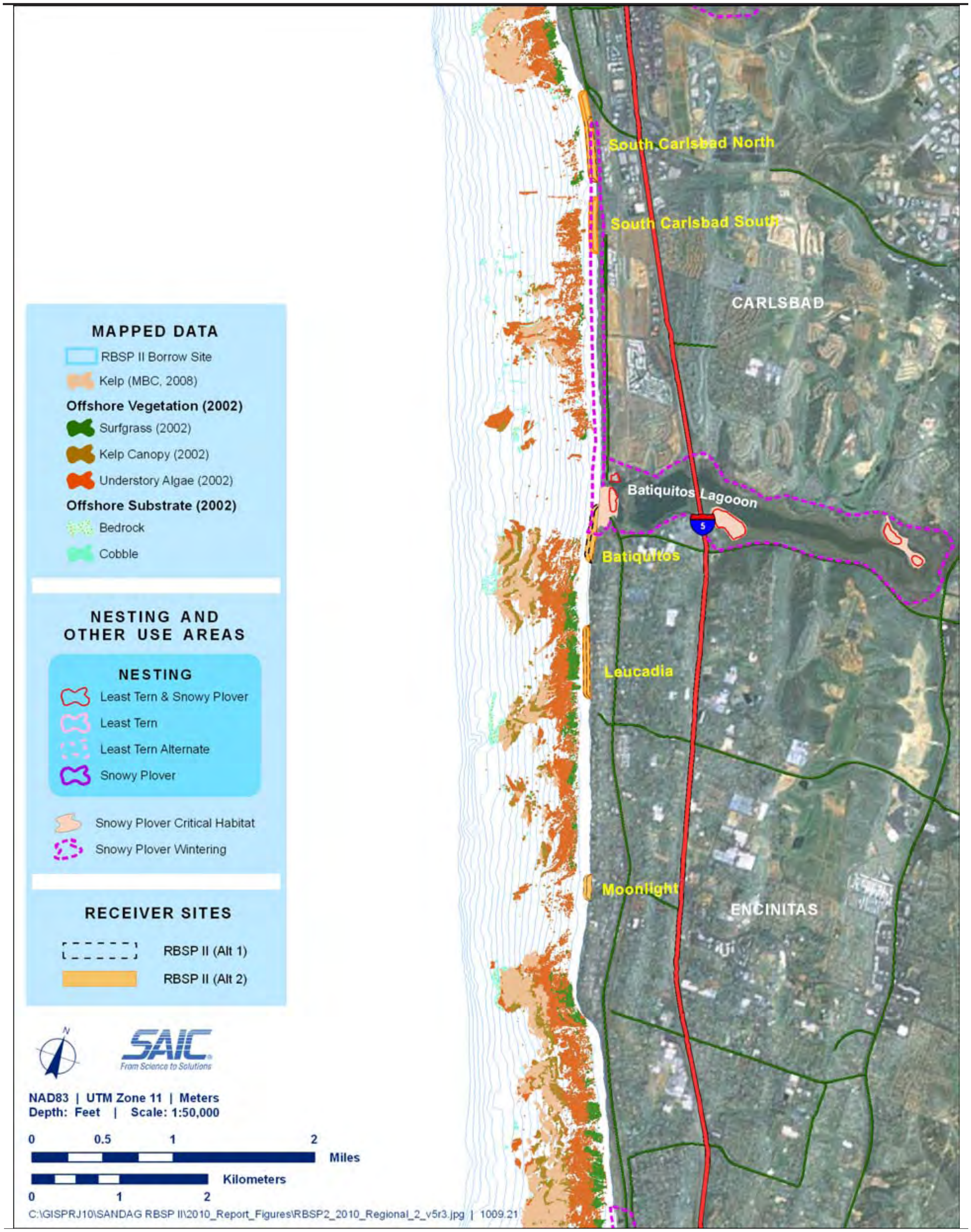

Figure 3.4-2
Sensitive Habitats in the Vicinity of
South Carlsbad, Batiquitos, Leucadia, and Moonlight Beach Receiver Sites

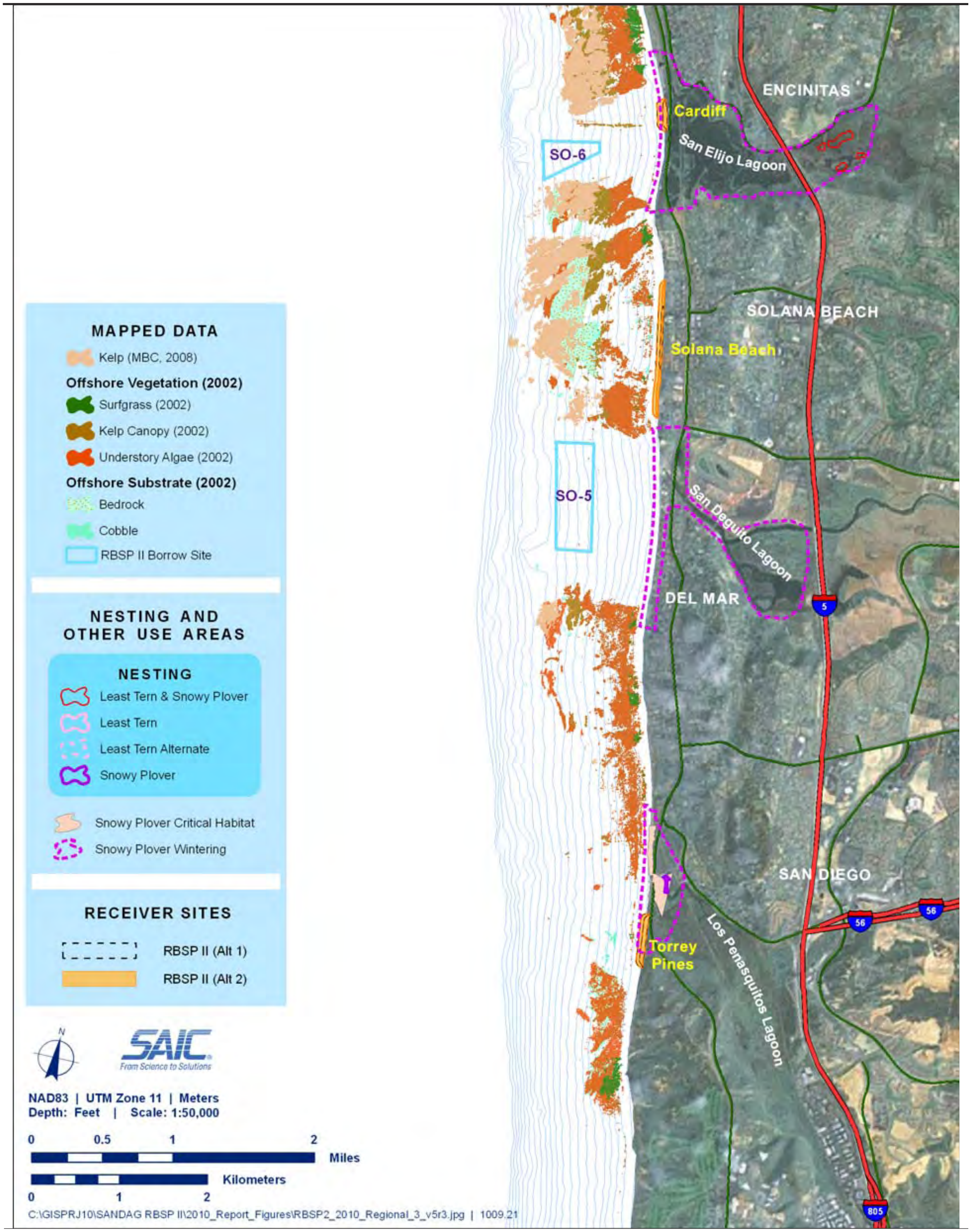

Figure 3.4-3
Sensitive Habitats in the Vicinity of
Cardiff, Solana Beach, and Torrey Pines Receiver Sites

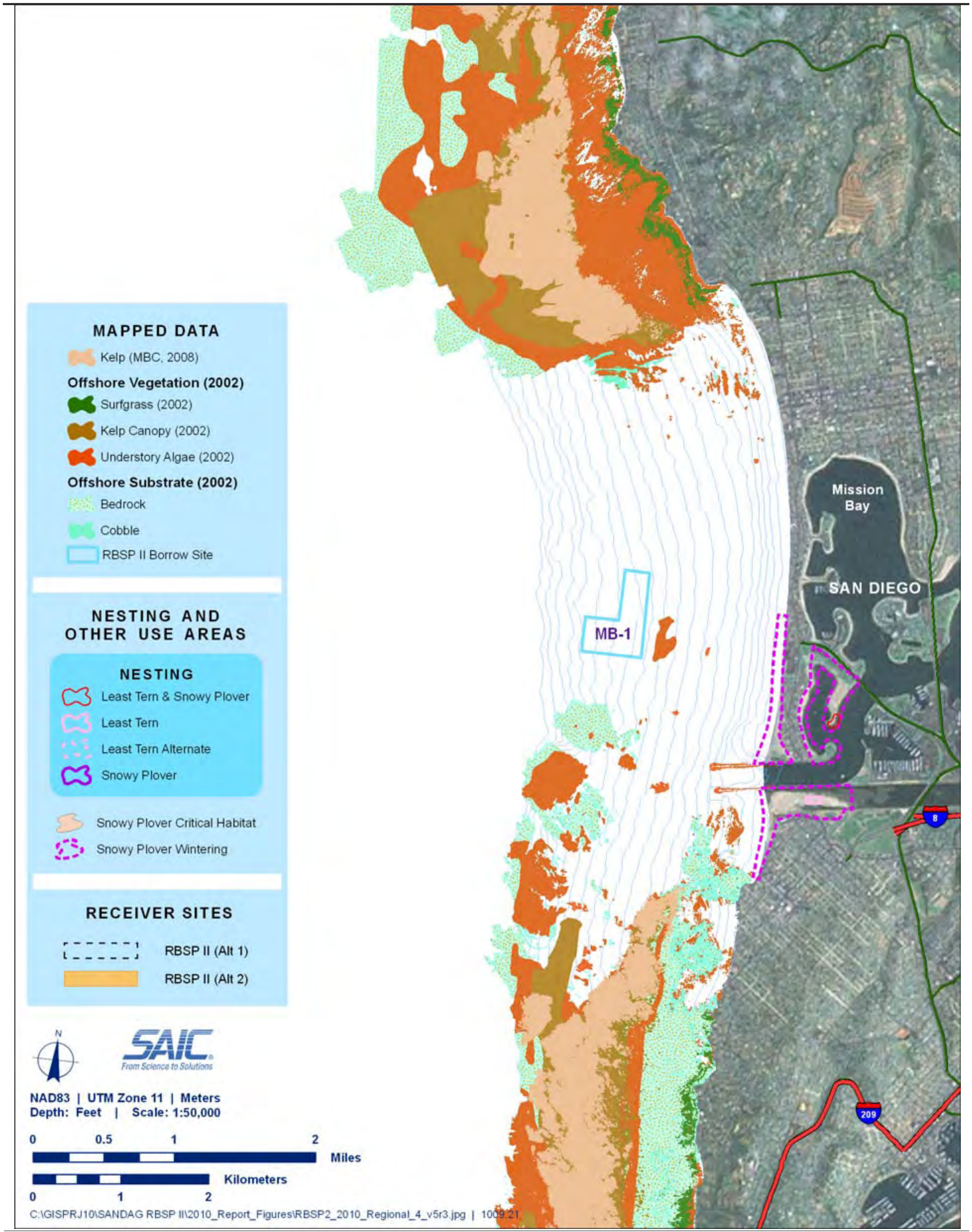

Figure 3.4-4
Sensitive Habitats in the Vicinity of the Mission Beach Borrow Site

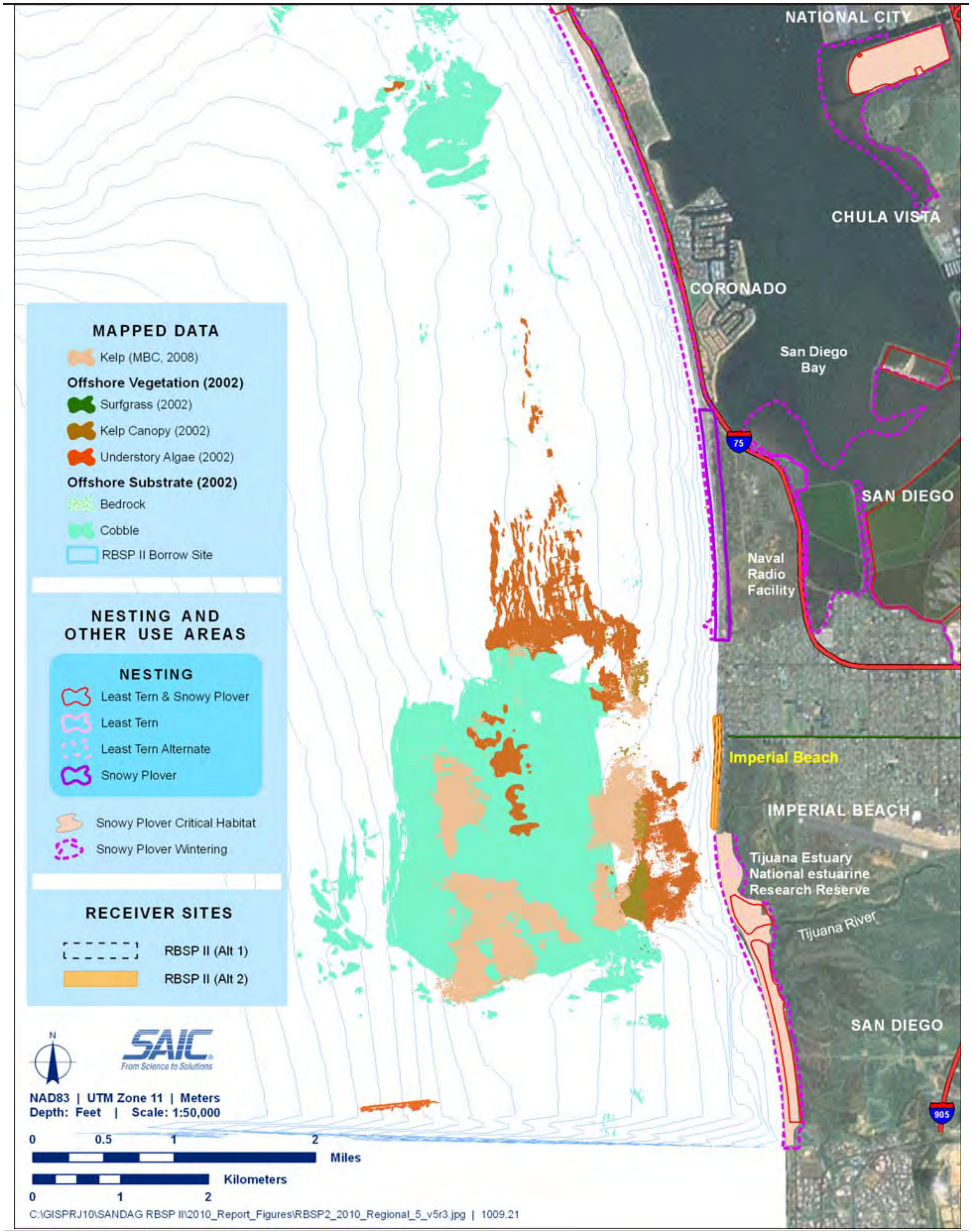

Figure 3.4-5
Sensitive Habitats in the Vicinity of the Imperial Beach Receiver Sites

Birds observed during the 2008 survey and 2009 and 2010 site visits included Heerman's gull, herring gull (*Larus argentatus*), western gull (*Larus occidentalis*), marbled godwit (*Limosa fedoa*), sanderling (*Calidris alba*), willet (*Tringa semipalmata*), great egret (*Ardea alba*); rock pigeon (*Columba livia*); and American crow (*Corvus brachyrhynchos*). California brown pelican were observed in flight. Generally, more gulls were seen on the wider beach near Oceanside Pier than along the narrower beach of the proposed receiver sites.

Nearby Sensitive Resources

The predominant habitat offshore of the receiver sites is sand. No Pismo clam beds were observed along soft-bottom transects surveyed directly offshore and upcoast of the proposed receiver sites (SAIC 2009).

Limited hard-bottom and vegetated habitats occur offshore approximately 1,600 feet downcoast of the receiver site. The largest of the hard-bottom areas has low-relief rocks (<1 to 2 feet) and cobble with localized occurrence of surfgrass, giant kelp, feather boa kelp, sea palm, and sea fan as well as common occurrence of turf algae. Surfgrass is localized with sparse occurrence. Surfgrass, feather boa kelp, and turf also occur on a smaller, adjacent patch reef. No vegetation or turf algae occur on most of the hard-bottom habitat. The closest kelp bed in 2008 was more than 1 mile downcoast.

The closest endangered least tern and threatened snowy plover nesting sites are located at MCBCP more than 3 miles from the receiver site. The closest potential snowy plover wintering area is located near the San Luis Rey River more than 1 mile from the receiver site.

North Carlsbad

Within Receiver Site Boundaries

Beach habitat is predominantly sandy within the boundaries of the receiver site. Sand depths averaged between 28 and 41 inches across tide zones during the July 2009 survey. Bean clams, juvenile Pismo clams (1.5 to 2 inches), polychaete worms, ribbon worms, and amphipod and sand crab crustaceans were collected. No sign of established Pismo clam beds was observed. Beach width and sand depths appeared suitable for grunion spawning.

Sand erosion was evident after January 2010 with greater beach slope, presence of cobbles, and exposure of small unvegetated sandstone reef patches in the swash zone. No marine life was observed on the cobble or sandstone rocks.

Birds observed during the 2009 survey and 2010 site visit included Heerman's and western gulls; two species of shorebirds (western sandpiper [*Calidris mauri*] and willets); elegant tern; rock pigeon; and American crow. California brown pelican and great blue heron were observed in flight.

<u>Nearby Sensitive Resources</u>

The closest intertidal surfgrass is located more than 1 mile downcoast. Nearshore reef and scattered rocks occur approximately 200 feet offshore of the proposed receiver site. The greatest concentration of reef occurs offshore of the central portion of the receiver site and decreases in development in both upcoast and downcoast directions. Hard-bottom with understory algae occurs approximately 200 feet offshore of the site boundaries. Surfgrass, sea palm, and feather boa kelp were observed on reef heights ranging from 1 to 4 feet on the central portion of the reef within 450 and 700 feet of the site boundaries during the November 2009 dive survey. Giant kelp, sea palm, feather boa kelp, and sea fans were on reef located approximately 1,200 feet offshore of the boundaries of the receiver site. A well-developed kelp bed was mapped approximately 1,400 feet offshore of the site boundaries in 2008.

The closest endangered least tern and threatened snowy plover nesting sites are located more than 4 miles upcoast at MCBCP. The closest potential snowy plover wintering area is located within 200 feet of the downcoast boundary of the proposed alternatives.

South Carlsbad North

<u>Within Receiver Site Boundaries</u>

Beach habitat is predominantly sandy with sparse to dense cobble in the upper intertidal and decreasing seaward to the middle tide zone. Sand depths during the July 2009 survey averaged 12 to 13 inches in the upper and middle intertidal zones and 32 inches in the lower intertidal. Bean clams; juvenile Pismo clams (<1.5 inches); polychaete and ribbon worms; and amphipod, isopod, sand crab, and other crustaceans were collected. No sign of established Pismo clam beds was observed. Sparse kelp and surfgrass wrack were on the beach. Potential habitat suitability for grunion spawning varied due to cobble cover in the upper intertidal and may vary over the course of the grunion season with natural sand movement.

Sand erosion was evident after the January 2010 storm with greater beach slope, more extensive cobble cover, and exposure of unvegetated sandstone reef in the swash zone. No marine life was observed on the cobble or sandstone rocks.

Birds observed during the 2009 survey and 2010 site visit included Heerman's and western gulls, marbled godwit, willet, and whimbrel. Unidentified swallows were observed in flight.

Nearby Sensitive Resources

Intertidal surfgrass occurs approximately 1,100 feet upcoast of the Alternative 1 receiver site boundary and 150 feet upcoast of the Alternative 2 receiver site boundary. Nearshore waters are characterized by mostly sandy bottom with scattered rock and two well-developed patch reefs offshore of the central and southern portions of the receiver site alternatives. These more developed reef areas have understory algae and surfgrass. The surfgrass occurs approximately 200 feet seaward of the receiver site boundaries. The closest kelp bed in 2008 was approximately 2,500 feet upcoast.

The closest endangered least tern and threatened western snowy plover nesting sites are located at Batiquitos Lagoon, which is more than 2 miles from the receiver sites. Potential snowy plover wintering areas occur within the site boundaries. No snowy plovers were observed at the site during the July 2009 survey or January 2010 visit.

South Carlsbad South

Within Receiver Site Boundaries

Beach habitat is predominantly sandy with sparse to dense cobble in the upper intertidal and decreasing seaward to the middle tide zone of the Alternative 2 receiver site. No sand would be placed at this location under Alternative 1. Sand depths during the July 2009 survey averaged 16 to 17 inches in the upper and middle intertidal zones and 34 inches in the lower intertidal. Bean clams, polychaete and ribbon worms, sand crabs, beach hoppers, and amphipod and isopod crustaceans were collected. No Pismo clams were collected and no sign of Pismo clam beds was observed. Sparse kelp and surfgrass wrack were on the beach. Potential habitat suitability for grunion spawning varied due to cobble cover in the upper intertidal and may vary over the course of the grunion season with natural sand movement.

Sand erosion was evident after the January 2010 storm with greater beach slope, extensive cobble cover throughout the upper and middle intertidal, and exposure of unvegetated sandstone reef in the swash zone. No marine life was observed on the cobble or sandstone rocks.

Birds observed during the 2009 survey and 2010 site visit included Heerman’s and western gulls, marbled godwit, willet, and western sandpiper.

Nearby Sensitive Resources

Intertidal surfgrass is located approximately 1,100 feet upcoast of the site. Nearshore reef with surfgrass, understory algae (sea palm, feather boa kelp), sea fan, and localized giant kelp occurs offshore of the boundaries of the proposed Alternative 2 receiver site. Reef heights varied from less than 1 to 3 feet during the November 2009 dive survey. Surfgrass was sparse on the inshore portion of the reef and increased in density offshore. The surfgrass occurs approximately 300 feet seaward of the receiver site boundaries. Although giant kelp occurs on the reef, it does not form a large bed at this location. The closest kelp bed in 2008 was approximately 1,300 feet downcoast.

Least tern and snowy plover nesting sites are approximately 1.6 miles from the proposed Alternative 2 receiver site. The receiver site is located within a potential wintering area for snowy plover. No snowy plovers were observed during the July 2009 or 2010 site visit.

Batiquitos

Within Receiver Site Boundaries

Beach habitat is predominantly sandy with sparse to dense cobble in the upper intertidal and decreasing seaward to the middle tide zone. Sand depths during the November 2008 survey averaged 9 inches in the upper intertidal and ranged from 27 to 30 inches in the middle and lower intertidal. Bean clams, sand crabs, and amphipod and mole crab crustaceans were collected. In addition, juvenile Pismo clams were collected, but no indication of established Pismo clam beds was observed. Kelp and surfgrass wrack was sparse on the beach.

Beach widths above the high tide zone ranged from 0 to 3.7 feet. Potential habitat suitability for grunion spawning was limited by dense cobble cover, relatively shallow sand depths, and narrow beach widths in the upper intertidal; therefore, habitat suitability would depend on environmental conditions during the grunion season.

Birds observed during the November 2008 survey or the July 2009 site visit included Heerman's and western gulls, marbled godwit, willet, whimbrel, elegant tern, rock pigeon, and black phoebe (*Sayornis nigricans*). Gulls were the only birds observed during the January 2010 site visit. Threatened snowy plovers were observed on the beach and endangered least terns were seen in flight during the July 2009 site visit. A potential snowy plover wintering area is located in the northern half of the receiver site.

Nearby Sensitive Resources

One relatively large Pismo clam (>3 inches) was collected along the wider beach formed on the downcoast side of the jetties to Batiquitos Lagoon, approximately 300 feet upcoast of the proposed receiver site alternatives. No Pismo clam beds were observed along two soft-bottom transects surveyed directly offshore of the northern boundary of the receiver site in 2009 (SAIC 2009).

Intertidal surfgrass is approximately 1,400 feet from the site. Relatively sparse nearshore reef occurs directly offshore of the southern half of the proposed receiver site but is more developed downcoast. Reef heights ranged from less than 1 to 4 feet offshore during the June 2006 survey. Reef immediately downcoast of Batiquitos Lagoon appears to be sand influenced, with reef heights of 1 to 3 feet with only turf algae. Generally, surfgrass would be expected on higher relief substrate on inshore reefs, and the lack of its occurrence on suitable substrate is considered atypical. Sand influence appears to be localized and was not observed on the more expansive reef located downcoast where surfgrass was extensively mapped in 2002. Sand-influenced reef near the lagoon was also observed in 2000 before RBSP I. Sand influence also was seen, but to a lesser extent, and surfgrass and understory algae (sea palm, feather boa kelp) had localized occurrence on a transect located approximately 700 feet seaward of the site boundary. A well-developed kelp bed was mapped approximately 1,500 feet offshore of the site boundaries in 2008.

Critical habitat for threatened snowy plover occurs on the adjacent upper beach and in the adjacent Batiquitos Lagoon. Nesting sites for snowy plover and least tern are located in the lagoon. The closest nest site is approximately 380 feet from the receiver site on the other side of

Carlsbad Boulevard. Endangered Belding's savannah sparrow reports are more than 1,000 feet and light-footed clapper rail reports are more than 3,000 feet from the site.

Leucadia

Within Receiver Site Boundaries

Beach habitat is sandy within the boundaries of the receiver site. Sand depths averaged between 19 and 25 inches across tide zones during the July 2009 survey. Polychaete worms, ribbon worms, and amphipod and isopod crustaceans were collected. Three juvenile Pismo clams (<2 inches) were collected, but no sign of established Pismo clam beds was observed. Kelp and surfgrass wrack was sparse on the beach. Habitat was potentially suitable for grunion spawning during the July 2009 survey.

Sand erosion was visible after the January 2010 storm with greater beach slope, presence of cobbles, and exposure of substantial unvegetated sandstone reef in the swash zone. The sandstone was largely unvegetated, indicating recent scour. One rock patch had sparse turf algae.

Birds observed during the 2008 survey, or 2009 and 2010 site visits included Heerman's and western gulls, marbled godwit, willet, and whimbrel. California brown pelicans were observed in flight.

Nearby Sensitive Resources

Intertidal surfgrass is approximately 150 feet from the receiver 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. Localized patches of surfgrass partially buried in sand were seen during the January 2010 site visit. Exposed blade lengths were less than 12 inches. Nearshore reef with surfgrass and understory algae begins approximately 150 feet seaward and extends farther offshore of the proposed receiver site boundaries. Kelp bed habitat was mapped approximately 1,000 feet offshore of the southern portion of the site in 2008.

The closest endangered least tern and threatened western snowy plover nesting sites are located at Batiquitos Lagoon, which is approximately 0.8 mile upcoast of the receiver site. Potential snowy plover wintering areas are located approximately 3,000 feet upcoast.

Moonlight Beach

<u>Within Receiver Site Boundaries</u>

Beach habitat is predominantly sandy with sparse cobble throughout the tide zones. Sand depths during the July 2009 survey averaged 22 to 29 inches across tide zones. Polychaete worms, sand crabs, and amphipod crustaceans were collected. No Pismo clams were collected and no sign of established Pismo clam beds was observed. No vegetation wrack was on the beach. Habitat was potentially suitable for grunion spawning during the July 2009 survey.

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.

Birds observed during the 2009 survey or 2010 site visit included Heerman’s and western gulls; willet shorebirds; and rock pigeon. One California brown pelican was resting on the beach during the July 2009 survey.

<u>Nearby Sensitive Resources</u>

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 surfgrass, understory algae, and kelp occurs approximately 400 to 500 feet offshore and upcoast of the northern boundary of the site. Scattered rock reef with understory algae occurs offshore of the southern site boundary and extends farther downcoast. Kelp was mapped in 2008 approximately 850 feet offshore.

The closest endangered least tern and threatened western snowy plover nesting sites are located at Batiquitos Lagoon, which is more than 2 miles upcoast of the receiver site. Potential snowy plover wintering areas are located more than 2 miles upcoast.

Cardiff

Within Receiver Site Boundaries

Beach habitat is predominantly sandy with variable cobble, ranging from sparse to localized areas of dense cobble. Sand depths during the November 2008 survey 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. Riprap shore protection occurred along most of the site; the wetted sand line indicated wave run-up to the revetment.

No sensitive habitats were observed within the proposed boundaries of the alternatives. No Pismo clams were collected and there was no evidence of Pismo clam beds. Beach hoppers, bloodworms, and sand flies were observed in the upper intertidal. Various polychaete and ribbon worms were collected in the middle and lower intertidal zones. Bean clams were sparse in the swash zone and no concentrated patches of sand crabs were observed. Kelp and surfgrass wrack was sparse and localized on the beach.

Observed birds during the November 2008 survey included herring and western gulls and a large flock of western sandpipers. The site is within a potential wintering area for threatened western snowy plover. No snowy plovers were observed at the time of the survey.

Sand erosion was visible after the January 2010 storm with greater beach slope and concentrations of cobbles.

Potential habitat suitability for grunion spawning was limited by relatively narrow beach widths and wave run-up to and/or within a few feet of riprap and/or dense cobble; therefore, habitat suitability would depend on environmental conditions during the grunion season.

Nearby Sensitive Resources

An outfall pipeline covered with riprap occurs offshore of the alternatives and supports localized occurrence of hard-bottom indicator species such as giant kelp, feather boa kelp, sea palm, and sea fans.

Intertidal surfgrass occurs approximately 2,500 to 1,800 feet upcoast for Alternative 1 and Alternative 2, respectively. Sensitive hard-bottom and vegetated habitats occur approximately

1,200 feet upcoast and more than 2,000 feet downcoast of Alternative 1. These same hard-bottom areas are approximately 1,000 feet upcoast and 1,500 feet downcoast of Alternative 2.

Historically, least terns and snowy plovers have nested at San Elijo Lagoon east of I-5, at locations more than 1 mile from the receiver site. However, there have been no recent records of successful nesting activity in the last 5 years. The closest active nest sites in the past 5 years have been at Batiquitos Lagoon located more than 5 miles upcoast. The proposed Cardiff receiver site is located nearly 3 miles from the new nest sites constructed at San Dieguito Lagoon. Endangered Belding's savannah sparrow reports have been more than 1,000 feet and light-footed clapper rail reports have been 500 feet or more from the site. Critical habitat has been proposed approximately 1,000 feet away from the Cardiff receiver site, within the west basin of San Elijo Lagoon.

Solana Beach

Within Receiver Site Boundaries

Beach habitat is predominantly sandy with sparse cobble. Sand depths during the November 2008 survey 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.

No sensitive habitats were observed within the proposed receiver site boundaries. No Pismo clams were collected and no sign was observed of Pismo clam beds. Beach hoppers, bloodworms, bean clams, and polychaete and ribbon worms were collected. Kelp and surfgrass wrack was sparse and localized on the beach. Potential habitat suitability for grunion spawning was limited by relatively narrow beach widths and wave run-up to and/or within a few feet of coastal bluffs; therefore, habitat suitability would depend on environmental conditions during the grunion season. Observed birds included Heerman's and western gulls, marbled godwit, willet, and black-bellied plover (*Pluvialis squatarola*).

Nearby Sensitive Resources

Intertidal surfgrass habitat occurs 2,400 feet upcoast of Alternative 1 and 1,500 upcoast of Alternative 2. Sensitive subtidal hard-bottom and vegetated habitats occur approximately 460 feet upcoast of Alternative 1. Sensitive hard-bottom and vegetated areas are located approximately 200 feet offshore of Alternative 2.

The closest active least tern and snowy plover nest sites in the past 5 years have been at Batiquitos Lagoon located more than 5 miles upcoast. The closest new nest sites constructed at San Dieguito Lagoon are approximately 1.3 miles from the Alternative 1 site boundary and 1 mile from the Alternative 2 site boundary.

Torrey Pines

Within Receiver Site Boundaries

Beach habitat is predominantly sandy with sparse cobble throughout the tide zones. Sand depths during the November 2008 survey averaged from 20 to 30 inches across tide zones. Beach widths above the spring high tide line ranged from 0 to 5 feet.

No sensitive biological resources were observed within the proposed receiver site boundaries. Sand crabs, bean clams, and polychaete worms were collected in shovel samples. One juvenile Pismo clam (<2 inches) was collected. No sign of Pismo clam beds was observed. Bean clams were sparse in occurrence in the swash zone. Kelp and surfgrass wrack was sparse and localized on the beach. Potential habitat suitability for grunion spawning was limited by relatively narrow beach widths above the high tide line; therefore, habitat suitability would depend on environmental conditions during the grunion season.

Birds observed during the 2008 survey and 2009 site visit included California, Heerman's, and western gulls; whimbrel; black phoebe, and snowy egret (*Egretta thula*). A potential wintering area for threatened snowy plover occurs within the site and extends farther upcoast. No snowy plovers were observed during the 2008, 2009, or 2010 site visits.

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.

Nearby Sensitive Resources

Intertidal surfgrass habitat occurs 200 feet offshore of the site. Other 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 for threatened western snowy plover occurs approximately 600 feet upcoast of the site. Endangered Belding's savannah sparrow reports have been more than 800 feet and endangered light-footed clapper rail reports have been more than 2,000 feet from the site.

Imperial Beach

Within Receiver Site Boundaries

Beach habitat is predominantly sand with sparse cobbles. The beach was relatively wide above the high tide zone near the pier (100 feet above the high tide zone) but rapidly narrowed with little dry beach along most of the length of the site. Riprap shore protection occurs along most of the downcoast portion of the site; the high tide line indicated wave run-up to the revetment. Sand depths during the November 2008 survey south of the pier ranged from 24 to 38 inches across tide zones. During the July 2009 survey north of the pier, sand depths averaged 16 to 27 inches across tide zones.

Bean clams, sand crabs, bloodworms, polychaete and ribbon worms, amphipod and isopod crustaceans, and two juvenile Pismo clams (<1 inch) were collected downcoast of the pier. Similar species also were collected north of the pier, except for bloodworms. In addition, nine Pismo clams were collected north of the pier ranging in size from <1 to nearly 3 inches and relatively large, dead shells of Pismo clams were observed on the beach, indicating presence of a Pismo clam bed nearby. Adult clams are defined as those that exceed the legal size limit (minimum of 4.5 inches). Data collected in Coronado and Imperial Beach from May 2008 to March 2009 identified many clams less than 0.8 inches, but only Coronado had individuals that exceeded the legal size limit (CDFG 2010c). The density of adult Pismo clams at Coronado was approximately 0.07 individuals per square foot. For the purposes of this project, a Pismo clam "bed" is defined as an area with adult clams at a density of 0.07 individuals per square foot or greater. Because density of adult clams was not determined during the July 2009 survey, this location may or may not qualify as a clam bed.

Potential habitat suitability for grunion spawning was best on the wider beach near the pier and decreased downcoast with the narrow beach widths; therefore, habitat suitability would depend on environmental conditions during the grunion season.

Birds observed during the 2008 survey or 2009 surveys included Heerman's, ring-billed (*Larus delawarensis*), and western gulls; marbled godwit and willet shorebirds; and rock pigeon. Brandt's cormorant (*Phalacrocorax penicillatus*) and California brown pelican were observed in flight.

Nearby Sensitive Resources

Cobble substrate with kelp habitat occurs offshore. Results of the Pismo clam sampling north of the pier suggest the occurrence of a nearby clam bed. No evidence of Pismo clam beds was observed along four nearshore transects surveyed both upcoast and downcoast of the pier in 2008. The upcoast transects were located farther north than the intertidal sampling in 2009.

Critical habitat and a potential wintering area for threatened western snowy plover occur adjacent to the site. Snowy plover nest sites are located within 0.6 mile for Alternative 1 and 0.3 mile for Alternative 2. No snowy plovers were observed at the time of the survey. Least tern nest sites are within 0.5 mile for Alternative 1 and 0.2 mile for Alternative 2. Marsh habitat within the Tijuana NERR occurs on the other side of Seacoast Drive, approximately 250 feet or more from the receiver site. Reported nesting locations of endangered Belding's savannah sparrow and light-footed clapper rail are more than 3,000 feet away.

3.4.6 Borrow Sites

Near-surface sediment characteristics, which support biological resources, and types of biological resources collected or expected at the borrow sites, are described below. These sediment characteristics may be different than those found in deeper sand cores taken for grain size and geologic analyses. In addition, their proximity to sensitive habitats is summarized in Table 3.4-5 and described below.

Table 3.4-5
Closest Distance to Sensitive Resources from the Dredge Area Boundaries

Borrow Site	Closest Profile	Distance (ft) Offshore Profile to -30 to -40 MLLW	Approximate Distance (ft) to Sensitive Habitats from Closest Dredge Area Boundary					
			Nearshore Reef*	Hard-Bottom	2008 Kelp Canopy	Artificial Reef	Sunken Vessel or Debris	Wastewater Pipeline
SO-6	SD-0625	1,650–2,300	1,400	560	500	NA	2,000	500–675
SO-5	DM-0580, DM-0590	2,400–2,500	1,000–2,050	780	600	NA	NA	NA
MB-1	MB-0320, MB-0335, MB-0340	5,280–5,406	NA	480	>5000	300–1,000	500–3,000	NA

*Nearshore reef is defined as occurring in less than -30 ft MLLW.

SO-6

Near-surface sediments consist of medium sand with a median grain size of 0.43 mm and low content of fine sediment (6% silt + clay) and TOC (0.2%) (see Section 3.3.3).

While most of the species observed during monitoring near this borrow site are species common throughout the SCB, some are more representative of coarse sand sediments. These tend to be less common than those species associated with sand and silt/sand sediments.

Infaunal animals collected during the November 2009 survey included a variety of worms; clams, snails, and scaphopod mollusks; brittle star, burrowing holothuroid, and sea urchin echinoderms; amphipod, crab, and ostracod crustaceans; and minor phyla such as acorn worm and ribbon worms. Mobile macroinvertebrates and fish collected from a nearby regional monitoring station off Cardiff included spiny sand star (*Astropecten armatus*), elbow crab (*Heterocrypta occidentalis*), white sea urchin, barred sand bass (*Paralabrax nebulifer*), California lizardfish (*Synodus lucioceps*), longfin sanddab (*Citharichthys xanthostigma*), sargo (*Anisotremus davidsoni*), and speckled sanddab.

Borrow site 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 mono buoy locations have the potential to be near vegetated reef, kelp habitats, and the pipeline at Cardiff.

SO-5

Near-surface sediments consist of fine sand with a median grain size of 0.12 mm and relatively low content of fine sediment (18% silt + clay) and TOC (0.3%) (see Section 3.3.3).

Infaunal animals collected during the November 2009 survey included a variety of worms; clams, snails, and scaphopod mollusks; brittle star, burrowing holothuroid, and heart urchin echinoderms; amphipod, cumacean, crab, ostracod, shrimp, and tanaid crustaceans; and minor phyla such as acorn worm and ribbon worms, burrowing anemones, brachiopods, and phoronids. Trawl caught macroinvertebrates and fish during the 2009 survey included blacktail shrimp (*Crangon nigricauda*), decorator crab (*Loxorhyrichus crispatus*), spiny sand star, xanthus's swimming crab (*Portunus xantusii*), bay pipefish (*Syngnathus leptorhynchus*), California bat ray, California lizardfish, giant kelpfish (*Heterostichus rostratus*), kelp bass (*Paralabrax clathratus*), and speckled sanddab. Similar species were collected in 1999 prior to dredging for RBSP I, including blackspotted shrimp, elbow crab, California halibut, English sole, and fantail sole (*Xystreurys liolepis*).

The SO-5 borrow site 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. Proposed pipeline and mono buoy locations have the potential to be near vegetated reef or artificial hard-bottom (pipeline).

MB-1

Near-surface sediments consist of medium sand with a median grain size of 0.73 mm and low content of fine sediment (1% silt + clay) and TOC (0.1%) (see Section 3.3.3).

Infaunal animals collected during the November 2009 survey included a variety of worms; clams, snails, and scaphopod mollusks; brittle star, burrowing holothuroid, sand dollar, and sea urchin echinoderms; amphipod, cumacean, crab, isopod, and tanaid crustaceans; and minor phyla such as ribbon and flat worms, burrowing anemones, and phoronids. Trawl caught macroinvertebrates and fish during the 2009 survey included olive snail, sand dollar, sand star (*Luidia foliolata*), spiny sand star, white sea urchin, a bay pipefish, California lizardfish, and speckled sanddab. Similar species have been collected at nearby regional monitoring stations as well as California sand star, California halibut, and California scorpionfish (*Scorpaena guttata*).

Borrow site MB-1 is located in an area locally known as Wreck Alley. The site boundaries are approximately 500 feet from natural hard-bottom, which supports understory algae. The nearest artificial reef is the NOSC Tower, a Navy research platform collapsed onto the seafloor in 1986, which is approximately 300 feet from the site. The site boundaries are more than 500 feet from the Mission Bay Bridge Wreckage Site 1, approximately 500 feet from the *Ruby E*. sunken vessel, and approximately 3,000 feet from the *Yukon* sunken vessel. These wrecks are illustrated in Figure 2-3. Proposed pipeline and mono buoy locations have the potential to be near hard-bottom and kelp habitats.

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3.5 CULTURAL RESOURCES

Cultural resource are prehistoric and historic period sites, structures, objects, districts, or other places with evidence of human activity that are considered significant to a community, culture or ethnic group. Significant cultural resources are referred to as historic properties under federal law and meet one or more criteria for eligibility for nomination to the National Register of Historic Places (NRHP). Under CEQA, important or significant resources are those that meet one or more of the evaluation criteria for the California Register of Historic Places.

Cultural resource investigations for the Regional Beach Sand Project were directed at assessing the effect of the proposed undertaking on significant cultural resources, as mandated under the National Historic Preservation Act (NHPA) and CEQA, and their implementing regulations and guidelines. The area of potential effect (APE) for cultural resources encompasses the proposed offshore borrow sites and associated anchor zones, along with the sand transport corridor, and receiver sites. This section provides a summary of the cultural resources potential of the various project features based on a review of archival literature (including shipwreck data bases, government baseline studies, and historic charts), informant interviews, as well as study of geophysical survey and sediment core data. It also provides a brief overview of the prehistoric and historic cultural setting, particularly underwater resources. The complete technical report is provided as Appendix D.

3.5.1 Background

Near Surface Geology

Sea level changes and other geologic processes govern the development and preservation of sediments on the continental shelf. About 20,000 years ago global sea level was as much as 400 feet lower than today (Curray 1965), exposing several miles of the coastal shelf offshore in the San Diego region. Streams incised deep valleys into the coastal plain and deposited deep fluvial sediments in the drainage bottoms. Beginning 18,000 years ago, the climate began to warm rapidly, glaciers began to melt, and sea level began rising at a rate of between 6 and 12 feet per century (Masters and Aiello 2007). This rapidly flooded the coastal shelf, converting the stream valleys into bays, and the streams then deposited their sediment load into these bays. Sea level rise was particularly rapid between about 16,000 and 7,000 years before present (B.P.), and for most of this interval the rate of sedimentation within the bays did not match the rate of sea level rise. However, this period of rapid transgression was interrupted by at least two periods with static sea level. The most significant of these events is known as the Younger Dryas (YD) episode, which occurred between 13,000 and 11,500 years ago, while the second is the 8.2 Kilo-Year (8.2KY) cooling event, which lasted between 8,400 and 8,200 years ago. These events allowed the development of wavecut terraces with stable beach profiles and the accumulation of sediment deposits within the coastal bays. On the Southern California coast, the YD episode formed a terrace that is now located at about 190 feet water depth and the 8.2KY event formed a terrace at 78 feet water depth (Nardin et al. 1981). During these periods, the continuing accumulation of sediment in the coastal bays allowed the formation of sediment bars that blocked the bay mouths to form tidal lagoons. A more gradual rate of sea level rise between 7,000 and 3,000 years ago produced many such lagoons and estuaries and allowed the development of wetland habitats containing many resources useful to prehistoric humans. Present-day sea level was attained by about 3,000 years ago, allowing sedimentation to almost completely fill the existing coastal bays and lagoons (Inman and Jenkins 1983).

Prehistoric and Ethnohistoric Cultural Setting

<u>Initial Occupation: Paleoindian and Early Coastal Adaptations</u>

Despite decades of research, the early prehistory of coastal Southern California remains poorly understood. The archaeological record does reveal that humans appeared by about 12,000 years ago on the Channel Islands, where they lived primarily by fishing and shellfishing. Archaeological sites left by these early island inhabitants are of interest in that they seem to reflect fully developed maritime economies that were distinct from, but roughly contemporaneous with, the Clovis tradition represented throughout much of interior North America. Identified late Pleistocene components are lacking on the mainland coast of Southern California, although several sites have produced calibrated radiocarbon dates of more than 9,000 years (Erlandson et al. 2007:58–59). Archaeological materials at these early sites are assigned to the San Dieguito complex, with its finely worked scrapers, and leaf-shaped and stemmed projectile points (Warren 1968; Warren et al. 1993), and the La Jolla complex, represented by simple flaked cobble tools, relatively abundant groundstone, and flexed burials. Although the temporal and cultural relationship between San Dieguito and La Jolla complexes continues to be debated, it is increasingly clear that human populations were well established along the mainland coast of Southern California by about 9,000 years ago.

<u>The Archaic</u>

After human occupation was established along the San Diego coast, sea levels continued to rise rapidly until 8200 B.P., when it slowed to a rate of less than 1 foot per century in response to the

8.2KY cooling event. As noted above, this slower sea level rise allowed the formation of a complex mosaic of productive lagoon and estuary habitats at many locations along the San Diego county coastline (Carbone 1991; Gallegos 1985; Masters and Gallegos 1997). These lagoons and estuaries seem to have supported a substantial coastal population during the early Archaic, as numerous coastal components have been found that date to this interval. Archaeological remains in these components typically represent the La Jolla complex and often contain abundant shellfish and fish remains, along with flaked cobble tools, basin metates, manos, discoidals, stone balls, and flexed burials.

A potentially important element of Archaic adaptations along the San Diego County coast may be represented by the several hundred submerged artifacts that have been reported at numerous locales. Consisting mainly of cobble mortars, these artifacts have been found off Del Mar, Solana Beach, Torrey Pines, and Point Loma, but principally in the area around La Jolla Cove and La Jolla Shores (Masters 1983; Masters and Gallegos 1997). At La Jolla Shores, many artifacts are associated with a submerged cobble bar thought to have been exposed around 4,000 B.P. (Masters and Gallegos 1997).

The Late Prehistoric

The appearance of small, arrowhead-size projectile points, ceramics, and the practice of cremation around 1,300 years ago mark the beginning of the Late Prehistoric period in Southern California. Projectile points commonly found in Late Prehistoric assemblages include Cottonwood Triangular and Desert Side-notched forms, both thought to mark the introduction of the bow and arrow into the region. Regional populations appear to have been relatively high during the Late Prehistoric, resulting in territorial restrictions, increased sedentism, and subsistence intensification (Byrd and Reddy 2002; Byrd and Raab 2007). Villages were relatively stable and occupied for much of the year, and were positioned for access to a variety of resource. Subsistence is thought to have focused on acorns and grass seeds, along with deer and a variety of small mammals. Along the coast, subsistence focused on the collection of shellfish and nearshore fishing. At Spanish contact, the northern portion of San Diego County was occupied by speakers of a Takic language related to those dialects spoken in the Los Angeles Basin to the north but distinct from the Yuman language spoken in the San Diego area to the south (Kroeber 1925). These groups were later known generally as the Luiseño and Juaneño, based on their associations with either Mission San Luis Rey or Mission San Juan Capistrano.

Historic Cultural Setting

The historic period in coastal San Diego County was ushered in by Juan Rodriguez Cabrillo, leader of the first expedition to what would become Alta California in September of 1542. Cabrillo was followed in 1602 by Sebastian Viscaino, but 160 more years would pass before the Spanish developed a permanent presence in San Diego through the establishment of the San Diego Presidio and mission (1769) and Mission San Luis Rey (1799). The Mexican period of California history (1821 to 1848) saw the secularization of the missions, the award of numerous large land grants by the Mexican government, and the establishment of an extensive of hide trading industry. Because San Diego Bay was utilized as a hide processing station, the waters off San Diego County were heavily traveled by trading ships.

The discovery of gold in 1849 and the signing of the treaty of Guadalupe Hidalgo acted to dramatically increase both land and maritime traffic along the San Diego coast. Additionally, the completion of the California Southern and the Santa Fe railroad tracks along the coast during the 1880s, combined with increased development of port facilities in San Diego, encouraged maritime commerce regional commerce and spurred a boom in development during the late 19th and early 20th centuries. By 1900, the Navy began to realize the strategic importance of San Diego and the Great White Fleet arrived in 1908. The rapid development of the San Diego fishing industry in the first half of the 20th century also greatly increased the maritime use of the coast. The outbreak of World War II greatly spurred development in San Diego County and brought increased Naval activities throughout San Diego waters and adjacent shore.

3.5.2 Receiver Sites

For the cultural resources investigations, the APEs of the receiver sites are defined as the limits of the areas in which sand would be placed. Assessments of the APEs of the proposed receiver sites reveal that while no cultural resources are known to exist within the receiver sites themselves, numerous cultural sites are found in the general vicinity. Records searches conducted at the South Coastal Information Center and the archives of the San Diego Museum of Man revealed a total of 83 cultural resources within 0.5 mile of the receiver sites, including 60 prehistoric sites, 14 historic sites, two sites containing both prehistoric and historic components, and seven isolated prehistoric artifacts. No cultural resources have been identified within the APEs of any of the receiver sites.

Oceanside

Six cultural resources are located within a 0.5-mile radius of the APE, including one historic site, three prehistoric sites, and two historic properties. The three prehistoric sites are classified as shell scatters, with one site (CA-SDI-13,212) also containing a historic trash dump. The lone historic site is the former site of the Atchison, Topeka, and Santa Fe Railroad maintenance yard. None of the archaeological sites or structures are within the Oceanside receiver site APE.

North Carlsbad

Two resources are located within a 0.5-mile radius of the North Carlsbad APE. Both sites are classified as prehistoric campsites; however, CA-SDI-17,414 exists beneath a historic trash lens. Neither site is within the North Carlsbad receiver site APE.

South Carlsbad North

Four prehistoric sites and one prehistoric isolate are located within a 0.5-mile radius of the northern South Carlsbad APE. One site is classified as a shell scatter (CA-SDI-15,678), one is described as containing shell and fractured rock (CA-SDI-760), one is described as a campsite containing middens (CA-SDI-17,408), and a final site contains shell and artifacts (CA-SDI-17,413). The isolate (W-6106) is a large obsidian blade. None of these are within the South Carlsbad North receiver site APE.

South Carlsbad South

Three prehistoric sites and one prehistoric isolate are located within a 0.5-mile radius of the southern South Carlsbad APE. The three sites (CA-SDI-760, -15,678, and -17,408) are also within a 0.5-mile radius of the northern South Carlsbad APE and were described above. Two *Chione* spp. shell fragments account for the lone prehistoric isolate. None of the resources are located within the South Carlsbad South receiver site APE.

Batiquitos

Six cultural resources, all prehistoric sites, are located within a 0.5-mile radius of the Batiquitos APE. Three can be classified as shell and artifact scatters, two as midden deposits, and one as a campsite. While none of the sites are within the Batiquitos receiver site APE, CA-SDI-9589 is close to the northeast end.

Leucadia

No cultural resources are located within 0.5 mile of the Leucadia receiver site APE.

Moonlight Beach

Two prehistoric sites and one historic property containing two structures are present within a 0.5-mile radius of the Moonlight Beach APE. One site (CA-SDI-4658) is described as containing fire-cracked rock and flaked stone artifacts, while the other (CA-SDI-17,402) is an intermittent campsite. Neither of these is within the Moonlight Beach receiver site APE.

Cardiff

Eleven resources have been identified within a 0.5-mile radius of the Cardiff APE. Seven of these sites are prehistoric, three are historic, and one has both prehistoric and historic elements. The prehistoric sites include a shell midden with associated artifacts (CA-SDI-6850), two campsites (CA-SDI-10,220 and -13,753), a shell midden (CA-SDI-13,754), a habitation site (CA-SDI-14,057), an artifact and shell scatter (CA-SDI-15,066), and cobble hearths (W-80). The historic sites include a small trash dump (CA-SDI-17,777), a kelp factory dating to 1915 (CA-SDI-6854H), and a railroad alignment (P-29481). CA-SDI-215/H contains both a small historic trash dump and remnant prehistoric shell midden and associated La Jollan flexed human burial. None of these sites are located within the Cardiff receiver site APE.

Solana Beach

Thirteen resources are within a 0.5-mile radius of the Solana Beach APE. Nine of these sites are prehistoric, three are historic, and one contains both prehistoric and historic elements. Six sites (CA-SDI-215/H, -13,753, -13,754, -14,057, -15,066, and -17,777) are also within a 0.5-mile of the Cardiff project APE and were discussed above. Of the seven sites found uniquely within a 0.5-mile radius of the Solana Beach APE, five are prehistoric and two are historic. The prehistoric sites are described as midden (CA-SDI-7979), a habitation site with human burials (CA-SDI-10,940), a campsite (CA-SDI-13,752), and two hearth sites (W-37 and -55). The two historic sites include a portion of Atchinson, Topeka, and Santa Fe Railway (CA-SDI-13,506H) and an asphalt lot with concrete foundations (CA-SDI-13,507H). None of these sites are located within the Solana Beach receiver site APE.

Torrey Pines

Twenty-nine resources are located within a 0.5-mile radius of the Torrey Pines APE, consisting of 22 prehistoric sites, two historic sites, four prehistoric isolates, and one historic property. The prehistoric sites include eight that are primarily shell concentrations or midden, three general artifact scatters, one bedrock milling site, one stone quarry, four lithic scatters, three hearth features, and two sites containing both hearths and debitage. The historic sites are both classified as refuse deposits. The prehistoric isolates include a flake, a core, a small shell scatter, and a sandstone metate. None of these resources are located within or near the Torrey Pines receiver site APE.

Imperial Beach

Four resources, including two prehistoric sites, one historic site, and one prehistoric isolate, are located within a 0.5-mile radius of the Imperial Beach APE. The prehistoric sites are classified as a sand dune with cobbles (CA-SDI-4641) and a shell and artifact scatter (CA-SDI-13,966). The historic site (CA-SDI-13,965) is a scatter of historic debris. The single isolate (P-14011) is a metavolcanic flake. While none of the resources are located within the Imperial Beach receiver site APE, CA-SDI-4641 is located a short distance to the east.

3.5.3 <u>Borrow Sites</u>

Cultural resources within the proposed borrow sites may include either historic or prehistoric resources. Historic resources may include shipwrecks, discarded debris, or materials intentionally placed to provide artificial reefs. Prehistoric resources may include submerged artifacts such as cobble mortars, pestles, net weights, metates, flaked stone tools, or other items (Masters 1983; Masters and Gallegos 1997), or preserved deposits of prehistoric habitation debris on the continental shelf that were inundated during marine transgression during the Holocene.

Data Sources

<u>Prehistoric Resources</u>

The potential for prehistoric resources within the borrow sites was assessed mainly through the development and application of a predictive model to address the likelihood for the occurrence and preservation of archaeological deposits within each borrow area (Hildebrand and York

2010). Based on analysis of geophysical data, sediment cores, and marine invertebrate fossils, this model considers access to prehistoric resources, topography, depth of erosion, sediment supply, and rate of sea level rise in assessing the archaeological sensitivity within each borrow area. A fundamental component of the model is that certain geologic settings are conducive to the burial and preservation of cultural materials, placing them beneath the impact of shoreline erosion during marine transgression. River valley settings are particularly appropriate, since sites within these valleys may become covered by fluvial and estuary sediments and protected from erosion. Additionally, records on file in the South Coast Information Center of the California Historical Resources Information System (CHRIS) were consulted to identify the locations of any known submerged artifacts within the borrow sites. Additionally, Native Americans that may have knowledge of prehistoric resources within the borrow sites are being consulted. Contact with Luis Guassac of the Southern California Tribal Chairmen's Association was initiated in August 2010 and is ongoing.

Historic Resources

Assessment of the potential for historic-period cultural resources within the borrow areas is based mainly on data compiled for the previous RBSP project (Pettus and Hildebrand 2000). This assessment presents the results of archival research and review of side-scan sonar data obtained for the RBSP I borrow areas. Archival sources and interviews included the following:

- *Museums and Historical Societies*: Archival research was conducted at the San Diego Historical Society, the San Diego Maritime Museum, the National Maritime Museum, the San Diego Museum of Man, and Scripps Institute of Oceanography.
- *Shipwreck Databases*: Shipwreck databases consulted included government shipwreck data on file at the Minerals Management Service (Outer Continental Shelf Office) in Camarillo, California, and the California Shipwreck Database maintained by the CSLC, as well as two private shipwreck databases (the Smith Collection and the Schwemmer Collection).
- *Cultural Resource Registers*: The National Register of Historical Resources, the California State List of Historic Landmarks, and the California Historical Information System were consulted.
- *Charts*: Historic hydrographic charts, topographic maps, and existing locations data on shipwrecks in local and regional newspaper files were examined.

- *Cultural Resource Reports*: A wide variety of cultural resources reports and papers were consulted. In addition to the previous RBSP I study (Pettus and Hildebrand 2000), reports most pertinent to the present borrow areas are Stright (1986, 1990), Stickel (1977), Gagliano (1977), and Piersen et al. (1987).

The RBSP I investigations at SO-5, SO-6, and MB-1 also included side-scan sonar imaging compiled by Sea Surveyor, Inc. (Pettus and Hildebrand 2000). The compiled images allow the detection of seafloor bedforms or objects such as sunken ships or structures. These covered the areas currently proposed for the SO-5 and MB-1 borrow sites, and an area adjacent to the SO-6 borrow site.

SO-6

Geoarchaeological Results

The potential for intact prehistoric archaeological deposits was assessed through the analysis of seismic reflection data and sediment recovered in selected vibracores taken from the proposed borrow site. The interpretation of the vibracore and seismic reflection data suggests a shallow (3–5 feet below seafloor) bedrock interface, with overlying offshore sediments in the northern and southern portions of the site. The offshore river valley is filled with a sequence of sedimentary facies that contains 5 to 15 feet of estuary/lagoonal sediments, and a 1- to 2-foot intertidal sand layer, underlain by fluvial sediments (below 16 feet in core SO6-204). A paleochannel is located along the southern portion of the river valley, flanked by terraces at depths 5 to 10 feet shallower.

The potential for occurrence of archaeological sites at SO-6 varies with location. Uneroded regions of the survey area located along the margins of the river valley are designated as having a high potential for archaeological site presence. These areas are extensions of the eroded zones where artifact materials are exposed and have been recovered by divers. The probability of site occurrence diminishes with distance from the river valley to the north and south, both due to lower desirability for prehistoric site location and because these regions tend to have experienced greater erosion with offshore sediments resting directly on bedrock. The terraces within the river valley (both north and south of the palaeochannel) have a moderate probability for site occurrence since these are regions where an intertidal-to-fluvial (pre-transgression to transgression) contact is present. The river paleochannel has a low probability for prehistoric site occurrence. The designated dredge area at SO-6 falls mostly within the palaeochannel and therefore has low potential for prehistoric site occurrence.

Historic Results

No shipwrecks or other historic cultural resources are recorded within the area of SO-6.

SO-5

Geoarchaeological Results

The seismic reflection profiles at SO-5 reveal a well-defined bedrock layer beneath sedimentary sequences that thicken seaward. In the beach parallel profiles, the outline of a broad paleochannel is preserved, with some suggestion that the channel may be divided into at least two separate branches. Based on the survey and core data, a geological cross-section was developed for SO-5. The interpretation shows the river valley filled with a succession of sediment facies. The lowest strata is pre-transgression fluvial sediments, represented by cores SO5-209 and SDG-79. Above this is a substantial strata of intertidal sands, measuring 2 to 8 feet thick, which is suggestive of a tidal bar at this location. At mid-depths in this core, poorly sorted sand deposits represent lagoonal environments. The uppermost layer is an offshore sediment facies with uniformly silty-sand materials.

The potential for occurrence of archaeological sites at SO-5 varies with location within the survey. Uneroded regions of the survey area located along the margins of the river valley are designated as having a high potential for archaeological site presence. These are extensions of the eroded zones; on the southern margin, artifact materials are exposed and have been recovered by divers. The probability of site occurrence diminishes with distance from the river valley margin to the north and south, both due to lower desirability for prehistoric site location, and because in these areas the offshore sediments rest directly on bedrock. The terraces within the river valley on both the north and south have a moderate probability for site occurrence. Although the northern terrace is poorly defined by the existing data, the southern terrace appears to be at a shallower depth, so it may have a somewhat higher potential for site occurrence. The river paleochannel has a low probability for prehistoric site occurrence. The potential for occurrence and preservation of archaeological sites within the SO-5 borrow site is low to moderate.

Historic Results

No shipwrecks or other historic cultural resources are recorded within the area of SO-5.

MB-1

Geoarchaeological Results

Seismic reflection profiles at MB-1 reveal a stair-stepped series of formations, stepping downward in the beach perpendicular direction (e.g., Sea Surveyor 1999, line 1). These are suggestive of a series of stable sea level stands at this location. These stable sea level stands may also represent the YD or 8.2KY events. The beach parallel subbottom profiles at MB-1 suggest a well-defined paleochannel, present in the southern portion of the river valley.

A geological cross-section for MB-1 was developed based on the seismic reflection and core data. The cross-section shows that the proposed dredge area for MB-1 is entirely within the submerged river valley. The river valley is filled with a sequence of sediment facies on the north side as follows (from top to bottom): estuary/lagoon, intertidal, marsh, and fluvial. On the south side of the valley the paleochannel is filled with at least 15 feet of intertidal sands. The channel fluvial layer and basement rocks were not reached by any of the cores (up to 15 feet below the seafloor).

In the northern portion of the survey grid the sediment sequence suggests a low energy transition from fluvial to marsh sediments, conductive to prehistoric site preservation. In the central and southern portions of the grid, core data suggest that the sediments were deposited in a high-energy intertidal environment. Pebble and cobble layers are present throughout these cores, which are dominated by poorly sorted sands. An intertidal environment is also suggested by the presence of bean clam (*Donax gouldii*) throughout the depth range of these cores (e.g., SDG-95; MB1-205).

The potential for occurrence of archaeological sites at MB-1 varies with location within the survey area. Uneroded regions of the survey area on both the north and south margins of the river valley are designated as having a high potential for archaeological site presence, owing to their desirability for site presence and potential for preservation. These areas, however, are adjacent to but outside of the proposed dredging area. In the northern portion of the river valley there is a low energy transition between fluvial and marsh sediments that would help to preserve prehistoric materials contained in the fluvial sediments. Although this transition was identified at approximately 10 feet below the seafloor in core MB-203, it may occur at somewhat higher elevations elsewhere in the borrow area. Therefore, the northern portion of MB-1 is considered to have moderate potential for archaeological site occurrence and preservation at depths less than 8 feet below the seafloor and high potential at lower than 8 feet. The potential for site presence and preservation is reduced in the southern portion of the river valley within the palaeochannel, given that these sediments are intertidal, perhaps representing a tidal sandbar. The southern portion of the MB-1 borrow area has a low probability for prehistoric site occurrence.

Historic Results

The MB-1 survey area includes several historic cultural features as shown in Figure 2-3. Three intentionally sunken vessels are located in this area including the *Yukon*, *Ruby E*, and *El Rey*. At least three other types of subsea cultural features exist within or in the immediate vicinity of MB-1. Artificial reef materials are found in several locations proximate to MB-1. The NOSC Tower, a navy research platform collapsed onto the seafloor in 1986, lies on the seafloor at the eastern edge of the proposed borrow area. These resources are outside the areas defined for the MB-1 dredging and would not be affected.

3.6 LAND AND WATER USE

This section describes existing land uses in the project areas and in the surrounding communities, and identifies pertinent general plan designations for the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach.

Proposed land uses are described in Chapter 5 (Cumulative Projects and Impacts). In general, proposed land uses in the vicinity of the receiver sites include maintenance dredging, beach replenishment projects, shoreline protection, and facility development.

This section also describes existing and designated recreational uses within the project areas. The Pacific Ocean and its shores are the focus of recreational activity and also define land uses in the project areas. Recreation and other beneficial uses are protected by the California Ocean Plan, which establishes standards to preserve the quality of ocean waters for use and enjoyment by the People of the State (SWRCB 2005). At all proposed receiver beaches, most of the same onshore recreational activities occur and are therefore not discussed separately. Unique recreational activities are noted under the discussion of that particular receiver beach. Surfing is more specific to individual receiver sites and is therefore discussed in more detail under each receiver site. Most recreational pursuits occur during the warmer spring and summer months, but are also popular during the fall and winter months due to the San Diego region’s mild climate. Additional information regarding the value of recreational fishing and diving is provided in Section 3.8 (Socioeconomics).

Each jurisdiction is responsible for maintaining a quality environment for its citizens and users through adoption of long-range planning documents. These documents contain goals, policies, implementation procedures, and regulatory controls, including permitting requirements, to guide and enforce conformance. State and federal agencies rely on executive orders, various laws, codes, mandates, management plans, and master plans to govern land use decisions within their jurisdiction. The most common guide used by local jurisdictions to define land use patterns is the general plan, which is, in turn, consistent with local ordinances. Land use elements of general plan documents typically contain those policies and maps governing land use compatibility within the jurisdiction. Local Coastal Plans (LCPs) are also key planning documents guiding land use within the coastal zone, as defined by the California Coastal Act (Cal. Code Regs. Title 14 § 30000).

Coastal Plans and Policies

Under the federal Coastal Zone Management Act of 1972 (16 C.F.R. § 1451 [1997]), long-range planning and management of California's coastal zone was conferred to the state with implementation of the California Coastal Act in 1977. The California Coastal Act (Cal. Code Regs. Title 14 § 30000) created the California Coastal Commission (CCC) who assist local governments in implementing local coastal planning and regulatory powers. Under that Act, local governments are encouraged to adopt LCPs. The LCP consists of a Land Use Plan (LUP) with goals and regulatory policies as well as a set of Implementing Ordinances. Of the six local jurisdictions for this project, five have approved LCPs acceptable to the CCC (Solana Beach submitted the draft LCP LUP to CCC on September 30, 2009, for review and consideration). Relevant policies specific to each LCP are discussed below under each jurisdiction. Section 2.7 (Permits Required) discusses permitting approvals required for cities with and without approved LCPs.

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. The Coastal Act also requires that new construction (Section 30253[2]) shall not require the construction of protective devices for erosion control.

California State Lands Commission

The CSLC 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).

Authority of the CSLC originates and is exercised from the state's position as a landowner. The CSLC 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. The Public Trust is a sovereign public property right held by the State or its delegated trustee for the benefit of the people. This right limits the uses of these lands to waterborne commerce, navigation, fisheries, open space, recreation, or other recognized Public Trust purposes. 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 CSLC has an oversight responsibility for tide and submerged lands legislatively granted in trust to local jurisdictions (Public Resources Code [PRC] § 6301).

Management responsibilities of the CSLC extend to activities within submerged lands (from mean high tide line) and those within 3 nautical miles offshore. These activities include oil and gas developments; harbor development and management oversight; construction and operation of any offshore pipelines or other facilities; dredging; reclamation; use of filled sovereign lands; topographical and geological studies; and other activities that occur on these lands. The CSLC also surveys and maintains title records of all state sovereign lands as well as settling issues of title and jurisdiction. Section 2.7 (Permits Required) discusses permitting requirements associated with each of the proposed receiver sites.

Marine Life Protection Act Initiative

In 1999, the California state legislature approved and the governor signed the MLPA (codified at Section 2850 through 2863 of the Fish and Game Code). The purpose of MLPA is to ensure that the existing collection of MPAs are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves by modifying the existing MPAs (URS 2010).

On December 15, 2010, the final MPA regulations were adopted for the South Coast Study Region, which extends from Point Conception to the California border with Mexico; and will go into effect in 2011. The regulations restrict specific activities within designated preserves but identify exceptions within specific MPA boundaries. Figure 3.6-1 shows the approved MPAs relative to the proposed RBSP II receiver and borrow sites.

3.6.1 Receiver Sites

For each of the 11 possible receiver sites, on-site and adjacent land uses (including recreation) are described, followed by a discussion of land use policies applicable to the proposed action. The proposed offshore borrow sites are described separately.

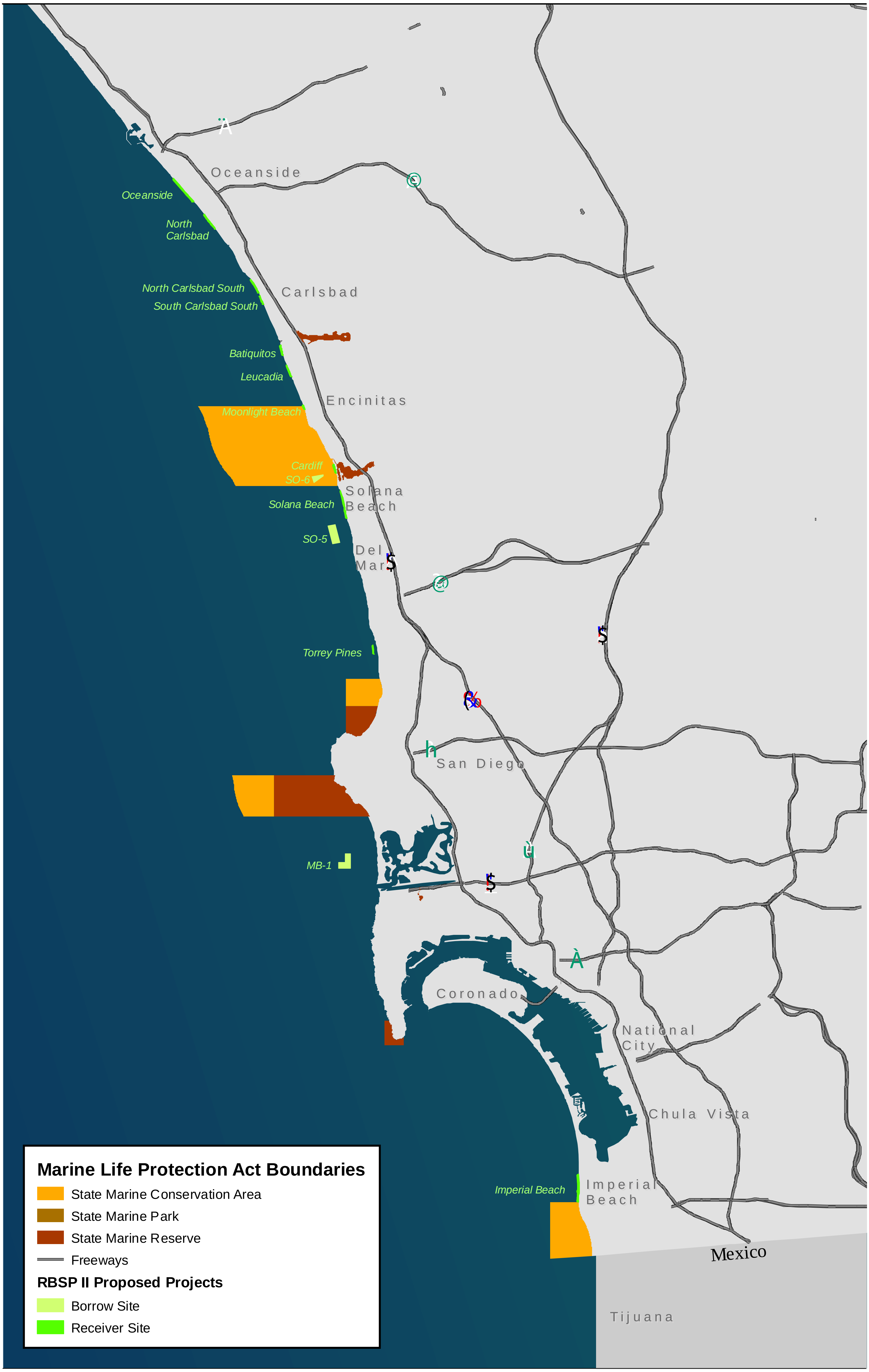
Recreational activities at all proposed receiver sites include a variety of onshore and offshore activities, including walking/jogging, swimming, surfing, stand up paddle boarding, windsurfing, sunbathing, beach combing, fishing (both commercial and sportfishing), SCUBA and skin diving, hiking, picnicking, boating, sailing, and bicycling. Many of the onshore activities are relatively common to many of the receiver sites. Offshore activities, particularly suring and fishing, are more specific to individual receiver sites. Fishing includes commercial fishing, sport fishing, lobster fishing, and gillnetting. Some of the species most commonly caught in the region include white seabass, rockfish, shark, halibut, lobster, sea urchins, and abalone. Fishing can occur throughout the offshore area, although most of the activity concentrates around offshore kelp beds. For more information on the commercial fishing industry, refer to Sections 3.8 and 4.8 (Socioeconomics). The large majority of human activity occurs closer to shore than the outer edge of the kelp beds.

Surfing occurs throughout the project area and within the vicinity of all proposed receiving beaches. Because surfing conditions are dependent on localized sand movement and sandbar development, this activity is discussed in additional detail. Wave conditions at regional beaches vary greatly in quality, temporarily depending on sandbars, swell direction, wind, and tide. Surfing sites in the project areas are shown in Figures 3.6-2 and 3.6-3.

Oceanside

<u>On-Site and Adjacent Land Use</u>

Under the maximum length alternative, the proposed Oceanside receiver site stretches for approximately 4,100 feet (0.8 mile) from Wisconsin Avenue south to Morse Street. The receiver site itself is used for recreational activities, while the area immediately adjacent is mostly composed of a mix of new and older residential uses. Riprap (large boulders) has been placed to protect beach front residences and structures. Scattered commercial and retail activities, mostly associated with tourism, also exist along adjacent roadways. The Strand, a beach front road that extends from Seagaze Drive to Wisconsin Avenue, abuts the northern end of the proposed receiver site. Although the entire site is a “beach” there are several named locations along the length. Wisconsin Avenue Beach is located at Wisconsin Avenue and The Strand. This is Oceanside’s least frequented beach because of the narrow width, particularly when the tide is high and the water reaches up to the riprap. To the south of Wisconsin Avenue, Oceanside Boulevard Beach offers more actual beach area than its neighbor, Buccaneer Beach. Buccaneer Beach is a small pocket beach situated in the southern end of the proposed receiver site where Loma Alta Creek reaches the ocean. Buccaneer Park is located just across the street (east) of



Source: ESRI 2010; CaliforniaCoastalCommission; California Department of Fish & Game 2010

0 4 Miles

Scale: 1 = 253,440; 1 inch = 4 mile(s)

Figure 3.6-1
Marine Preserve Areas Relative to RBSP II

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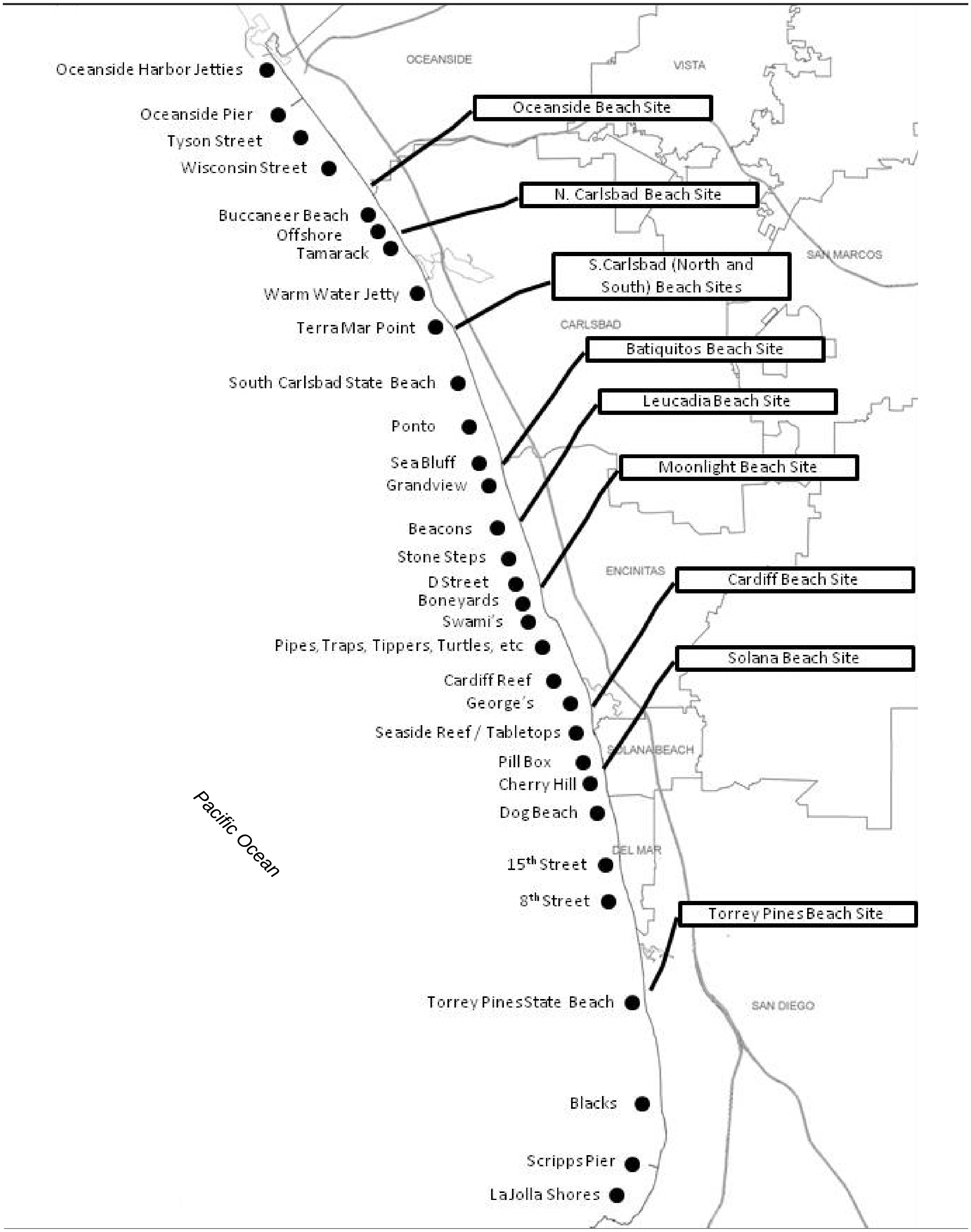
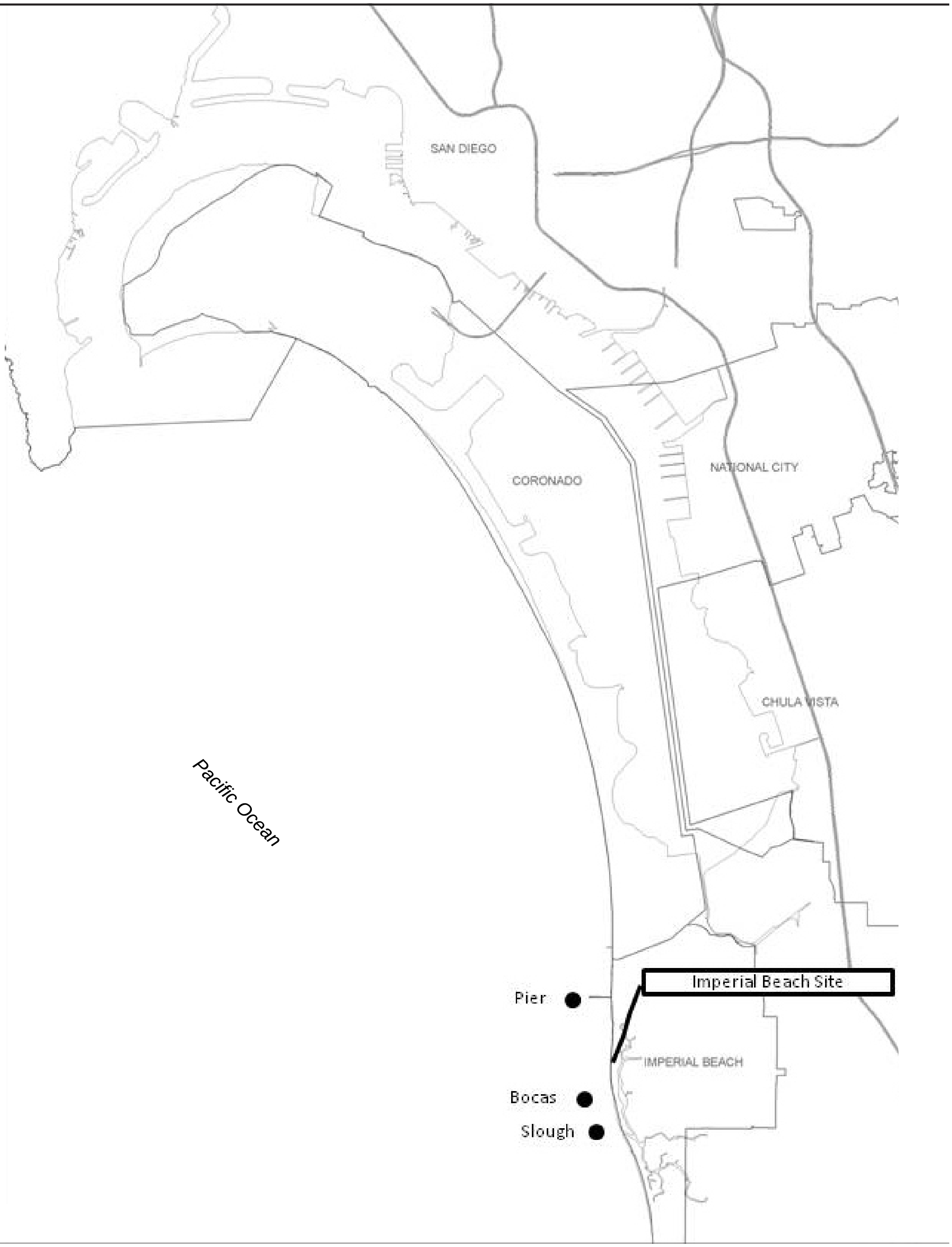


Source: Moffet & Nichol

Figure 3.6-2
Surfing Spots near the Project Areas #1



Source: Moffet & Nichol

0 1 2 4 Miles

Figure 3.6-3
Surfing Spots near the Project Areas #2

Buccaneer Beach. Located to the north of the northern end of the proposed receiver site are Tyson Street Beach/Park and the Oceanside Pier.

Surfing in Oceanside is popular as it is known for its beach breaks as well as the more consistent waves around the pier and harbor. The pier and harbor south groin and north jetty can create well-shaped sandbars and also physically refract swells that may otherwise close-out at a nearby beachbreak. The beachbreaks, which span the entire coastline, are most popular in the summer but can be surfed year-round contingent on sandbars, swell, and wind conditions. Due to beach access, the most popular beach break spots tend to be Bucanneer Beach, Wisconsin Avenue, and Tyson Street. However, on good surf days in the summer, the crowd spreads out from these main spots and the entire city shoreline can be relatively crowded. Popular surf spots near the receiver site are shown in Figure 3.6-2.

The Oceanside receiver beach involves CSLC sovereign land granted to the City of Oceanside pursuant to Chapter 848, Statutes of 1979. As such, any state lands permits necessary for the proposed action would be granted by the City, as trustee of these lands.

Land Use Policies

The proposed receiver site is located within the coastal zone as designated in the City of Oceanside Land Use Element of the General Plan (2002). The objective of the coastal zone is to provide for the conservation of the City's coastal resources and fulfill the requirements of the California Coastal Act of 1976.

In compliance with the California Coastal Act of 1976, the City adopted an LCP in 1985. The coastal zone boundary runs parallel to Coast Highway and west to the ocean. The north shore of Buena Vista Lagoon and an area north of Mission Avenue and east of I-5 are also included in the boundary area (City of Oceanside). In general, the LCP requires that development not interfere with public access to and along the shoreline.

As stated in Policy A of Section 1.32 of the Land Use Element,

> *The City shall utilize the certified Local Coastal Plan and supporting documentation for review of all proposed projects within the Coastal Zone. Specifically, the goals and policies of the Local Coastal Program Land Use Plan shall be the guiding policy review document.*

In the Land Use Element, Section 3.17 Coastal Preservation, are the following policies:

A. The City shall attempt to preserve shoreline beach area as a valuable recreational asset and visitor inducement.

B. The City shall continue with periodic replenishment of beach sand by the Federal government until permanent beach sand management systems are decided on and implemented.

Within the LCP, two of the major coastal access findings state:

I.B.3. Lateral access along the beach is presently restricted because of the severely eroded condition of the beach from the southerly end of the Strand to the Buena Vista Lagoon. Restoration of the beach will greatly improve lateral access, as well as enlarging the usable beach area.

I.B.4. Existing rock seawalls may, in some instances, inhibit lateral access, especially at high tide. However, the presence of the seawalls bears a direct relationship to the beach erosion problem which both necessitates shoreline protection and inhibits lateral access. Restoration of the beach may diminish this problem.

In the City's LCP, the following recreation-related findings are presented:

II.B.1. There has been a periodic decline in beach usage in Oceanside which corresponds to the seriousness of the beach erosion problem.

II.B.6. Future growth in beach usage in Oceanside will depend upon:
a. Restoration of the beach.

II.C.5. The City shall continue to take the initiative to resolve the problem of beach erosion.

As evidenced in the City's General Plan and LCP, beach replenishment is an important goal of coastal planning for the City of Oceanside.

North Carlsbad

On-Site and Adjacent Land Use

The North Carlsbad receiver site is within the City of Carlsbad and stretches for approximately 3,100 feet (0.6 mile) from just south of Buena Vista Lagoon and extends to north of Oak Avenue. Carlsbad State Beach is located immediately south of the receiver site. The receiver site is moderately utilized for beach activities due to its confined location between Buena Vista Lagoon and Carlsbad State Beach and proximity to local residences. The California Department of Parks and Recreation reported 1,472,280 visitors to Carlsbad State Beach in fiscal year 2008–2009 (DPR 2010). Access to the site is via public access to the beach at Carlsbad Village Drive, Grand Avenue, Christiansen Way, Beech Avenue, and Rue des Chateaux. There are no lifeguard services, restrooms, showers or other amenities. There is occasional riprap to protect beach front properties. The area located adjacent to the proposed receiver beach site is composed of new and older residential uses and a military (Army/Navy) preparatory school.

Surfing in the vicinity of the receiving beach is in the form of scattered beach breaks from Buena Vista Lagoon to just north of Tamarack. Conditions at these breaks are variable depending on sandbars, swell, and wind conditions. Tamarack is on the north side of the Agua Hedionda Lagoon entrance, which is stabilized by short jetties, and the bottom consists of reef variably covered with sand. Tamarack is divided into a number of peaks and is surfed consistently year-round. Offshore and Tamarack are the most popular surf spots in the vicinity; however, the entire stretch is surfed on a relatively consistent basis. Popular surf spots near the receiver site are shown in Figure 3.6-2.

The North Carlsbad receiver site involves ungranted sovereign land under CSLC jurisdiction; authorization from the CSLC would be required for implementation of the proposed action. The owner of the Encina Power Plant, Cabrillo Power, has an existing CSLC lease (PRC 932) for deposition of sediment from the dredging of Agua Hedionda Lagoon immediately south of this receiver site.

Land Use Policies

The site is located within the coastal zone as designated in the City of Carlsbad General Plan (2009). The objective of the coastal zone is to identify areas subject to the requirements of the California Coastal Act of 1976. Any project within the coastal zone is subject to review by the City of Carlsbad and the CCC. The City's permitting authority extends to landward of the mean high tide line, while the CCC retains jurisdiction seaward of that line. Therefore, since sand placement associated with RBSP II would take place seaward of the mean high tide line, it is anticipated that the City would not issue a separate local permit for the project.

In compliance with the California Coastal Act of 1976, the City certified an LCP in 1980. Subsequent amendments to the LCP in 1982, 1985, 1988, 1996, 2000, 2002, 2003, and 2006 have produced a substantive LCP, composed of five segments. The proposed receiver site is located within the Mello II Segment (City of Carlsbad 1996). In general, the LCP requires that development not impact biological or cultural resources, interfere with the public access to and along the shoreline, or impact visual or natural resources in the coastal zone.

The following policies identified in the City of Carlsbad Land Use Element of the General Plan, Chapter III: Environmental, Section C, are relevant to the proposed action:

C.9. *Implement to the greatest extent feasible the natural resource protection policies of the Local Coastal Program.*

C.11. *Participate in programs that restore and enhance the City's degraded natural resources.*

The following policy identified in the City of Carlsbad LCP, Chapter II-2, Policy 4-1: Coastal Erosion, is also relevant to the proposed action:

II. <u>Beach Sand Erosion</u>

Pursue mitigation measures which address the causes of beach sand erosion; sand dredging and use of the Longard Tube to reduce wave energy are two such measures which have been suggested. The City should continue to participate in the Regional Coastal Erosion Committee's (now the SANDAG Working Group) studies of the causes and cures for shoreline erosion.

South Carlsbad (North and South)

<u>On-Site and Adjacent Land Use</u>

There are two proposed receiver sites in South Carlsbad. Both are adjacent to the Carlsbad State Beach campground facilities and are located north and south of Encinas Creek. The South Carlsbad North and South Carlsbad South proposed receiver sites are under the jurisdiction of the California State Department of Parks and Recreation. An estimated 1,582,743 persons visited South Carlsbad State Beach in fiscal year 2008–2009 (DPR 2010). The South Carlsbad North receiver site is located approximately 2 miles north of the Batiquitos Lagoon inlet, stretching for approximately 3,100 feet (0.6 mile) (maximum length) to the north near Palomar Airport Road, under the maximum length alternative. The site is bordered by steep vegetated bluffs. The South Carlsbad South receiver site begins just south of the South Carlsbad North receiver site, stretching for approximately 1,830 feet (0.3 mile) southward. Due to their location on a State Beach adjacent to the South Carlsbad State Beach Campground, the receiver sites are highly utilized for recreational purposes. The campground consists of 222 campsites, a lifeguard tower, park ranger facilities, and maintenance facilities. This narrow beach has historically been described as "cobble beach." Sand periodically buries the natural seawall of cobblestones for long periods of time. Changing weather and water currents, along with the nearby dredging of Agua Hedionda Lagoon, affect the beach composition (DPR 2009).

Surfing in the vicinity consists of scattered reef, beach breaks and jetty waves. The most consistently surfed spot in the reach is most likely Terramar Point; however, the warm water jetties surf spot (adjacent to the north jetty) can also be very popular depending on the sandbar condition. Scattered reef/beach breaks span the coast south of Terramar Point and are most popular north of Encinas Creek in the vicinity of Palomar Airport Road and within the South Carlsbad State Beach. These breaks are generally most popular in the summer and are contingent on sandbars, swell, and wind conditions. Popular surf spots near the receiver site are shown in Figure 3.6-2.

Adjacent land use includes several new residential plus mixed-use developments, including Encina Power Plant, Seapointe Resort, and a hotel.

At both receiver sites, the CSLC has jurisdiction over sovereign land. Authorization from the CSLC would be required for implementation of the proposed action.

Land Use Policies

Both sites are located within the coastal zone as designated in the City of Carlsbad General Plan (1994). For relevant plans and policies under the City's Land Use Element and LCP, refer to the discussion above under the North Carlsbad subheading.

The receiver sites are also subject to the plans and policies identified in the San Diego Coastal State Park System General Plan, Volume 3: South Carlsbad State Beach (1984). This plan identifies proposed improvements to South Carlsbad State Beach facilities and policies intended to protect natural resources in the vicinity of the State Beach. The following policy is relevant to the proposed action:

> *Littoral sand loss is recognized as a major threat to existing facilities and recreational resources. The department shall work with other agencies, including the California Department of Boating and Waterways, the City of Carlsbad, the San Diego Association of Governments, and the U.S. Army Corps of Engineers, to develop regional solutions to the sand loss problem. Any major program of sand replenishment or retention must consider the regional nature of the problem and the regional impact of actions taken along a segment of the shoreline.*

Encinitas

On-Site and Adjacent Land Use

Within the City of Encinitas, there are four proposed receiver sites: Batiquitos, Leucadia, Moonlight Beach, and Cardiff. At all Encinitas receiver sites the CSLC has jurisdiction over sovereign land. Authorization from the CSLC would be required for implementation of the proposed action.

The proposed Moonlight Beach and Cardiff Beach receiver sites and the SO-6 borrow site are located within the Swami's SMCA boundary. The MPA regulations for Swami's SMCA include an exception for sand replenishment and sediment management activities within its boundaries.

Batiquitos

The Batiquitos site is located approximately 1,000 feet south of Batiquitos Lagoon, stretching for approximately 1,490 feet (0.3 mile) from the City of Carlsbad into the community of Leucadia and Leucadia State Beach, which are within the City of Encinitas. The northern part of the site is known as "Ponto." Lifeguards utilize the Ponto State Beach entrance for Junior Lifeguard programs and surf camps all summer. This state beach is a unit of the state park system operated by parks staff. The City of Encinitas boundary is just to the south and that portion of the beach is operated by the City of Encinitas; the City of Carlsbad boundary is to the north. The state beach is subject to the San Diego Coastal State Park System General Plan. Adjacent land use is predominantly open space and residential, with some commercial uses along Coast Highway 101.

Due to erosion at this site, it is only moderately used for recreational purposes. In addition, public access to the southern segment of this beach is limited due to steep cliffs abutting the beach. There are also lifeguard stands along the beach.

Several popular surf breaks exist in the vicinity of the receiving beach and include Ponto, Sea Bluff, and Grandview. Grandview is likely the most popular spot in the reach and is surfed year-round. Patchy reef exists offshore in this area that results in a peak just south of the beach access point. Ponto is variably popular depending on the sandbar that forms offshore of the Batiquitos Lagoon inlet. Sea Bluff is a beach break located just north of the Grandview access stairs and is variably popular depending on sandbar and swell conditions. Popular surf spots near the receiver site are shown in Figure 3.6-2.

Leucadia

The proposed receiver beach at this site extends approximately 2,700 feet (0.5 mile) from just south of the Grandview access stairs to Jasper Street. As described above, this state beach is a unit of the state park system but is operated by the City of Encinitas. The Leucadia site is similar to the southern end of the Batiquitos site in that recreation 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. The Leucadia receiver site is in the vicinity of Beacon's and the spots mentioned above for the Batiquitos site. Beacon is a reef break and is surfed year-round. Scattered beach breaks exist to the south of this receiving beach; however, surfing in this reach is isolated due to access and generally poor sandbars. Popular surf spots near the receiver site are shown in Figure 3.6-2. Adjacent land use is predominantly residential, with some commercial uses along Coast Highway 101.

Moonlight Beach

The proposed Moonlight Beach receiver 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. The state beach is subject to the San Diego Coastal State Park System General Plan. 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 § 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 D Street, Boneyards, and Swami’s (Figure 3.6-2). Swami’s is the most consistent and 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. These beach breaks are most popular in the summer and are of variable quality contingent on sandbar, swell, and wind conditions.

Cardiff

Beach replenishment at this site would occur south of San Elijo Lagoon. The proposed receiver site is approximately 780 feet long (0.1 mile) and comprises the northern end of Cardiff State Beach. The proposed Cardiff site is characterized by cobble beaches and a steep, 10- to 15-foot berm south of Restaurant Row. The site is located adjacent to Coast Highway 101. 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 (on each at the north and south ends of the beach), restrooms, and an emergency vehicle access ramp. California Department of Parks and Recreation recorded approximately 2,264,552 visitors at Cardiff State Beach during the 2008–2009 fiscal year (DPR 2010). This estimate includes visitors to the south and central sections of Cardiff State Beach (i.e., George’s and Seaside).

Popular surf breaks in the vicinity of the proposed receiver beach are Cardiff reef to the north, George’s (located just south of Restaurant Row) within the receiving beach, and Seaside reef/Tabletops to the south (Figure 3.6-2). 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 the San Elijo State Park that includes 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 receiver 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. San Elijo State Beach had approximately 960,683 visitors in fiscal year 2008–2009 (DPR 2010).

The San Elijo Lagoon Ecological Reserve is adjacent to the site, just east of Coast Highway 101. The San Elijo Lagoon Nature Center opened to the public in January 2009. Recreation at the reserve is primarily limited to passive uses such as hiking, jogging, nature photographing, and bird watching. The reserve includes a nature center, a self-guided 5-mile nature trail, and an accessible boardwalk.

The waters off of Cardiff State Beach also support nonrecreational uses, including commercial fishing, kelp harvesting, and behavioral studies of the bottlenose dolphin (*Tursiops truncates*). Commercial fishing generally occurs in the same locations as recreational fishing.

Land Use Policies

All four Encinitas sites are located within the coastal zone as designated in the City of Encinitas General Plan (1995). Public beaches in the City of Encinitas are designated as Ecological Resource/Open Space/Parks in the City's General Plan (1995). The Leucadia and Moonlight beach sites are also within the Coastal Bluff Overlay zone.

The Encinitas General Plan identifies issues and opportunities relative to planning decisions within the City. Regarding beaches, the plan states, "the beach areas are losing sand depth each year and sand replenishment programs are needed to provide for their restoration." Additionally, the Resource Management Element of the General Plan identifies the following policies relevant to the proposed action:

8.6 The City will encourage measures which would replenish sandy beaches in order to protect coastal bluffs from wave action and maintain beach recreational resources. The City shall consider the needs of surf-related recreational activities prior to implementation of such measures.

10.3 The City shall explore the prevention of beach sand erosion. Beaches shall be artificially nourished with excavated sand whenever suitable material becomes available through excavation or dredging, in conjunction with

> *the development of a consistent and approved project. The City shall obtain necessary permits to be able to utilize available beach replenishment sands (as necessary, permits from the Army Corps of Engineers, California Coastal Commission, Department of Fish and Game, USEPA, etc.).*

In compliance with the California Coastal Act of 1976, the City of Encinitas includes an LCP LUP in its General Plan. The LUP identifies policies and provisions that serve to apply the Coastal Act in the City.

The City of Encinitas operates Leucadia State Beach and Moonlight State Beach. Cardiff State Beach is operated and maintained by the California Department of Parks and Recreation. However, all three beaches are subject to guidelines set forth in the San Diego Coastal State Park System General Plan (refer to the relevant land use policy described under South Carlsbad State Beach).

Solana Beach

<u>On-Site and Adjacent Land Use</u>

The proposed receiver site in the City of Solana Beach is located just north of Estrella Street for Alternative 2 and at Fletcher Cove Beach Park for Alternative 1 (terminus of Plaza Drive) and extends approximately 4,700 feet (0.9 mile) (maximum length) south. Steep cliffs abut the receiver site and the area consists of a gently sloping sand beach with scattered rocks and cobbles. Fletcher Cove Beach Park, also known as Pillbox due to its history as a World War II Gunnery installation, is the main park within Solana Beach. A playground, a basketball court, and picnic tables are located on top of the bluffs next to the Marine Safety Department Headquarters (San Diego Coast Life 2010). Residential development and some commercial uses exist near the receiver site along the bluffs. 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. There is also a lifeguard station, restrooms, and a public shower 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 Fletcher Cove, known as Pill Box. 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 (discussed above) and to the south at Cherry Hill. Popular surf spots near the receiver site are shown in Figure 3.6-2.

The proposed receiver beach is within the CCC's jurisdiction. Any decisions regarding activities on the beach would be subject to CCC review and approval.

Land Use Policies

The City of Solana Beach currently has no approved LCP. The City submitted the draft LCP LUP to the CCC on September 30, 2009, for review and consideration (City of Solana Beach 2010; Meyerhoff 2010). The Draft LUP for the Solana Beach LCP recognizes the importance of a sandy beach, and includes a number of policies that specifically encourage beach sand replenishment and sand retention strategies to establish a wide sandy beach in the city. The Draft LUP has an overarching land use policy that addresses beach replenishment and sand retention. The specific policy below addresses regional sand replenishment and is relevant to the proposed project:

Policy 4.106 *To participate in and encourage other long-term beach sand replenishment and retention programs at the federal, state, and regional level.*

Torrey Pines

On-Site and Adjacent Land Use

The proposed Torrey Pines receiver 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 (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 North Torrey Pines Road to protect it from eroding further (El Niño-driven storms of 1997–1998 eroded much of this road). As shown in Figure 3.6-2, popular surf breaks in the vicinity are scattered beach breaks 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., Blacks and Scripps Beach). Black's Beach and 15th Street are likely the most popular spots in the area as they provide consistent surf year-round. In fiscal year 2008–2009, there were 1,771,446 visitors to Torrey Pines State Beach (DPR 2010). In addition to the popular recreational activities found on other San Diego beaches, paragliding and parasailing are popular at this site.

The Torrey Pines receiver beach involves sovereign land granted to the City of San Diego pursuant to Chapter 688, Statutes of 1933. As such, any permits necessary for the proposed action would be granted by the City, as trustee of these lands.

Land Use Policies

The proposed receiver site at Torrey Pines is located within the coastal zone as designated by the City of San Diego General Plan (2008). The City's LCP guides development in sensitive coastal areas and provides for the preservation of natural resources. The City's LCP requires any project occurring within the coastal zone to be reviewed by the City and the CCC.

The receiver site is also subject to the plans and policies identified in the San Diego Coastal State Park System General Plan, Volume 8: Torrey Pines State Beach and State Reserve (DPR 1984). This plan identifies improvements to facilities at Torrey Pines State Beach and policies intended to protect natural resources in the vicinity of the State Beach. The following policy identified in the Park System General Plan is relevant to the proposed action:

> *Sand and similar sediment in active alluvial fans and other storage areas in the Los Peñasquitos watershed is a valuable resource that shall be considered for replenishment of littoral beach sand. Material excavated from sediment basins and other depositional storage areas in the watershed, and which is of suitable quantity, size, and chemical constituency to meet the management objectives of the state beach and state reserve, shall be considered for disposal into the littoral zone just below the Los Peñasquitos Lagoon opening. When beach replenishment is not needed or appropriate at the time of necessary dredging, the sand should be deposited for eventual use as beach replenishment, provided that suitable locations for deposit are available and that steps are taken at them to protect significant natural resources and their public use.*

Imperial Beach

On-Site and Adjacent Land Use

The proposed Imperial Beach receiver site (maximum length) extends for approximately 5,750 feet (1.1 miles) (maximum length) from Palm Avenue to approximately 1,000 feet south of Encanto Avenue. The site is primarily bounded on the east by a riprap slope approximately 10 feet high. Single- and multi-family residences are located east of the beach and riprap slope, with setbacks of approximately 5 to 10 feet, along much of the receiver site. The Tijuana River Natural Estuarine Research Reserve, which includes the Tijuana Slough NWR, managed by the USFWS, is located south and east of the site.

The Imperial Beach pier is located within the northern part of the receiver site and is the focus of a downtown activity hub that includes the beach, pier, a plaza with shops and restaurants, and Dunes Park, a shoreline park with a playground. Imperial Beach Chamber of Commerce is located east of the north end of the receiver site. Among other recreational activities common to other beaches in the region, visitors to this beach enjoy nature interpretation due to its proximity to the Tijuana Slough NWR. The beach turns from gently sloping and sandy in the northern part of the receiver site to narrow, steep, and cobbly as one travels south.

Surfing in the vicinity is generally focused from the pier to the Tijuana River outlet located south of the southerly terminus of Seacoast Drive. This area consists of scattered beach breaks that are of variable quality year-round and an offshore reef break (the Sloughs). The most popular break in the area is highly dependent on the sandbar, swell, and wind conditions but is generally either the Pier, Bocas, or a spot between these locations (Figure 3.6-3). These breaks are typically beach breaks, and are dependent on development sandbars in the nearshore zones. The Tijuana River Slough (reef) breaks relatively infrequently (i.e., typically during big surf) and is not exceptionally popular due to hazards (e.g., high currents and distance offshore) associated with the spot. Anecdotal evidence from local surfers indicates that RBSP I improved surfing in the area due to increased sandbar development (Dedina 2010).

The Imperial Beach receiver site involves sovereign lands granted to the San Diego Unified Port District pursuant to Chapter 1796, Statutes of 1990. Imperial Beach is located just north of the Tijuana River Mouth SMCA but is not located within the preserve and would not be affected by the MPA regulations.

<u>Land Use Policies</u>

The City of Imperial Beach General Plan and Coastal Plan (1994) contains the following policy and goals regarding sand deposition:

Conservation and Open Space Element Policy:

> *CO-1 The Beach: Imperial Beach has few industries and must, therefore, rely on the attraction of tourists for economic development. The beach area is most critical and the City should:*

5. *Assure continued replenishment of sand.*

Land Use Element, Goal 11 Small Beach Oriented Town:

c. Immediate Ocean Shoreline. The ocean, beach and the immediately abutting land are recognized as an irreplaceable natural resource to be enjoyed by the entire City and region. This unique, narrow strip of land should receive careful recognition and planning. The purpose of the beach is to make available to the people, for their benefit and enjoyment forever, the scenic, natural, cultural, and recreational resources of the ocean, beach and related lands.

Safety Element, Goal S-11, Storm Waves, Flooding and Seacliff Erosion:

The City should protect property by:

d) Working in coordination with SANDAG and other coastal cities in developing a regional beach replenishment program and continuing to implement the adopted "Shoreline Preservation Strategy for the San Diego Region."

3.6.2 Borrow Sites

The three proposed offshore borrow sites are illustrated in Figures 2-1 through 2-3. The sites are located along the coast from Encinitas to Mission Beach, in relative proximity to each receiver site but far enough offshore to be outside the littoral cell depth of closure. All of the dredge 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 borrow 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 3.8.3. 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.

Both SO-6 and SO-5 are located in ungranted sovereign lands under the jurisdiction of the CSLC. A lease is required from the CSLC for any portion of a project extending into State-owned lands that are under its exclusive jurisdiction. MB-1 is within sovereign lands legislatively granted to the City of San Diego.

SO-6

The refined SO-6 borrow area is shown in Figure 2-1 and is located west of San Elijo Lagoon and south of both the RBSP I SO-6 borrow area and the San Elijo wastewater outfall pipeline. SO-6 is located seaward of a lease to the California Department of Parks and Recreation from the CSLC (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 shipwrecks within the area of SO-6.

SO-5

The RBSP II SO-5 borrow site is located offshore of the San Dieguito River, as shown in Figure 2-2. The SO-5 borrow site is approximately 2 miles south of the San Diego–La Jolla Underwater Park, a recreational area for divers. There are no artificial reefs or shipwrecks within the area of SO-5.

MB-1

This borrow site is located offshore of Mission Beach, north of the Mission Bay jetties, as shown in Figure 2-3.

This borrow site is almost entirely encompassed by the Mission Bay Artificial reef (MBAR) and is within 700 feet of the proposed San Diego Underwater Recreation Area (SDURA). MBAR is utilized by recreational fishermen and sport divers. MBAR was permitted by the CCC in 1986 and reauthorized in 1996, and is administered by the CDFG. Located approximately 1 mile northwest of the Mission Bay Boat Channel, MBAR is easily accessed by vessels launched from or moored in Mission Bay. The proposed SDURA is located northwest of MBAR.

Mission Bay Bridge Wreckage reefs 1 and 2, along with Mission Bay Cement reef provide habitat for sport-fished species within MBAR, but the primary resources for sport divers are the sunken vessels of "Wreck Alley," which are also utilized by sport fishermen. Wreck Alley is a cooperative effort between the San Diego Divers Council and the CDFG. There are three intentionally sunken vessels located in this area including the *Yukon*, *Ruby E*, and *El Rey*. The *Yukon*, a 366-foot-long decommissioned Canadian navy Mackenzie class destroyer, is the latest contribution to Wreck Alley. The *Yukon* is California's latest and most popular wreck, both in and outside of diving circles. It was sunk in July 2000 in 100 feet of water. At 2,380 tons, 70 feet tall, and with six decks, it is one of California's largest wrecks accessible by divers. The *Ruby E* is a 165-foot-long Coast Guard cutter that was sunk in 1989 in approximately 90 feet of water. It rests intact and upright on the bottom, and is the most complex of the wrecks in Wreck Alley. A number of local SCUBA shops use this wreck in their advanced dive certification classes. The *El Rey*, a 100-foot-long 32-foot beam kelp cutter built in 1946, was placed in Wreck Alley in 1987. It rests in approximately 80 feet of water (California Wreck Divers 2010). At least three other types of subsea cultural features exist within or in the immediate vicinity of MB-1. Artificial reef materials are found in several locations proximate to MB-1.

Another important diving resource in Wreck Alley is the Naval Ocean Surveillance Center (NOSC) Tower, which is a navy research platform. It collapsed onto the seafloor in 1986 and lies on the seafloor at the eastern edge of the proposed borrow area. This feature has several popular names. Erected by NOSC in 1959 for oceanographic research and other studies, it functioned as a Naval Experimental Lab (NEL), and in late 1987 jurisdiction was transferred to the Chief of Naval Research, and Scripps Institute of Oceanography (SIO) operated it. Today it is variously referred to as the NOSC, NEL, or SIO tower, and is a popular dive spot.

3.7 AESTHETICS

Aesthetic resources are composed of natural and manufactured features that give a particular area its visual qualities. These features form the overall impression that an observer receives of an area, or its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of its landscape.

The significance of a change in visual character is influenced by social considerations, including public value placed on the resource, public awareness, and general community concern for visual resources in the area. These social considerations are addressed as visual sensitivity and are defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. High visual sensitivity exists when the public can be expected to react strongly to a potential change in visual quality. Moderate visual sensitivity would exist when affected views are secondary in importance or are similar to others in the region. Low visual sensitivity exists when the public has little or no concern about changes in the landscape.

To evaluate change to the landscape character of a project site, it is necessary to understand the existing visual qualities. Each receiver site is described below and a representative photograph is provided. The locations from where the site is visible are identified, which indicates the type of viewer. Then the actual beach site characteristics are described, including beach segments proposed for temporary pipelines for sand placement. Views of the borrow sites are longer distance views (a minimum of 0.5 mile) and are characterized by transiting recreation and commercial vessels. Because the borrow sites are underwater and the actual site character is not visible, they are not discussed separately in this section.

3.7.1 Receiver Sites/Temporary Pipeline Routes

Oceanside

The Oceanside receiver site is visible from several beachfront residences and businesses in the area. The Strand, a beachfront road that runs from Seagaze Drive to Wisconsin Avenue, abuts the northern end of the receiver site, and users of the Strand would view the site. The receiver site is severely eroded and portions of the beach, particularly at the southern end of the site, are visible only at low tide. Beachfront homes and condominiums are located east of this portion of the receiver site. As shown in Figure 3.7-1 (Photograph A), huge boulders have been placed in front of these structures for protection and are elevated slightly above the beach. Buccaneer Beach


Photograph A: Typical rip-rap protection


Photograph B: Bucaneer Beach Park

Figure 3.7-1
Photographs of Oceanside Receiver Site

Park is located within the receiver site. This park is situated where Loma Alta Creek drains to the ocean. Because the immediate area has not been developed, there is a sandy beach approximately 150 feet wide and 125 feet from the road to the line of riprap, which protects homes on either side of the park. Photograph B in Figure 3.7-1 shows the beach in front of Buccaneer Beach Park and reflects the relatively greater activity level at this location.

The delivery pipeline would likely extend northward from North Carlsbad across the Buena Vista Lagoon mouth, and be located along the back of the beach at the toe of revetments. Alternatively, a direct pipe route from offshore would make landfall south of 9th Avenue and continue south to the receiver site. It would be generally parallel to the Strand on the west side of the sea wall. On the east side of the Strand is a mix of beach-front homes, condominiums, parks, shops, and restaurants. West of the road there is a short wall that allows residents and users of the Strand to view the flat sandy beach. This beach narrows as it approaches Wisconsin Avenue. Also visible are palm trees (parallel to the wall from 9th Street to the Tyson Street Park), a traffic circle at 6th Street, a small parking lot just north of the pier at 3rd Street, and various lifeguard towers.

North Carlsbad

Primary views of the proposed North Carlsbad receiver site are from beachfront residences, which front the proposed site from the northern boundary near the mouth of Buena Vista Lagoon to Pine Avenue (Figure 3.7-2). From Pine Avenue to the southern terminus near Hemlock Street, residents are located on the bluff tops east of Carlsbad Boulevard and a walkway is constructed near the base of the bluffs with intermittent beach access points. The North Carlsbad receiver site is also visible for recreationalists at Buena Vista Lagoon, drivers on Ocean Street where intermittent beach access is available, and Carlsbad Boulevard. Visual resources at the North Carlsbad receiver site consist of a flat sandy beach lying in front of riprap or vegetated slopes, and sea walls that support beach-front structures. Slopes behind these protection structures rise to a height of approximately 30 feet. Structures along this receiver site include single-family residences, apartments, condominiums, and a military preparatory school. The sand beach along this site is typically under water during high tide.

The delivery pipeline would make landfall at the foot of Grand Avenue and extend north and south along the receiver site. Alternatively, it could extend from the Oceanside receiver site across the Buena Vista Lagoon mouth. Generally, it would be placed as far landward on the beach as possible to reduce exposure to wave action. From Hemlock Street south to the terminus of Tamarack Avenue, the pattern of adjacent residents on bluff tops, east of a busy roadway,


View looking north near Beech Street

Figure 3.7-2
Photograph of North Carlsbad Receiver Site

continues. However, continuing south across the lagoon mouth there are no adjacent residents until approximately Cannon Road.

Viewers would be limited to drivers along Cannon Road. A small subdivision is located between Cannon Road and Palomar Airport Road so there would be residential viewers along this length. From Palomar Airport Road to the south where the pipeline would eventually serve the receiver site, the adjacent land is undeveloped.

South Carlsbad South and South Carlsbad North

Both of these receiver sites are visible from South Carlsbad State Beach Campground. Portions of the northern site are visible from the parking areas north of the campground and Carlsbad Boulevard. The southern site is obscured from drivers by the intervening campground. This receiver site is characterized by a sand and cobble beach abutted by steep bluff slopes. The only development along this stretch of beach is the State Beach Campground located on the bluff approximately 65 feet above the site (Figure 3.7-3). Several stairways run from the campground down onto the beach.

The pipeline to serve these two sites would reach landfall 1,000 feet south of the north end of South Carlsbad State Beach campground (approximately 2,300 feet south of Encinas Creek Mouth). The general goal is to place the pipeline at the base of the bluffs to reduce exposure to wave action. In this area the bluff slopes vary from nonexistent at the creek mouth and 60 to 80 feet at the campground. There are no residents adjacent to the pipeline route.

Batiquitos

This proposed receiver site is just south of Batiquitos Lagoon with the northern portion adjacent to Carlsbad Boulevard/Coast Highway 101. Continuing south the proposed receiver site is situated in front of steep bluffs with houses constructed along the tops. Views are available from the roadway and residences. Views of the beach along this site are dependent upon the tides and location. Near the lagoon there is more sand (Figure 3.7-4, Photograph A). In front of the bluffs, conditions are different. At low tide, a low profile sand and cobble beach is visible below the cliffs; however, at high tide the beach is not visible as waves crash directly against the cliffs. The pipeline to serve this site would come from directly offshore and be placed as close to the bluff face as possible.


Photograph A: Looking south at South Carlsbad North site from bluff above


Photograph B: Looking south at South Carlsbad South site from bluff above

Figure 3.7-3
Photographs of South Carlsbad Receiver Sites

Photograph A: Looking south at site, south of Batiquitos Lagoon mouth

Photograph B: View looking north at Leucadia site, south of Batiquitos Lagoon mouth

Figure 3.7-4
Photographs of Batiquitos and Leucadia Receiver Sites

Leucadia

This receiver site is located entirely at the base of the bluffs and residences line the bluff tops. The northern limit is generally the public staircase at Grandview Avenue. Figure 3.7-4, Photograph B, shows the view looking north at this site from near Batiquitos Lagoon. As shown, the bluffs are vegetated near the top where the slopes are less steep, but at the base there are cobbles. Some sea caves in this area have been filled and the fill material is visible against the lighter, tan bluffs. As with the Batiquitos site, at low tide the sand and cobble beach is visible but at high tide the waves 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. Several stairways descend onto the beach from residences located on the bluff.

The pipeline to serve this site would be placed at the base of the bluff, coming directly inshore at the northernmost end of the beach fill site. Alternatively, the pipe could be extended south from the landfall site at Batiquitos to reach Leucadia. For either route, the pipeline would traverse a beach similar to the receiver site itself, with residences constructed atop high bluffs and viewing a beach that comes and goes with the tide.

Moonlight Beach

This receiver site has bluffs on either end, and Moonlight State Beach Park at the terminus of B Street. Views of the site would be available from residents and park users. The site contains a wider sand area at the 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. Figure 3.7-5, Photograph A, is a photograph looking north at the Moonlight Beach site. As shown, 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 structures. At high tide the water comes to the base of the bluffs and the beach is not visible. The delivery pipeline would most likely reach shore at the foot of D Street from directly offshore. Alternatively, the pipeline could be located at the base of the bluffs between the Leucadia receiver site and the Moonlight Beach site. The character of the area traversed by the pipeline would be much the same as described under Leucadia.

Photograph A: View looking north at Moonlight Beach site from C Street

Photograph B: Viewing looking south at Cardiff site from south of Restaurant Row

Figure 3.7-5
Photographs of Moonlight Beach and Cardiff Receiver Sites

Cardiff

This receiver site is parallel to Coast Highway 101 and San Elijo Lagoon. Several restaurants front the beach just north of the site. As shown in Figure 3.7-5, Photograph B, the beach is virtually all cobble. In fact, large boulders surrounding the restaurants are the only barrier between these structures and the sea. The length of the roadway is also protected by riprap. There are no obstructions between the receiver site and persons in the restaurants and for drivers along Coast Highway 101. However, for drivers 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 for residences on the hills north and south of San Elijo. The pipeline to serve this site would come from directly offshore.

Solana Beach

This receiver site sits below steep cliffs and is visible from the stairs at Solana Vista Drive, Fletcher Cove, and some residences along the bluff. It currently consists of little or no existing beach area. Views of the beach along this stretch are dependent upon the tides. At high tide, no dry beach exists along the majority of the receiver site as waves crash directly against the cliffs. The only exception is the small sandy beach at Fletcher Cove, which sits above the high tide mark and is located within the receiver site. At low tide a low profile sand and cobble beach is visible below the cliffs (Figure 3.7-6).

The pipeline to deliver sand would come from offshore and would make landfall at a point 1,350 feet south of the north end of Fletcher Cove (where Dahlia Drive would meet the sea if it were extended to the west from its present terminus) for Alternative 1 and Alternative 2.

Torrey Pines

The Torrey Pines receiver site is visible from North Torrey Pines Road, the parking area at Torrey Pines State Reserve, and view points within the State Reserve. This segment consists of a thin sand and cobble beach abutted by steep cliffs. Much of the southern part of the site is visible only during low tide, as waves reach the base of the cliffs at high tide. Cliffs range in elevation from approximately 50 to 200 feet. The beach trail from the State Reserve descends onto the beach, south of the receiver site. With the exception of the parking area for the State Reserve, no development exists in the vicinity of this site (Figure 3.7-7, Photograph A). There are residences constructed on the hills north of Los Peñasquitos Lagoon with distant views of the receiver site.

Photograph A: Looking south at Solana Beach site from Fletcher Cove beach

Photograph B: Looking south at Solana Beach site, south of Fletcher Cove beach

Figure 3.7-6
Photograph of Solana Beach Receiver Site

Photograph A: Looking south at Torrey Pines site from North Torrey Pines Road

Photograph B: Rip-rap protection along North Torrey Pines Road

Figure 3.7-7
Photographs of Torrey Pines Receiver Site

The Torrey Pines site would be one component of the viewscape, which includes the lagoon, beach, and steep hills of Torrey Pines State Park.

The lack of sand and protection for North Torrey Pines Road has resulted in severe erosion and failure at the road's western edges. Figure 3.7-7, Photograph B shows the riprap protection underneath this closed portion of the roadway.

The delivery pipeline would extend directly onshore from an offshore mooring location. The bluffs descend to beach level at the mouth of Los Peñasquitos Lagoon, and the backbeach is bordered by the elevated highway along the majority of the length of the receiver site. The far south end of the receiver site is bounded by the state beach parking lot and the north bluff line along Torrey Pines State Park. There are no houses adjacent to the beach in this location and the beach is paralleled by North Torrey Pines Road.

Imperial Beach

The Imperial Beach site is characterized entirely by homes, apartments, and condominiums constructed on the beach. Most are protected by riprap. There are also commercial uses adjacent to the pier. The public pier is at the north end of the receiver site, and there would be views from the pier under either alternative. The northern end of the site, from Imperial Beach Boulevard to Beach Avenue, has some sand and cobble, but south of Beach Avenue the beach is entirely cobble (Figure 3.7-8). Views would be available from residences along the site and from the pier. The pipeline to serve this site would come from directly offshore and make landfall just north of Descanso Avenue.

Photograph A: View looking north near Descanso Avenue

Photograph B: View looking south near Descanso Avenue

Figure 3.7-8
Photographs of Imperial Beach Receiver Site

3.8 SOCIOECONOMICS

Under NEPA "economic" and "social" effects are environmental consequences to be examined (40 C.F.R. § 1502.16 and 40 C.F.R. § 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 (Cal. Pub. Res. Code § 21060.5; Cal. Code Regs. Title 14 § 15358(b) and § 15382). The proposed action would place sand on existing beaches where there are no structures, except lifeguard towers, 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 Sections 6.6 and 6.7 of this EA/EIR, 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 EA/EIR (Section 1.2), is intended to enhance a valuable public resource that serves local residents in a number of ways. These include enhancing recreational opportunities at the receiver sites and bolstering the beaches as an important element of San Diego's attraction as a tourist destination, thereby providing benefits to the entire regional economy.

In addition to local and regional demographic and income information, this section presents information on commercial fisheries, the local social and economic sector most likely to be adversely impacted by the proposed project. During the NOP process, the City of Encinitas raised concerns regarding sand placement and potential impacts to commercial fishing resources. Local fishermen also shared their concerns during a stakeholder meeting with SANDAG consultants. Refer to Section 1.4.2 and Chapter 8 for a summary of the coordination and consultation efforts with these and other groups.

This section contains census data regarding population and income in Section 3.8.1. Commercial fisheries and the relative economic value of various species are discussed in Section 3.8.2. Kelp harvesting value is addressed in Section 3.8.3, followed by recreational fishing and diving value in Section 3.8.4.

3.8.1 Socioeconomic Characteristics

In terms of the broad economic contribution of beaches to the economy as a whole, while the total value of the beaches to the local jurisdictions and the region is known to be substantial, the quantification of the value this resource is not straightforward. One way to approach the problem of valuation is to examine the estimated costs of continuing beach loss to the region. As noted in Section 2.4.4, the No Project Alternative would not enhance protection, nor would it improve recreational opportunities or tourism value at specific receiver sites. Additionally, if no sand is placed at the specific receiver sites, then no additional sand would be available for transport elsewhere along the San Diego coastline. An earlier regional study (SANDAG 1993) conducted before RBSP I estimated annual costs (losses) of lost property and recreational benefits to the region at $52 million by 2010 and over $226 million by 2040. While the local (and regional) economy has changed somewhat since 1993, it can be assumed that lost property and recreational benefits under the No Project Alternative would still result in substantial annual losses in the tens of millions of dollars.

To provide a localized socioeconomic context for the proposed project, the remainder of this section presents information on population and income in the project area. To meet the specific intent of Executive Order 12898 on Environmental Justice (59 Fed. Reg. 7629 (1994)), it is necessary to consider the minority and economic status of the population surrounding receiver beaches. 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, and median income for each of the receiver beaches 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 enhanced recreational and tourism opportunities would likely be felt at a subregional or regional level.

Census tracts are the standard localized units of analysis for these types of data. The receiver beaches are contained within 11 census tracts. These census tracts, as well as the receiver beach sites they each encompass, are listed in Table 3.8-1. Although some tracts contain all or portions of more than one receiver beach, some sites straddle two census tracts. In addition, census tract boundaries do not follow city boundaries. For example, census tract 173.03 includes portions of both Encinitas and Solana Beach.

Table 3.8-1
Census Tract Numbers and Jurisdictional City Boundaries for Each Proposed Receiver Site

City	Census Tract	Receiver Site
Oceanside	181/183	Oceanside
Carlsbad	180	North Carlsbad
	178.05	South Carlsbad North
	178.05	South Carlsbad South
Encinitas	177.01	Batiquitos
	177.01	Leucadia
	177.02/175.01	Moonlight Beach
	173.03	Cardiff
Solana Beach	173.03/173.04	Solana Beach
San Diego	83.12	Torrey Pines
Imperial Beach	102	Imperial Beach

Source: U.S. Census Bureau 2000

The data presented in this section for census tracts, local jurisdictions, and the region as a whole are from SANDAG's most recent Population and Housing Estimates Profiles, which are based on 2000 census data and SANDAG's own proprietary estimates based on California Department of Finance and local agency data.[4]

Population/Ethnicity

Tables 3.8-2 through 3.8-7 show population characteristics, including total population and race/ethnic distribution, for the census tracts contiguous with the proposed receiver sites. The tables also provide 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 the tables, the majority of the project census tracts area have a lower non-white population percentage than both the local jurisdiction and the County of San Diego as a whole. Although the non-white population within census tracts 173.04 and 177.01 is larger than that within the cities of Solana Beach and Encinitas, respectively, the minority population is still far below that of San Diego County region in general. Therefore, while there may be a higher non-white population within those isolated census tracts compared to adjacent areas, these concentrations remain below the average regional minority population. Expressed in terms of a

[4] For a more detailed explanation of SANDAG's methodology, please see http://www.sandag.org/resources/demographics_and_other_data/demographics/estimates/methodology/index.asp.

total minority population, most of the census tracts contiguous with the sand replenishment project area have a lower total minority population percentage than their jurisdictional cities or the county as a whole.

Table 3.8-2
Population and Ethnicity for City of Oceanside Receiver Site

Race/Ethnicity	Project Census Tract		City of Oceanside	San Diego Region
	No. 181	No. 183		
White	4,295	2,046	86,016	1,579,146
Black	103	37	10,323	166,516
Hispanic[(1)]	1,719	412	62,206	959,075
Other	496	183	21,136	468,670
Total	6,613	2,678	179,681	3,173,407
Total Non-White	2,318	632	93,665	1,594,261
Percent Non-White	35.1%	23.6%	52.1%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
Source: SANDAG 2010

Table 3.8-3
Population and Ethnicity for City of Carlsbad Receiver Sites

Race/Ethnicity	Project Census Tract[(2)]		City of Carlsbad	San Diego Region
	No. 180	No. 178.05		
White	3,028	2,996	79,770	1,579,146
Black	24	20	1,189	166,516
Hispanic[(1)]	460	289	14,576	959,075
Other	189	286	9,117	468,670
Total	3,701	3,591	104,652	3,173,407
Total Non-White	673	595	24,882	1,594,261
Percent Non-White	18.2%	16.6%	23.8%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
(2) CT 180 contains the North Carlsbad site and CT 178.05 contains the South Carlsbad North and South Carlsbad South receiver sites.
Source: SANDAG 2010

Table 3.8-4
Population and Ethnicity for City of Encinitas Receiver Sites

Race/Ethnicity	Project Census Tract[2]				City of Encinitas	San Diego Region
	No. 177.01	No. 177.02	No. 175.01	No. 173.03		
White	3,757	2,272	2,450	2,466	47,816	1,579,146
Black	19	5	30	17	433	166,516
Hispanic[1]	2,120	389	381	312	11,568	959,075
Other	254	137	155	199	4,328	468,670
Total	6,150	2,803	3,016	2,994	64,145	3,173,407
Total Non-White	2,393	531	566	528	16,329	1,594,261
Percent Non-White	38.9%	18.9%	18.8%	17.6%	25.5%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
(2) CT 177.01 contains Batiquitos Lagoon and Leucadia receiver sites, CT 177.02 and CT 175.01 contains the Moonlight Beach receiver site, and CT 173.03 contains the Cardiff receiver site.
Source: SANDAG 2010

Table 3.8-5
Population and Ethnicity for City of Solana Beach Receiver Site

Race/Ethnicity	Project Census Tract		City of Solana Beach	San Diego Region
	No. 173.03	No. 173.04		
White	2,466	3,741	10,001	1,579,146
Black	17	38	82	166,516
Hispanic[1]	312	1,912	2,529	959,075
Other	199	380	935	468,670
Total	2,994	6,071	13,547	3,173,407
Total Non-White	528	2,330	3,546	1,594,261
Percent Non-White	17.6%	38.4%	26.2%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
Source: SANDAG 2010

Table 3.8-6
Population and Ethnicity for City of San Diego Receiver Site

Race/Ethnicity	Project Census Tract No. 83.12	City of San Diego	San Diego Region
White	3,322	609,195	1,579,146
Black	31	94,149	166,516
Hispanic(1)	272	377,499	959,075
Other	553	273,150	468,670
Total	4,178	1,353,993	3,173,407
Total Non-White	856	744,798	1,594,261
Percent Non-White	20.5%	55.0%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
Source: SANDAG Population and Housing Estimates Profiles 2010

Table 3.8-7
Population and Ethnicity for Imperial Beach Receiver Site

Race/Ethnicity	Project Census Tract No. 102	City of Imperial Beach	San Diego Region
White	3,900	10,466	1,579,146
Black	274	837	166,516
Hispanic(1)	2,236	13,263	959,075
Other	788	3,677	468,670
Total	7,198	28,243	3,173,407
Total Non-White	3,289	17,777	1,594,261
Percent Non-White	45.7%	62.9%	50.2%

(1) The Hispanic category is an ethnic, rather than a racial, distinction. These tables therefore include only non-Hispanic individuals in the black, white, and Asian/other categories to avoid double-counting.
Source: SANDAG Population and Housing Estimates Profiles 2010

Thus, in comparison to the adjacent cities and the county, the census tracts contiguous with the project area cannot be considered a high minority population area.

Income

Information on median household income in the census tracts contiguous with the receiver sites, as well as median incomes of the contiguous jurisdictional cities and the county in general, are presented in Table 3.8-8.

Table 3.8-8
Median Household Income (2009) of Receiver Sites Compared to City and County

Receiver Beach Site	Census Tract No.	Median Income by Tract	Median Income by City	Median Income by County
City of Oceanside				
Oceanside	181	$55,945	$69,044	$72,963
	183	$46,758	$69,044	$72,963
City of Carlsbad				
North Carlsbad	180	$60,827	$101,358	$72,963
South Carlsbad North/South Carlsbad South	178.05	$78,755	$101,358	$72,963
City of Encinitas				
Batiquitos Lagoon	177.01	$65,585	$99,043	$72,963
Leucadia	177.01	$65,585	$99,043	$72,963
Moonlight Beach	177.02	$62,780	$99,043	$72,963
	175.01	$86,072	$99,043	$72,963
Cardiff	173.03	$97,741	$99,043	$72,963
City of Solana Beach				
Fletcher Cove	173.03	$97,741	$119,521	$72,963
	173.04	$78,851	$119,521	$72,963
City of San Diego				
Torrey Pines	83.12	$125,721	$70,149	$72,963
City of Imperial Beach				
Imperial Beach	102	$53,141	$54,017	$72,963

Six of the 11 census tracts contiguous with the project area have median household incomes greater than the median household income for the San Diego region, although many of the median incomes within the census tract are less than those in the jurisdictional cities. The median incomes within the affected tracts are close to the county median incomes, with the exception of those census tracts in Oceanside and Imperial Beach (which are lower), and the census tract in San Diego (which is higher). The affected tracts within the City of Oceanside have a substantially lower household median income than the city and the region, a trend that was also present in 1990 and 2000. However, based on information from 2000, the per capita median incomes in these census tracts vary substantially by neighborhood, and the neighborhoods closest to the project site generally contain households with a medium to high per capita income. These neighborhoods contain predominantly single-family homes on small lots and multi-family residential units, compared with the suburban-style single-family homes that constitute the majority of the City of Oceanside. These residences have fewer persons per household compared with the City average (Census Tract 181 has 2.38 persons per household and Census Tract 183 has 1.84 persons per household, compared to the City average of 2.96). Therefore, the neighborhoods closest to the project site in Oceanside generally have households with fewer residents, but these residents are more likely to earn medium to high incomes.

The median income of the coastal census tract within the City of Imperial Beach, although lower than the median income for the San Diego region, is similar to the median income of Imperial Beach, indicating that the affected tract does not contain a disproportionately low-income population within the city. Census tract 83.12, located in San Diego, includes part of the relatively exclusive coastal community of Torrey Pines where residents generally earn medium to high incomes.

3.8.2 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 specific to the project area. The information presented in this section has been gathered from CDFG catch statistics, recent work conducted by CDFG for the MLPA, 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 Carlsbad Lagoon. In 2007, there were 153 commercial vessels, 145 commercial fishermen, 53 fish-related businesses and one aquaculture business that reported landings in these ports (MLPA 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% from the late 1970s to 1998 (SDUPD 1998). During that period, the number of fishing vessels in the San Diego region declined by about 67%. However, there may be an opportunity for future growth. Although the number of fishing vessels and fishermen in the San Diego region declined from 1999 to 2006, there was a slight increase from 2006 to 2007 (MLPA 2009). One reason for that potential upswing is that the global appetite for seafood has more than doubled over the past 30 years, and a demand for local, sustainable seafood is growing (SDUPD 2010). The number of people employed in the fishing industry in San Diego

County is 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 (CEDD 2010). The four San Diego ports earned nearly $200 million in the period from 1985 to 2008 (in 2009 dollars). In 2008 alone, commercial fishing brought the region nearly $7 million in ex-vessel value, the price paid to fishermen (SDUPD 2010).

In response to this upward trend in commercial fishing, SDUPD, along with the State Coastal Conservancy, embarked on a comprehensive plan in 2008 to support commercial fishing at the two commercial fishing facilities on San Diego Bay: Driscoll's Wharf in America's Cup Harbor in the north bay and Tuna Harbor, at G Street Mole near downtown San Diego.

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 being 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% and 35% 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% of the state's total value of landings. However, this trend may be reversing, if only slightly. In 2008, San Diego County represented over 6% of the state's total commercial fishing landing value (SDUPD 2010).

The role of tuna in these large-scale changes can be seen by the fact that, in 1980, various species of tuna comprised 96% of San Diego's volume and value of landings. By 1990, this figure had dropped to less than 1% 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 (CDFG n.d.).

In the last three decades, the California fishing industry was generally harvesting 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 (SDUPD 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% (CDFG n.d.).

In addition to fishery data provided by SDUPD, more specific and regional fishery data are provided by the CDFG. 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 being determined by how the shoreline intersects the block area.

Relevant fish blocks and their corresponding shorelines within the project area include blocks 877 (Imperial Beach), 860 (Point Loma to La Jolla), 842 (Torrey Pines to Del Mar), 821 (Encinitas), 822, and 801 (Oceanside), as shown in Figure 3.8-1. 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 Area Overall Commercial Fishing Catch Volume and Value

San Diego area port landings for the 10-year period 1999 to 2008 (inclusive) had an average total dollar value over $27 million and averaged a total of nearly 28 million pounds for the data blocks analyzed (Table 3.8-9). This dollar amount was an ex-vessel value (e.g., whole fish, wholesale price), whereas the final economic contribution may be estimated to have been three to four times higher. Table 3.8-9 includes both nearshore and offshore species.

Lobster was the highest ranked commercial species in San Diego, representing 5.5% of the 1999 through 2008 average dollar value of all species. Ten-year averages were $1.5 million for an average of nearly 200,000 pounds. The majority of the lobster catch (71.1%) came from the Point Loma and La Jolla area. Approximately 15.0% of the catch came from the Encinitas to Solana Beach fish block, 8.6% from the Del Mar to Torrey Pines block, 4.6% from the Oceanside block, and 0.7% from the Imperial Beach block.

Urchin dollar value was ranked second at $577,199, and urchin poundage was ranked first at 734,636 pounds. The dollar value for urchin represents 2.1% of the average total of all species. Over 97.3% of the urchin catch was from the La Jolla to Point Loma fish block. Squid was the third ranked by dollar, with 374,434 pounds worth $145,043 (0.5% of the total dollar value).

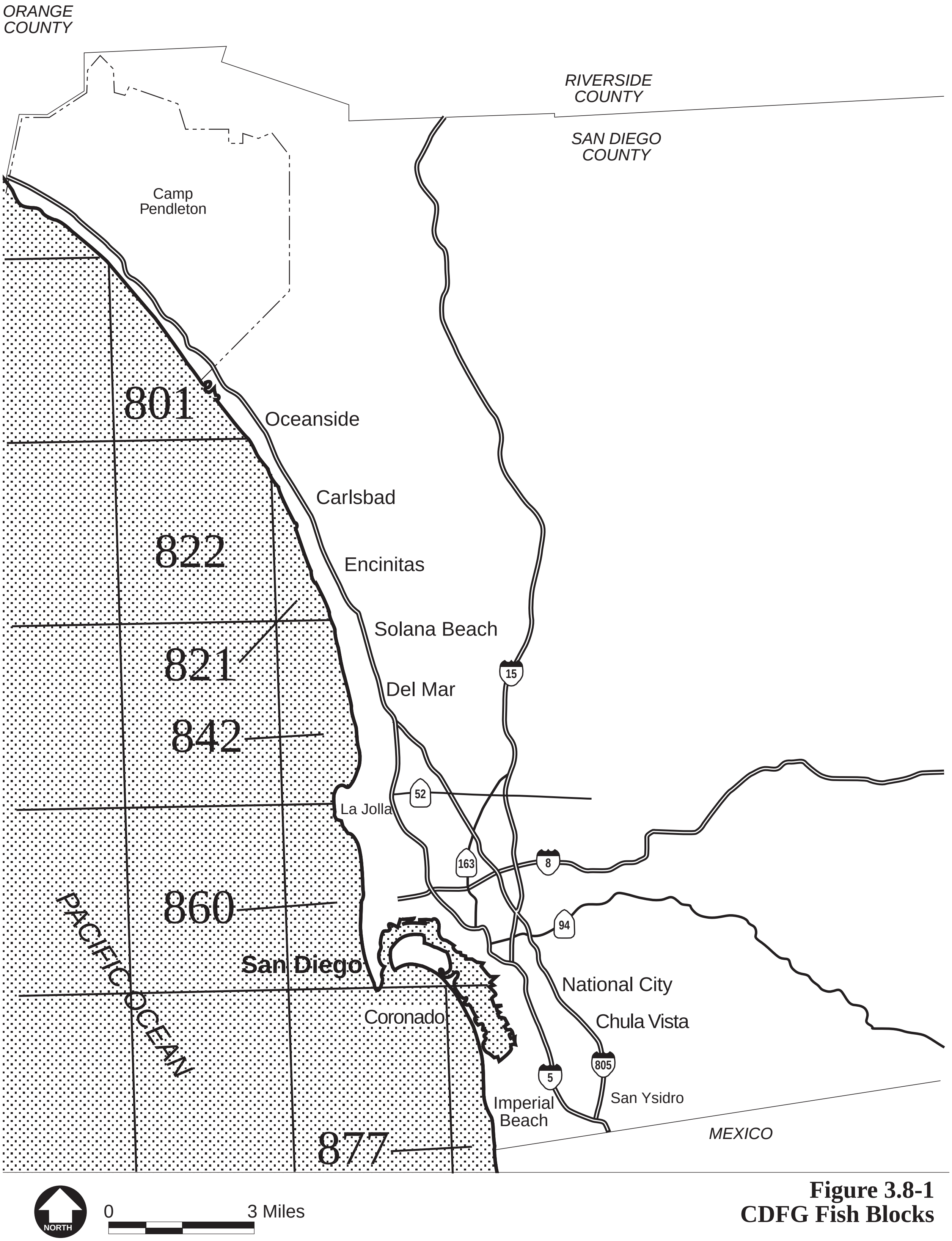


Figure 3.8-1
CDFG Fish Blocks

Table 3.8-9
San Diego County Landings by Fish Block for 1999–2008
Averaged Volume (Pounds) and Values (Dollars)

Species	Area Name and Fish Block Number					Totals
	Oceanside Block 801/822	Encinitas/ Solana Beach Block 821	Del Mar/ Torrey Pines Block 842	La Jolla/ Point Loma Block 860	Imperial Beach Block 877	
Fish						
Anchovy	17,097	--	5,453	886	--	23,436
	$4,023	--	$181	$14	--	$4,217
Barracuda	430	--	424	3,978	--	4,832
	$225	--	$306	$3,185	--	$3,717
Bonito	2	--	6	2,947	--	2,955
	$2	--	$5	$1,345	--	$1,351
Croaker	40	--	--	56	--	96
	$2	--	--	$106	--	$108
Hagfishes	14,495	--	--	7,863	--	22,358
	$14,969	--	--	$7,950	--	$22,919
Halibut	1,141	7	98	10,623	19	11,889
	$4,622	$9	$144	$33,951	$64	$38,791
Mackerel	291,678	--	235,947	56,801	43	584,469
	$18,586		$15,832	$4,576	$13	$39,007
Rockfish	1,219	54	537	5,521	3	7,335
	$2,903	$112	$1,216	$10,078	$7	$14,316
Sardine	221,573	--	116,870	1,396	--	339,839
	$22,211	--	$4,489	$228	--	$26,928
Seabass	422	--	118	882	20	1,442
	$625	--	$295	$22,040	$88	$23,048
Shark	1,782	34	431	8,406	113	10,765
	$2,892	$61	$617	$11,199	$116	$14,885
Sheephead	533	1,547	3,183	14,907	75	20,245
	$2,013	$6,113	$14,754	$60,881	$270	$84,031
Swordfish	673	--	331	10,888	346	12,238
	$3,415	--	$1,583	$37,242	$1,270	$43,510
Tuna	718	48	1,448	13,872	534	16,618
	$1,083	$40	$691	$14,612	$983	$17,409
Yellowtail	347	3	146	4,297	--	4,793
	$500	$2	$243	$5,985		$6,731
Invertebrates						
Crab	9,627	3,368	9,145	65,377	2,221	89,739
	$9,893	$3,912	$9,133	$68,831	$3,112	$94,881
Lobster	9,255	29,880	17,147	142,080	1,367	199,728
	$70,164	$226,639	$125,563	$1,101,597	$10,490	$1,534,453
Prawn / Shrimp	1,196	168	4,651	2,253	--	8,268
	$11,514	$1,521	$48,714	$25,672	--	$87,422
Urchin	12,202	4,625	2,029	714,625	1,156	734,636
	$10,243	$3,470	$1,411	$561,293	$781	$577,199
Squid	31,301	--	103,001	233,986	6,147	374,434
	$40,156	--	$28,530	$69,585	$6,771	$145,043

Species	Area Name and Fish Block Number					Totals
	Oceanside Block 801/822	**Encinitas/ Solana Beach Block 821**	**Del Mar/ Torrey Pines Block 842**	**La Jolla/ Point Loma Block 860**	**Imperial Beach Block 877**	
Averages Total	615,731	39,733	500,964	1,301,645	12,042	2,470,115
	$220,039	$241,880	$253,707	$2,040,372	$23,967	$2,779,964
Total for all species 1999–2008	**8,980,704**	**403,362**	**5,048,477**	**13,437,294**	**122,117**	**27,991,954**
	$2,200,401	**$2,418,883**	**$2,537,430**	**$20,405,747**	**$239,674**	**$27,802,135**

Source: CDFG 2010b

By weight, sea urchin was followed by mackerel, squid, and sardine. The relatively low value per pound for the two fish species placed them much lower rank by average dollar value. The landing volume for most commercial fish and invertebrate species varied substantially by port and year.

The pattern of distribution of total catch between fish blocks is also apparent in Table 3.8-9. The La Jolla/Point Loma block alone accounted for 48.0% of the total five-block area volume of catch landed and 73.3% of the total area catch value over the period 1999–2008.

San Diego Commercial Fishing Catch Volume and Value for Nearshore or Potential Nearshore Species by Port

To provide a more specific analysis of commercial landings for species that might be impacted by the proposed project, and because commercial catch and value can change dramatically from year-to-year, a longer-term perspective of nearshore commercial fishing is more appropriate for analysis. Figures 3.8-2a through 3.8-2d summarize the San Diego and Oceanside port area data for volume and value by year for the period 1999 to 2008. For the purposes of the analysis, landings at any sites between Torrey Pines and Oceanside were included in the Oceanside landings, and landings reported at locations between La Jolla and Imperial Beach were considered as a port of the San Diego landing. These data provide a regional view of the historical usage, resource trends, and value of the resources, divided between a north county and central/south county perspective. Only those species generally fished in nearshore waters, or with the potential to occur in nearshore waters, were considered for discussion.

The total value of San Diego County commercial landings from 1999 to 2008 for species that occur nearshore or potentially nearshore was $38 million (Table 3.8-10), or an annual average of $3.8 million. 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. Commercial landings at Oceanside

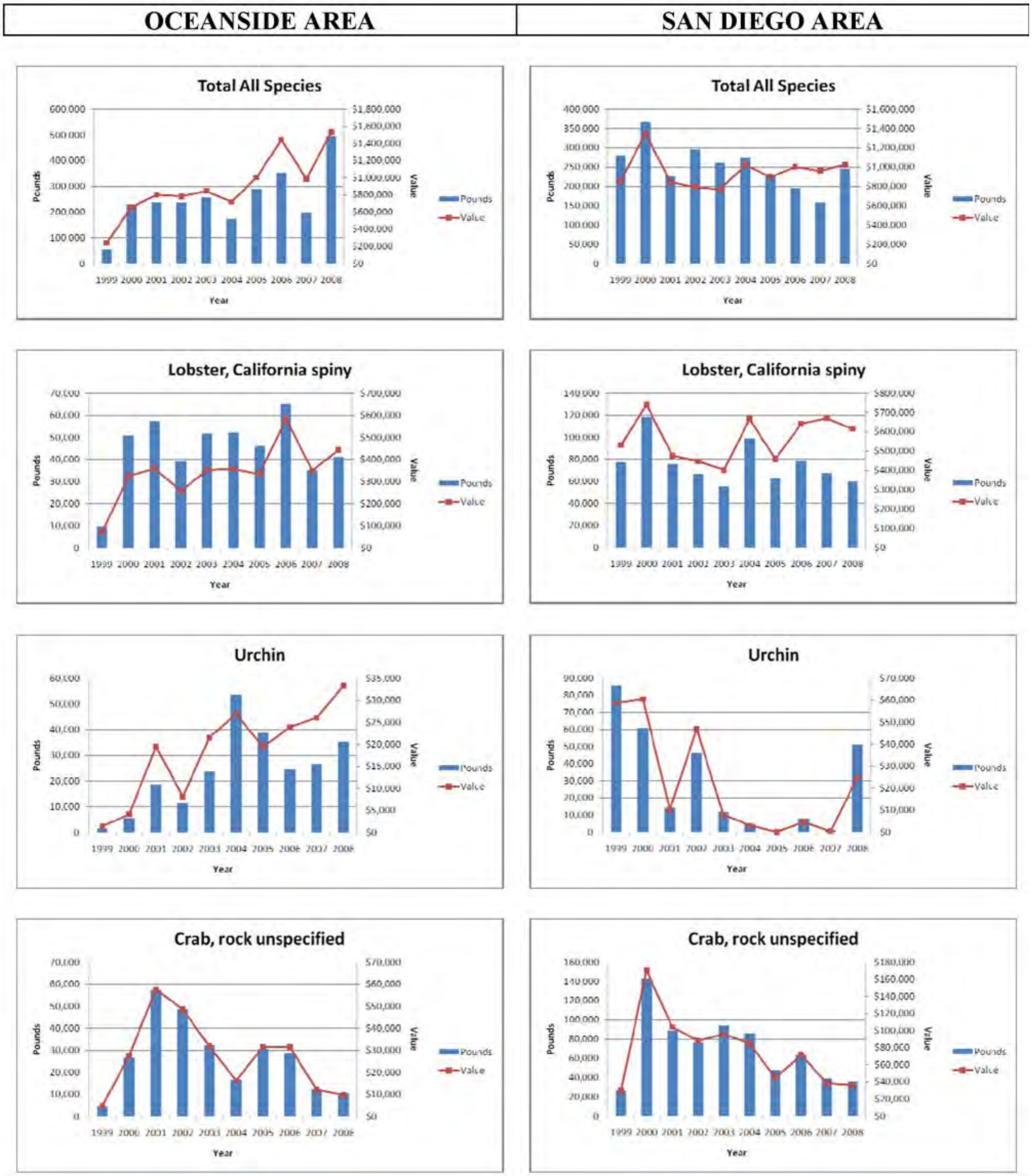


Figure 3.8-2a
Summary of Commercial Landings (Value and Pounds)
for Port of San Diego and Port of Oceanside
for Nearshore Commercially Important Species by Year from 1999 to 2008

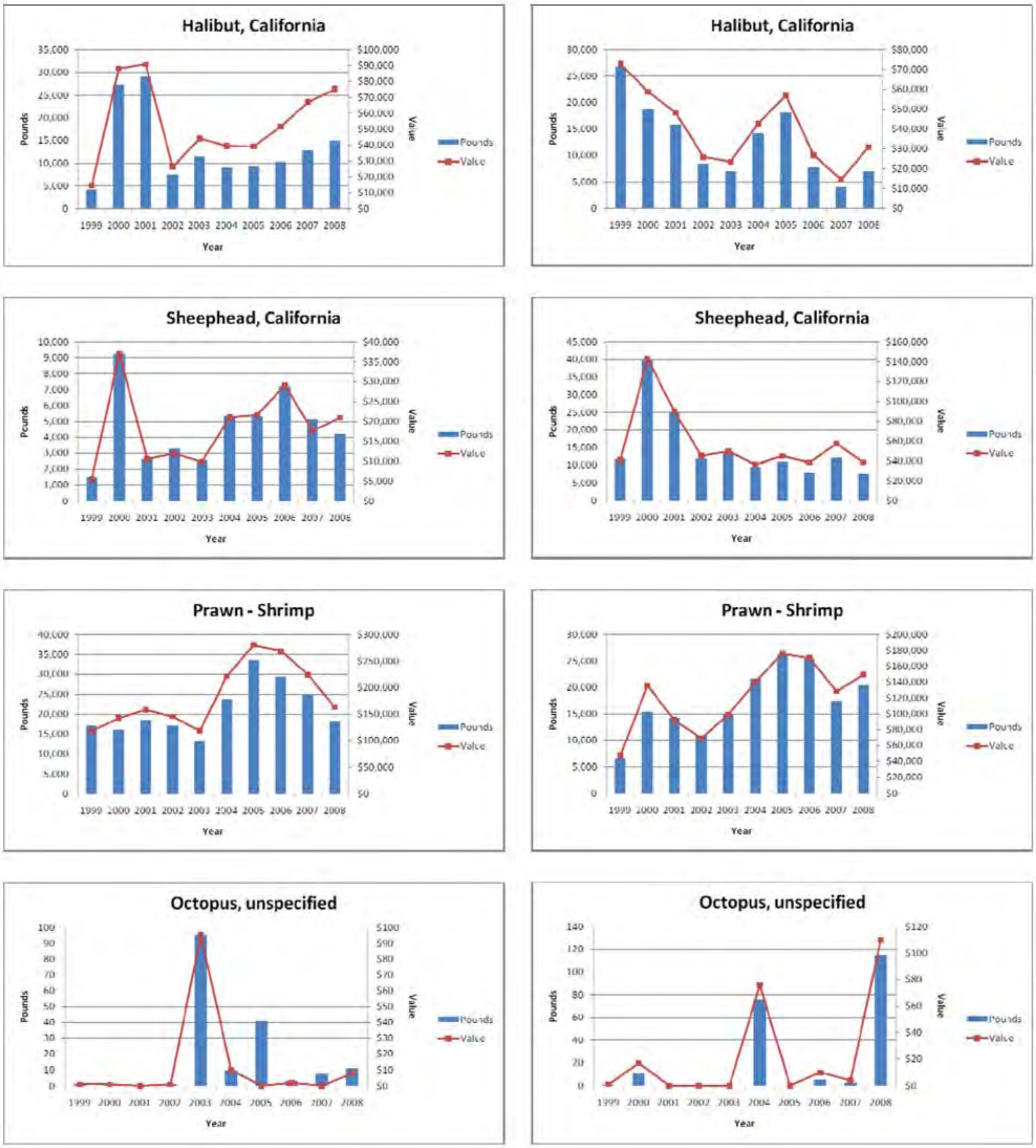


Figure 3.8-2b
Summary of Commercial Landings (Value and Pounds)
for Port of San Diego and Port of Oceanside
for Nearshore Commercially Important Species by Year from 1999 to 2008

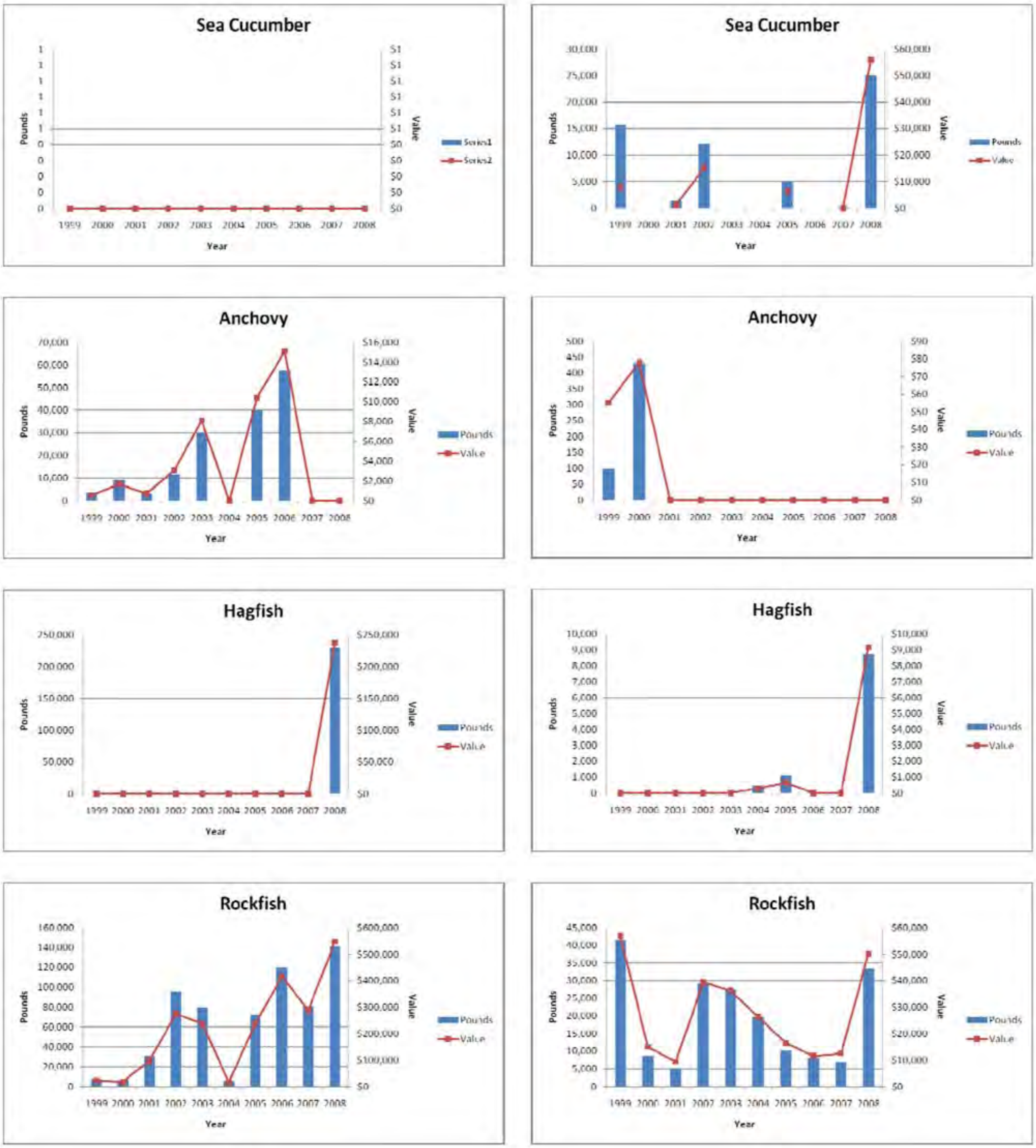


Figure 3.8-2c
Summary of Commercial Landings (Value and Pounds)
for Port of San Diego and Port of Oceanside
for Nearshore Commercially Important Species by Year from 1999 to 2008

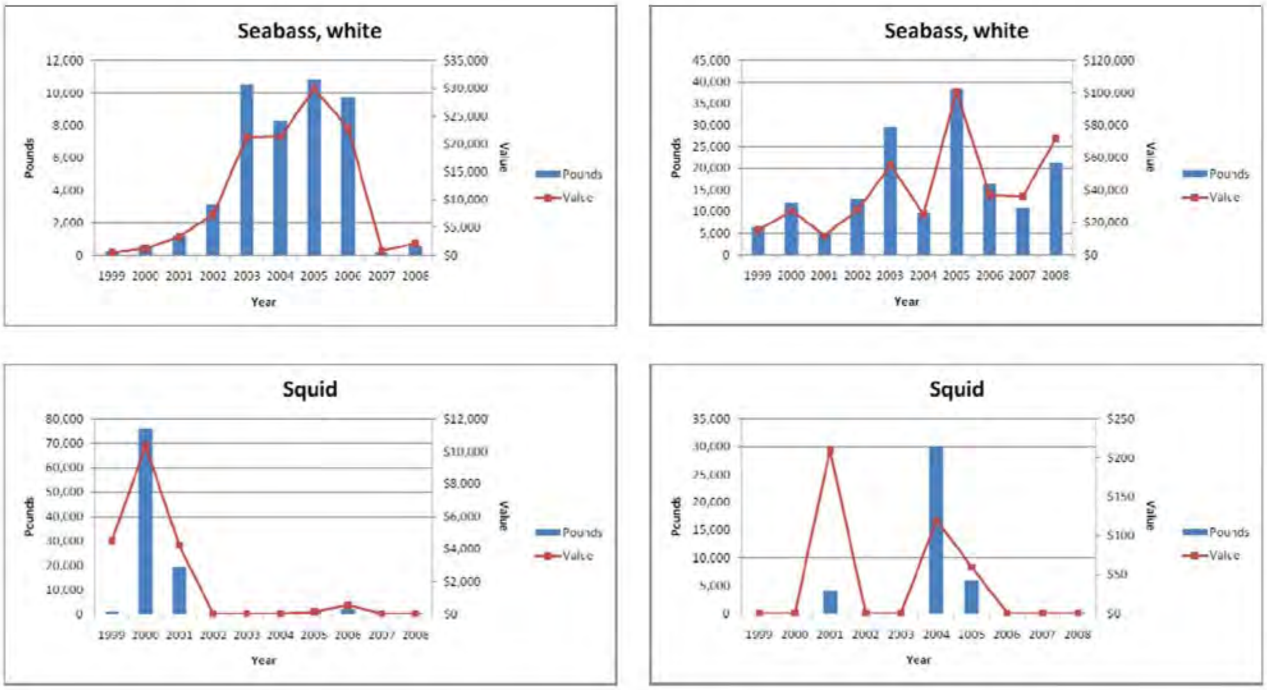


Figure 3.8-2d
Summary of Commercial Landings (Value and Pounds)
for Port of San Diego and Port of Oceanside
for Nearshore Commercially Important Species by Year from 1999 to 2008

represent 34.5% 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% of the total. This is in sharp contrast to 1999 when the total landings were $1.1 million with Oceanside accounting for 22.1% of that figure. 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 do 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.

Table 3.8-10
Summary of Values ($) of CDFG Commercial Landings by Port for San Diego County 1999 to 2008

Species Group	North County Oceanside	Port of San Diego	Total San Diego County	Rank
Swordfish	$60,087	$11,519,442	$11,579,529	1
Lobster	$3,434,818	$5,648,475	$9,083,293	2
Tuna	$2,743,023	$864,761	$3,607,784	3
Prawn-shrimp	$1,841,033	$1,207,714	$3,048,747	4
Rockfish	$2,153,816	$274,193	$2,428,008	5
Shark	$307,643	$1,899,316	$2,206,960	6
Crab	$271,546	$764,091	$1,035,637	7
Halibut	$536,102	$401,088	$937,189	8
Sablefish	$764,084	$33,078	$797,162	9
Sheephead	$185,281	$583,670	$768,952	10
Seabass - white	$110,787	$408,858	$519,645	11
Sea urchin	$184,323	$216,591	$400,914	12
Opah	$783	$346,890	$347,673	13
Hagfishes	$237,899	$10,157	$248,056	14
Sardine	$151,362	$45,412	$196,773	15
Yellowtail	$23,743	$116,102	$139,845	16
Louvar	$100	$131,363	$131,463	17
Snail	$3,361	$125,530	$128,891	18
Sea cucumber		$86,437	$86,437	19
Eel	$5,523	$56,016	$61,539	20
Total Top 20	**$13,015,314**	**$24,739,184**	**$37,754,497**	
Total All Species	**$13,106,675**	**$24,888,316**	**$37,994,991**	

For the San Diego area as a whole, swordfish ranked first in value ($11.6 million) of landings followed by lobster ($9.1 million) (Table 3.8-10). These two species accounted for over 50% of the total commercial catch of nearshore or potential nearshore species. Swordfish accounted for

30.5% of the total catch, and 46.3% of the catch at the San Diego port. However, swordfish only accounted for 0.5% of the catch at Oceanside. In contrast, landings of lobster at Oceanside accounted for 26.4% of the commercial value. Lobster accounted for 22.8% of the value of the total catch at the San Diego port, and swordfish and lobster combined accounted for 69.1% of the value of the total catch. Thus, swordfish and lobster landings were by far the most valuable resource for local fishermen, but swordfish was not nearly as valuable as lobster for fishermen working in the Oceanside port. Other species such as tuna, prawn-shrimp, and rockfish also supported the fishing industry in Oceanside, and were greater in value in Oceanside than in the San Diego port.

It is important to note how relatively large the swordfish and spiny lobster fisheries are in relation to other San Diego area fisheries. As shown in Table 3.8-10, swordfish and lobster were the only species whose ex-vessel value was in excess of $9 million over the period 1999–2008. The next most valuable species for the same period was well under $4 million.

Other important commercial species for San Diego County include tuna, which ranked third in value ($3.6 million), prawn-shrimp which ranked fourth ($3.0 million), and rockfish ($2.4 million). There is substantial difference between the Port of Oceanside and the Port of San Diego, with rockfish representing a relatively low amount of total catch at San Diego, while swordfish represented a low amount of total catch at Oceanside. Each port had four species whose local landing value was in excess of $1 million each over the period 1999 to 2008.

Some species historically had low value and were not commercially exploited in the recent past (Figures 3.8-2a through 3.8-2d). However, with the advent of the live trap market for California sheephead and for spot prawn, the value of these resources has increased. Averaged over the last 10 years, these species ranked tenth and fourth (when combined with shrimp), respectively (Table 3.8-10). In 2008, sheephead and spot prawn (when counted with shrimp) represented 2.3% and 11.9% of the nearshore San Diego County commercial catch.

As displayed in Figures 3.8-2a through 3.8-2d, the catch volume and value of nearshore species varied by year and by port over the period of 1999 to 2008. The Oceanside port experienced a substantial increase in overall catch volume and value during this period, while the volume and value of landings from the San Diego port varied slightly by year, with the value for landings in 2008 only slightly more than it was in 1999. Lobster catch volume and value in Oceanside varied by year but the value generally increased during this period. Lobster catch volume in the San Diego port also varied by year, and experienced periods of sharp increases and decreases. From 2006 to 2008, the volume of lobster caught in the San Diego port decreased, but the value of lobster increased during this period. The volume and value of urchin also varied substantially by port. While the overall value of urchin was lower than the San Diego port for the 1999 to 2008 period, urchin catch volume and value generally increased in Oceanside but decreased in the San Diego port. However, a large uptick in value and volume of urchin catch in the San Diego port from 2007 to 2008 could signify a reemerging fishery in this area.

The volume and value of crab landings generally decreased for both ports from 1999 to 2008. The volume and value of landings for species such as halibut, sheephead, seabass, rockfish, and prawn-shrimp experienced sharp inclines and declines during this period, and varied substantially by port.

Economic Importance of Nearshore Species by Fish Block

Table 3.8-11 provides 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 urchin are the most valuable in terms of dollar amount.

Table 3.8-11
San Diego County Average Landings by Fish Block for 1999 to 2008
Most Valuable Nearshore Species Average Values (Dollars)

	Area Name and Fish Block Number					
Species	**Oceanside Block 801/822**	**Encinitas/ Solana Beach Block 821**	**Del Mar/ Torrey Pines Block 842**	**La Jolla/ Point Loma Block 860**	**Imperial Beach Block 877**	**Totals**
Lobster	$70,164	$226,639	$125,563	$1,101,597	$10,490	$1,534,453
Urchin	$10,243	$3,470	$1,411	$561,293	$781	$577,198
Rock Crab	$9,893	$3,912	$9,133	$68,831	$3,112	$94,881
Swordfish	$3,415	$0	$1,583	$37,242	$1,270	$43,510
Prawn-shrimp	$11,514	$1,521	$48,714	$25,672	$0	$87,421
Sheephead	$2,013	$6,113	$14,754	$60,881	$270	$84,031
Squid	$40,156	$0	$28,530	$69,585	$6,771	$145,042
Total	**$147,398**	**$241,655**	**$299,688**	**$1,925,101**	**$22,694**	**$2,566,536**

Source: CDFG n.d.

In terms of geographic distribution of valuable nearshore species, several important facts are evident in Table 3.8-11. First, the overall importance of fish block 860, La Jolla to Point Loma, must be highlighted. This block accounts for 75.0% of the total value for the species listed. Second, lobster and urchins are each worth more than 14 times as much as the next most valuable species. Third, within the two most valuable species, a very different geographic distribution pattern is found. For urchins, more than 97.2% of the value of the local fishery is concentrated in fish block 860, stretching from La Jolla to Point Loma. For lobsters, the La Jolla to Point Loma area dominates the value of catch as well, but not as strongly. An estimated 71.8% of the value is concentrated in this block, but the value of lobster is substantially worth more than any other species in each block. Each is also worth in excess of seven times the value of urchins from any one block in the region, aside from the La Jolla/Point Loma block.

Looking at the next-tier species by value in Table 3.8-11, squid is also a valuable species for the region. Although only a quarter of the value of urchin, it is substantially higher in value than other species listed in Table 3.8-11. Although the highest value ($69,585) is concentrated in the La Jolla/Point Loma fish block, there is also a relatively high presence in Oceanside ($40,156). The only fish block without any recording of squid catch is Encinitas/Solana Beach.

The value of rock crab, swordfish, prawn-shrimp, and sheephead is generally concentrated in the La Jolla/Point Loma fish block, although the Del Mar/Torrey Pines fish block has the highest value of prawn-shrimp ($48,714).

Nearshore Species Habitat Range and Fishing Techniques

California spiny lobster (*Panulirus interruptus*), the commercial species of greatest value locally, is found from Monterey Bay to Manzanillo, Mexico, mostly from Point Conception to Magdalena Bay, Baja California. Adult lobsters are typically found in rocky areas from the intertidal zone to at least 240 feet. Population size is unknown for the California spiny lobster. Specific information on life cycles and biological issues regarding lobsters are discussed in Section 3.4. Commercial landings have fluctuated through the years and are influenced by some factors that are independent of the health of the population, such as weather, oceanographic patterns, and the export market (CDFG 2003a).

Lobster fishermen typically use 100 to 500 traps, although some may use as many as 750 traps at the peak of the season. Lobster traps are box-like devices usually constructed of heavy wire mesh, although other materials (such as plastic) may be used. Traps are baited with whole or cut fish, and placed on the seafloor using cement, bricks, or steel as ballast. High speed boats from 20 to 40 feet in length are popular in the fishery, but boats range in size from 15-foot skiffs to 50-foot vessels. Most lobster boats are equipped with a davit and hydraulics to pull traps from the water, and sophisticated electronic equipment that allows fishermen to find good lobster habitat and locate their traps. Traps are usually fished along depth contours in water less than 100 feet in depth, or clustered around rocky outcrops. Fishermen set traps closer to shore when the season opens, and farther from shore, at depths of up to 300 feet, by the end of the season (CDFG 2003a).

Lobster fishing season runs from early October to mid-March. More lobster is taken by the commercial and sport fisheries in October than in any other month. Effort and landings drop sharply in January and continue to decline through mid-March when the season ends (CDFG 2003a). Smaller vessels may work the season with a single fisherman, while larger vessels may start the season with a skipper and two crew members, but then reduce to one crew member as the catch drops off. The basis for crew compensation varies from operation to operation, with some based on various types of the more traditional “share” calculations, while others have moved toward flat rates.

As noted in Table 3.8-11, the area of highest concentration for lobster fishing occurs in the La Jolla to Point Loma area, but vessels from Mission Bay to Oceanside fish the North County coast, according to interviews conducted with fishermen in 2000, before RBSP I and again in 2010. Other information gathered during public meetings suggests that live bottom fishing also takes place off of Mission Beach, near the MB-1 borrow site. Where a vessel is “homeported” is a trade-off between expense and convenience as, for example, fuel costs and slip fees tend to be less expensive at port facilities farther from local fishing grounds. Also according to interviews, vessels working the area may have several hundred traps per vessel, up to perhaps 600 to 700 traps per boat for the larger operations. As gear sets and hauls can be 6 days apart, it is not necessarily the largest vessels that work the greatest number of traps, as small vessel owners can increase their effective gear capacity by making more frequent sets. According to local fishermen interviewed in 2000 and 2010, an estimated 10,000 to 12,000 traps are set during peak season (October through November), with progressively fewer traps set as the season continues past the peak.

A lobster operator permit was required beginning in 1961, but the nature of the fishery has reportedly changed with the implementation of a limited entry regulatory system in the 1980s. Prior to limited entry, there was apparently a larger number of part-time lobster fishermen than today. According to interviews, approximately one-half the fishermen who fish lobster do so exclusively. They do not switch to other species after the lobster harvest starts to decline or the season ends but, rather, discontinue fishing until the next lobster season. Those who do continue to fish transition into a variety of other fisheries, including spot prawns, sheephead, rock crab, live eel, or gillnetting. While levels of dependency vary, lobster is clearly the central element of the typical year’s economic base for participants, especially for the smaller boats that have less flexibility in their ability to change gear types and move between fisheries.

The market for locally caught lobster has varied considerably over the last few years. Lobster is not landed at central processing facilities; rather, both the fishermen and the buyers are mobile and sales can take place wherever appropriate harbor facilities are available. While a substantial portion of the local catch reportedly goes to the local restaurant market, it is not uncommon for larger operations to sell catch to Los Angeles-based entities.

Surfgrass is an important nursery habitat for California spiny lobster. The puerulus larval stage, which lasts approximately 2.5 months, is commonly associated with surfgrass habitat (Shaw 1986). Juvenile lobsters usually spend their first 2 years in surfgrass beds, although they also occur in rocky habitats with other algae (Engle 1979; Castañeda-Fernández de Lara 2005). In addition, mature lobsters use a variety of rocky habitats, including surfgrass and kelp beds. Surfgrass has not been restored successfully, other than at an experimental scale. Adults are found in rocky habitats, though they will move onto sand in search of food. It takes about 7 to 11 years for lobsters to reach legal size. Fishermen expressed concerns about the impact that sand replenishment projects may have on nursery areas by increasing turbidity, endangering juvenile lobster habitat. There are only a few studies on the effects of turbidity and sand burial on juvenile lobsters (e.g., Engle 1979; Herrnkind et al. 1988). The work of Herrnkind et al. off the coast of Florida suggests that there is a general lack of juvenile lobsters in heavily silted environments because of lower rates of postlarval settlement and avoidance of silted algal areas due to decreased numbers of prey species. However, the team found that silt did not have an effect on survival of lobster larvae through metamorphosis. Other descriptions of the lifecycle of the spiny lobster suggest that the species can survive being buried with no apparent detrimental effect. Thus, juvenile rock lobsters appear capable of tolerating high turbidity and suspended sediments. There may be benefits as well, as high turbidity may reduce visual predation.

Cumulative ex-vessel dollar value for lobster from 1999–2008 composed 23.9% of all commercial species landed in San Diego County (Table 3.8-10). As detailed in Table 3.8-9, the highest percent of lobster as compared to overall average value of catch was in the La Jolla/Point Loma fish block (39.6%), followed by the Encinitas/Solana Beach fish block (8.2%), followed by Del Mar/Torrey Pines (4.5%), Oceanside (2.5%), and Imperial Beach (0.4%).

Red sea urchins (*Strongylocentrotus franciscanus*) are ranked number two in value to local fishermen. Red and purple sea urchins are found from Alaska to Cedros Island in Baja California. The commercial fishery for the red sea urchin has been one of California's most valuable fisheries for more than a decade. This fishery is relatively new, having developed over the last 30 years, and caters mainly to the Japanese export market (CDFG 2003c). The majority of urchins are found in rocky bottom habitats from the intertidal zone out to a depth of approximately 100 feet. According to local fishermen interviewed in 2000, urchins take 3 to 5 years to reach a commercially viable harvest size. Harvesting of red sea urchins can occur in depths of 5 to 100 feet, but most of the quality catch is taken between 20 and 60 feet deep. It is estimated that most of the local catch is taken in water between 10 and 50 feet deep, with a smaller amount harvested somewhat deeper. Urchins are reportedly fished locally anywhere between Oceanside and San Diego where there is a hard-bottom, but kelp areas are considered the prime fishing locations.

Red urchins are generally landed at San Diego, which is a processing center, and generally not landed at Oceanside where there is no processing facility. In terms of harvest area, nearly 97% of the red urchins are caught in the La Jolla/Point Loma fish block. Urchin harvest is conducted by divers. Diving typically is done from small vessels (22 to 32 feet) with several divers generally using surface supplied air. Urchins are collected in net bags and hauled to the surface at regular intervals. According to local fishermen, at least some San Diego area-based urchin divers harvest urchins from as far away as northern California. A moratorium on the issue of new permits to catch red sea urchins was imposed in 1989, and further restrictions on size and catch season were implemented in the 1990s.

In Southern California, the red sea urchin resource now produces less than 10 million pounds annually, with harvestable stocks in decline since 1990. In the 1990s, the fishery was impacted by two El Niño events (1992 to 1994 and 1997 to 1998) and a weakening Japanese economy that lowered demand and ex-vessel prices; both factors contributed to reduced fishing effort and catches (CDFG 2003c). Specific information on life cycles and biological issues regarding urchins are discussed in Section 3.4.

3.8.3 Kelp Harvesting

Kelp harvesting operations also occur in the proposed project area. Giant kelp (*Macrocystis pyrifera*), is found all along the western coast of the United States. Off the Southern California coast, kelp is found on rocky substrate in wave-exposed areas at depths of 20 to 120 feet. Areas of particular kelp abundance in the San Diego region include La Jolla Point and Point Loma (MLPA 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 borrow 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 2003b).

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 2003b). 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 the CDFG. 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% 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 (MLPA 2009).

Two kelp beds, one located from the California/Mexico International Boundary 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 leaseable and provide the exclusive privilege of harvesting to the lessee (MPLA 2009).

3.8.4 Recreational Fishing and Diving

A wide range of marine recreational fishing and diving opportunities exists 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 the NMFS (2010), the direct economic impact of recreational fisheries in California totaled more than $1.7 billion in 2008, with nearly $1 billion more in value-added impacts. Of the $1.7 billion, durable equipment accounted for $1.3 billion, shore activities such as pier and beach fishing accounted for $226 million, charter boats accounted for $174 million, and private boats accounted for $107 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 (MPLA 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 the CDFG's California Recreational Fisheries Survey, over 40% of fishing trips occur in the months of June, July, and August (MPLA 2009).

Parnell et al. (In Press) 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. (In Press) 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 (CDFG n.d.).

Sport diving and spearfishing activities mostly occur in the nearshore waters, and the number of diving trips in San Diego in the early 1990s was 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 2010). 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 not accessible other than 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 the SCUBA gear. In addition to the California spiny lobster, divers also harvest rock scallops, marine snails and limpets, various species of clams, and in recent years, Humboldt squid (MPLA 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 (MLPA 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 (2010). The average number of divers varies according to season, weather, and sea conditions (NMFS 1991).

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3.9 PUBLIC HEALTH AND SAFETY

For purposes of this EA/EIR, public health and safety issues are defined as those that directly affect the continued ability to protect and preserve life and property at locations along the proposed receiver sites. Specifically, these issues are lifeguard services and recreational safety. In addition, vessel safety is addressed because dredging activity would occur in the ocean. Safety issues relating to structures and utilities, including lifeguard towers, are discussed in Section 4.10 (Structures and Public Utilities). Sediment and chemical comparisons of dredged material and receiver sites have been completed and there would be no risk to health or safety (Appendix E). This issue is not addressed further.

3.9.1 Lifeguard Services

At six proposed receiver sites (Oceanside, Batiquitos, Leucadia, Moonlight, Solana Beach, and Imperial Beach), the respective jurisdiction provides lifeguard services. At the five state beaches, however, the California Department of Parks and Recreation provides lifeguard services. The lifeguards are responsible for all recreational safety measures along the beach. Safety measures include manned lifeguard towers and regular vehicle patrols during the summer months. Lifeguard towers are typically more heavily staffed on weekends during summer months. The locations of lifeguard towers at each receiver site are addressed in Section 3.10 (Structures and Public Utilities).

3.9.2 Recreational Safety

Storm drain outfalls occasionally contribute to water pollution at the receiver sites, especially after rainy periods. Water pollution stemming from these outfalls has resulted in the periodic closing of the region’s beaches, when water contact is not recommended. In the days after a rain period, tidal action and longshore currents disperse pollutants and the beaches are reopened for recreation.

3.9.3 Vessel Safety

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.

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3.10 STRUCTURES AND PUBLIC UTILITIES

For the purpose of this EA/EIR, structures and public utilities are defined as sewer outfalls, access stairs and ramps, storm drain pipes, sea walls, and lifeguard towers. The following section identifies the location of the existing structures and public utilities within or adjacent to the receiver sites. The description of structures and public utilities is based on limited field surveys and prior environmental documentation (KEA Environmental 2000). In addition, city personnel were contacted in 2010 to update/confirm the current location of sewer and storm drain ocean outfalls, as well as other facilities that could be potentially impacted by implementation of the proposed action.

3.10.1 Receiver Sites

Oceanside

A 36-inch sewer outfall pipe is buried almost perpendicular to the shoreline directly north of Loma Alta Creek. The depth of cover is unknown. This pipe was installed in approximately 1971 (KEA Environmental 2000). There are two side-by-side 36-inch storm drains at the end of Marron Street. Two side-by-side 18-inch storm drains are located directly south of Tyson Street. An 18-inch pipe, half filled with sand, is located at the end of Forster Street.

Public access stairs are located at the end of Tyson Street, Pine Street, Ash Street, Haynes Street, Cassidy Street, one block south of the Loma Alta Creek outlet, and Vista Way. The bottom elevation of the stairs at Cassidy Street is approximately 6.6 feet above mean sea level (AMSL). Ramp access exists at Wisconsin Avenue, Forster Street, and just north of Loma Alta Creek. In addition, there is an access road at Oceanside Boulevard. A number of additional access paths and stairs have been constructed in front of private homes, including a stairway just north of the creek. Riprap (large boulders) exists to protect beachfront residences and structures. Lifeguard Tower No. 7 is located at the base of Wisconsin Avenue Beach. Lifeguard Tower No. 9 is located at the base of Oceanside Boulevard on top of a concrete and riprap structure, and Tower No. 11 is located farther south at Buccaneer Beach on top of a concrete and riprap structure. Towers No. 9 and No. 11 are located approximately 50 feet from the shoreline and remain in their locations year-round. The platforms for these lifeguard towers are approximately 8 feet high (Quan 2010).

North Carlsbad

The North Carlsbad site is bounded by Buena Vista Lagoon to the north and Oak Street to the south. A 50-foot weir controls the water level of the Buena Vista Lagoon and is located at the mouth of the lagoon at the Pacific Ocean.

Public access stairs to the beach are located at Ocean Street, Beech Avenue, Pacific Avenue, Grand Avenue, and Carlsbad Village Drive. In addition, adjacent to each access stairway is an public drainage easement that includes a storm drain pipe and associated outlet structure. A public access ramp providing a walkway to the beach is located at Pine Avenue. Several residential properties also have private stairways for beach access, a few of which reach the beach surface. All of the properties in the reach have constructed sea walls and riprap to protect against erosion (Jantz 2010).

Lifeguard Tower No. 38 is located on the sand at the southern end of the receiver site on Pine Avenue. The tower is surrounded by riprap and remains in the same location throughout the year. Its platform is approximately 15 feet above the sand (Caldwell 2010).

South Carlsbad North

Lifeguard Tower No. 29 is located on the bluff just south of Palomar Airport Road and is permanent. There are no structures or utilities located on the beach along this receiver site (Caldwell 2010; Jantz 2010).

South Carlsbad South

The South Carlsbad South site is located south of Encinas Creek. The Encina Wastewater Authority (EWA) Ocean Outfall line is buried just outside the north end of the receiver site, and extends approximately 1.5 miles offshore. The EWA Landfall line is protected by steel and concrete, and is covered by rip rap.

One public access stairway is located in the vicinity of the proposed receiver site. The stairway is located across from Ponto Drive and has beach access from the South Carlsbad State Campground on top of the bluff. In addition, two lifeguard towers are located along the beach; Tower No. 27 is located approximately 30 yards north of the access staircase and Tower No. 26 is located approximately 250 yards south of the access stairs. The towers are moved south to the jetty in late October and replaced on the beach in March (Caldwell 2010; Jantz 2010).

Batiquitos

An 18-inch storm drain is located at the base of Moorgate Road. Public access is provided at the Ponto State Beach entrance. There is an overlook at Ponto State Beach but it does not connect to the beach. The second public access stairs is the Grandview staircase just south of Sea Bluff. There are no sea walls along this section and any elevated path is on the top of the bluff only accessible to the homeowner. State Lifeguard Tower No. 2 is located directly north of the receiver site, and Lifeguard Tower No. 1 is located near the public restrooms. Both towers are annually removed from the beach in late fall and placed back on the beach in mid-April (Weldon 2010).

Leucadia

The main access point to Leucadia, which is also known as Beacons Beach, is located at the end of Leucadia Boulevard. A lifeguard tower is placed at Beacons Beach every summer. Beacons Beach is an active landslide without seawalls. Numerous seawalls have been built between Grandview and Beacons (permitted and unpermitted). As Beacons and Grandview are very popular surfbreaks in Encinitas, numerous surf camps operate in this area during summer (Weldon 2010).

Moonlight Beach

One 36-inch, one 60-inch, and three 48-inch storm drain pipes are located at the end of B Street at Moonlight State Beach. The City of Encinitas has excavated several feet around the outlets to expose the pipes and allow proper drainage flow.

The lifeguards utilize an access point just south of the volleyball courts and at the main headquarters. There is riprap along the north section of Moonlight Beach, and nothing to the south. 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 towers are situated on the berm above the low tide beach, and neither tower is moved during the winter season (Weldon 2010).

Cardiff

The 30-inch-diameter San Elijo sewer outfall is located just south of the mouth of San Elijo Lagoon. The outfall is buried within the southern end of the proposed Cardiff receiver site.

North of the receiver site, three restaurants are located next to the beach and a sewer pump station is located east of the parking lot that serves the restaurants. Coast Highway 101 has placed nonengineered riprap and cobble to protect the highway. Just south of the restaurants, a lifeguard access ramp extends to the beach. State Lifeguard Tower No. 6, located just south of the lagoon mouth, is pulled back to the parking lot during the winter season. Lifeguard Tower No. 5 is located just south of the restaurants. This tower is fixed by the cobbles on the beach and is not moved seasonally. Its viewing platform is approximately 15 feet high (Weldon 2010).

Solana Beach

A 60-inch energy dissipator storm drain pipe is located at the west end of Plaza Street. Another 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 AMSL.

There is a public access ramp at Fletcher Cove, a private access at Seascape Shores, and a public access at Seascape Surf. Access to the beach is through the new Fletcher Cove parking lot off of South Sierra Avenue. In addition, there is a public access staircase at Del Mar Shores Beach Park. There are four temporary lifeguard towers located within the proposed receiver 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 (Miller 2010; Goldberg 2010).

Torrey Pines

There are three permanent lifeguard towers on the receiver 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 further north. Riprap has been placed on the beach to protect the road. No additional structures or utilities presently exist within the shoreline area of the proposed receiver site (Schrutberger 2010; Vodrazka 2010).

Imperial Beach

Public beach access points exist at Elder Avenue and Descanso Avenue. A gated access road used by lifeguard vehicles is located at the south end of Seacoast Drive. There is a vehicle beach access point at the Elm Avenue street end. The main lifeguard headquarters is located at the Elder Avenue street end. Lifeguard Towers No. 1, 2, and 3 are located south of the Imperial

Beach Pier. Lifeguard Towers No. 4 and 5 and the portable lifeguard tower are located north of the Imperial Beach Pier. Riprap protects residences along the southern portion of the receiver site. No additional structures or utilities presently exist within the shoreline area of the proposed receiver site (Nakagawa 2010; Stabenow 2010; Wade 2010).

3.10.2 Borrow Sites

All three borrow sites are located offshore and contain no utilities within their boundaries. For more information, refer to Section 3.6 (Land Use) and Figures 2-1 through 2-3.

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3.11 TRAFFIC

This existing conditions section for traffic addresses receiver site access. Vessel traffic is discussed in Sections 3.9 and 4.9 (Public Health and Safety) and in Section 2.4.

Regional access to all receiver 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 and Seacoast Drive provide direct access to the Torrey Pines and Imperial Beach receiver sites, respectively. The principal access routes from I-5 to each of the 11 receiver sites are identified in Table 3.11-1 below.

Table 3.11-1
Principal Access Routes

Receiver Site	Principal Access Route
Oceanside	Oceanside Boulevard
North Carlsbad	Carlsbad Village Drive
South Carlsbad North	Palomar Airport Road, Poinsettia Drive
South Carlsbad South	Palomar Airport Road, Poinsettia Drive
Batiquitos	Poinsettia Drive, La Costa Avenue
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
Imperial Beach	Descanso Avenue, Elm Avenue

Existing traffic on the beach access routes is often heavy, as most of the routes serve commercial, motel or camping, and residential uses as well as the 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.

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3.12 AIR QUALITY

3.12.1 Environmental Setting, Climate, and Meteorology

Climate, topography, and meteorology influence regional and local ambient air quality. The Southern California region is characterized as a semiarid climate. The region's climatic zones may be roughly defined as being coincident with its broad geographic and topographic regions of coast, mountain, and desert. Within the region are subregions, consisting of coastal valleys lying below mountains, separated from the ocean shore by plateaus and low hills behind the coastline.

In general, the region lies within the semipermanent, high-pressure zone of the eastern Pacific (the Pacific High), resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The typical daily wind pattern is a light to moderate westerly onshore sea breeze during the daytime, giving way to light offshore breezes during the night.

The Pacific High maintains clear skies for much of the year and drives the dominant onshore circulation. In the summer, the Pacific High is located well to the north, causing storm tracks to be directed north of California. 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 the 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%.

The proposed project is located within the San Diego Air Basin (SDAB), which is contiguous with San Diego County. The proposed project area is identified as coastal plain, which is characterized by mild annual temperatures. The mean average temperature is approximately 62ºF, and the mean maximum and mean minimum temperatures are approximately 75ºF and 48ºF, respectively. Rainfall in the coastal San Diego County area is primarily seasonal, occurring between November and March, averaging approximately 9 to 14 inches annually.

A common atmospheric condition known as a temperature inversion affects air quality in the SDAB. During a temperature inversion, air temperatures get warmer rather than cooler with increasing height. The Pacific High helps create two types of temperature inversions—subsidence and radiation—that contribute to the degradation of local air quality. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific High comes into contact with cool marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. The inversion layer is approximately 2,000 feet AMSL during the months of May through October. During the winter months (November through April), the inversion layer is approximately 3,000 feet AMSL. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality. Radiation inversions typically develop on winter nights with low wind speeds, when air near the ground cools by radiation and the air aloft remains warm. A shallow inversion layer that can trap pollutants is formed between the two layers.

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

3.12.2 Applicable Regulations, Plans, and Policies

Federal and California Standards

The Federal Clean Air Act (CAA) of 1970 (as amended in 1977 and 1990) (42 U.S.C. §§ 7401–7671q) requires the adoption of national ambient air quality standards (NAAQS) to protect the public health and welfare from the effects of air pollution. NAAQS were initially established for six criteria pollutants of concern: ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); particulate matter (PM); and lead (Pb). More recently, PM was divided into two separate standards: inhalable particulates, equal to or smaller than 10 microns in diameter (PM_{10}); and fine particulates, equal to or smaller than 2.5 microns in diameter ($PM_{2.5}$). Pb is considered in the demolition of older facilities (constructed pre-1980s) that may contain lead-based paint.

In addition to NAAQS, USEPA allows states to set state air quality standards more stringent than NAAQS based on a state’s air quality. The California Air Resources Board (ARB) has established California Ambient Air Quality Standards (CAAQS) for most of the CAA criteria pollutants and for some additional pollutants with no NAAQS.

Table 3.12-1 contains the current NAAQS and CAAQS, shown comparatively.

Table 3.12-1
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3,4]	Secondary[3,5]	Concentration[3]
Ozone (O_3)	1-Hour	-	Same as Primary Standard	0.09 ppm (180 μg/m^3)
	8-Hour	0.075 ppm (147 μg/m^3)		0.070 ppm (137 μg/m^3)
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	None	9.0 ppm (10 mg/m^3)
	1-Hour	35 ppm (40 mg/m^3)		20 ppm (23 mg/m^3)
	8-Hour (Lake Tahoe)	-	-	6 ppm (7 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 μg/m^3)	Same as Primary Standard	0.030 ppm (57 μg/m^3)
	1-Hour	0.100 ppm	None	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.030 ppm (80 μg/m^3)	-	-
	24-Hour	0.14 ppm (365 μg/m^3)	-	0.04 ppm (105 μg/m^3)
	3-Hour	-	0.5 ppm (1300 μg/m^3)	-
	1-Hour	-	-	0.25 ppm (655 μg/m^3)
Respirable Particulate Matter (PM_{10})	24-Hour	150 μg/m^3	Same as Primary Standard	50 μg/m^3
	Annual Arithmetic Mean	Revoked		20 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	35 μg/m^3	Same as Primary Standard	-
	Annual Arithmetic Mean	15 μg/m^3		12 μg/m^3
Lead (Pb)[6]	30-Day Average	-	-	1.5 μg/m^3
	Calendar Quarter	1.5 μg/m^3	Same as Primary Standard	-
	Rolling 3-Month Average[7]	0.15 μg/m^3	Same as Primary Standard	-
Hydrogen Sulfide (H_2S)	1-Hour	No Federal Standards		0.03 ppm (42 μg/m^3)
Sulfates (SO_4)	24-Hour			25 μg/m^3
Visibility Reducing Particles	8-Hour (10 am to 6 pm, Pacific Standard Time)			Extinction coefficient of 0.23 per km – visibility of ten miles or more (0.07 to 30 miles for Lake Tahoe) due to particles when the relative humidity is less than 70%.
Vinyl chloride[6]	24-Hour			0.01 ppm (26 μg/m^3)

1 NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. 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 standard. Contact USEPA for further clarification and current federal policies.

2 California Ambient Air Quality Standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, 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.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°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 a reference pressure of 760 torr. Ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

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

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

6 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.

7 National lead standard, rolling 3-month average: final rule signed October 15, 2008.

ppm = parts per million; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; km = kilometers
$PM_{2.5}$ = 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
Source: USEPA 2010; ARB 2010

Description of Criteria Pollutants

Ozone (O_3)

O_3 is a colorless, odorless gas at certain concentrations and primarily exists in the upper atmosphere (stratosphere) as the ozone layer, and in the lower atmosphere (troposphere) as a pollutant. O_3 is a principal cause of lung and eye irritation in the urban environment. O_3 is the principal component of smog, which is formed in the troposphere through a series of reactions involving reactive organic gases (ROG[5]) and oxides of nitrogen (NO_X) in the presence of sunlight. Therefore, ROG and NO_X are precursors of O_3. NO_X includes various combinations of nitrogen and oxygen, including nitrogen oxide (NO), NO_2, and nitrogen trioxide (NO_3). ROG and NO_X emissions are both considered critical in O_3 formation. Control strategies for O_3 have focused on reducing these emissions from vehicles, industrial processes using solvents and coatings, and consumer products. Significant O_3 concentrations are normally produced only in the summer, when atmospheric inversions are greatest and temperatures are high.

Nitrogen Dioxide (NO_2)

NO_2 is a gas and 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 O_3 and smog production.

Sulfur Dioxide (SO_2)

SO_2 is a gas and the 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.

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. Relatively high concentrations are

5 Reactive organic gases (ROG) are also identified as volatile organic compounds (VOCs). In this EA/EIR, the term ROG is used.

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. 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; therefore, California has required the use of oxygenated gasoline in the winter months to reduce CO emissions.

Lead (Pb)

Pb is a highly toxic metal that may cause a range of human health effects. Pb anti-knock additives in gasoline represent a major source of Pb emissions to the atmosphere. However, Pb emissions have significantly decreased due to the near elimination of leaded gasoline use. Lead-based paint, banned or limited by USEPA in the 1980s, is a health hazard when deteriorating (peeling, chipping, or cracking) or altered (scraped, sanded, or heated), generating lead dust.

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. USEPA 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. Health studies have shown a significant association between exposure to PM and premature death. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. USEPA groups PM into two categories, coarse PM or PM_{10}, and fine PM or $PM_{2.5}$, as described below.

Inhalable coarse particles, such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter (PM_{10}). 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, such as those found in smoke and haze, with an aerodynamic diameter of 2.5 microns or smaller ($PM_{2.5}$). These finer particles pose an increased health risk because they can deposit deep in the lung and contain substances that are particularly harmful to human health. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California. Control of $PM_{2.5}$ is primarily achieved through the regulation of emission sources; these regulations include USEPA's Clean Air Interstate Rule and Clean Air Visibility Rule for stationary sources, the 2004 Clean Air Nonroad Diesel Rule, the Tier 2 Vehicle Emission Standards, and Gasoline Sulfur Program; or the ARB Goods Movement Reduction Plan, and Air Toxic Control Measures (ATCM).

Attainment

When an area is in violation of the NAAQS for a criteria pollutant, the CAA requires that the area be designated as "nonattainment" for the pollutant in violation. Specific geographic areas or air basins are designated by USEPA as either "attainment" or "nonattainment" areas for each criteria pollutant based on the area's air quality monitoring data exceeding NAAQS.

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce NAAQS throughout its state. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more NAAQS are violated. In California, local air pollution control districts have the primary responsibility for developing and adopting the regional elements of the California SIP.

If USEPA redesignates an area from nonattainment to attainment for a criteria pollutant, the CAA requires a revision to the SIP, known as a maintenance plan, to demonstrate how the NAAQS will be maintained for at least 10 years.

Other Air Pollutants

Toxic Air Contaminants

Air quality regulations also focus on localized hazardous air pollutants, which are also called toxic air contaminants (TACs). For those TACs that may cause cancer, in general, there is no minimum concentration that does not present some risk, i.e., there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and ambient standards have been established (i.e., NAAQS). USEPA and ARB have ongoing programs to identify and regulate TACs. The regulation of TACs is generally through statutes and rules that require the use of the maximum or best available control technology (MACT or BACT) to limit TAC emissions.

Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by ARB in 1998. The control of diesel PM emissions is a very active current concern of regulatory agencies at all levels. According to the 2006 California Almanac of Emissions and Air Quality (ARB 2006), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. The composition of diesel PM emissions from diesel-fueled engines varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Federal and state efforts to reduce diesel PM emissions have focused on the use of improved fuels, adding particulate filters to engines and requiring the production of new-technology engines that emit fewer exhaust particulates.

Greenhouse Gases. Greenhouse gas (GHG) emissions are discussed in Section 3.14 (Climate Change) and Chapter 5 (Cumulative Impacts).

Odor. An air pollutant is defined as any fume, smoke, particulate matter, vapor, gas, odorous substance, or any combination thereof. Therefore, odor is considered an air quality issue, either at a local level (e.g., odor from wastewater treatment) or at a regional level (e.g., smoke from wildfire). Odor is an air quality consideration for NEPA projects.

Local Standards

In the SDAB, the San Diego Air Pollution Control District (APCD) is the agency responsible for protecting public health and welfare through the administration of federal and California air quality laws and policies. The APCD monitors air pollution, prepares and implement their portion of the SIP, and promulgates Rules and Regulations. The SIP for the SDAB includes strategies and tactics to be used to attain and maintain acceptable air quality in the basin including establishing annual air emission budgets for the basin. The strategies are contained in the APCD's Regional Air Quality Strategy (RAQS), which is the APCD plan for attaining NAAQS and CAAQS. The Rules and Regulations include procedures and requirements to control the emission of air pollutants and prevent significant adverse air quality impacts.

The SIP includes strategies and tactics to be used to attain the federal O_3 standard in the County. The elements are taken from the RAQS, which is the APCD plan for attaining the state O_3 standard, which is more stringent than the federal standard. The Rules and Regulations include procedures and requirements to control the emission of pollutants and to prevent adverse impacts.

APCD regulations require permits for any equipment that emits or controls air contaminants before beginning construction, installation, or operation (e.g., Permit to Construct or Permit to Operate). The APCD is responsible for review of permit applications and the approval and issuance of these permits.

3.12.3 <u>Clean Air Act Conformity</u>

The 1990 Amendments to the CAA Section 176 requires USEPA to promulgate rules to ensure that federal actions conform to the appropriate SIP. These rules, known together as the General Conformity Rule (40 C.F.R. Parts 51.850–51.860 and 93.150–93.160), require any federal agency, responsible for an action in a federal nonattainment or attainment/maintenance area, to demonstrate conformity to the applicable SIP, by either determining that the action is exempt from the General Conformity Rule requirements, or subject to a formal conformity determination.

Actions would be exempt, and thus conform to the SIP, if an applicability analysis shows that the total direct and indirect emissions of nonattainment or attainment/maintenance pollutants from the action's construction and operation activities would be less than the general conformity emission rate thresholds specified for those pollutants, known as *de minimis* levels, and that these emissions would be less than 10% of the area's annual emission budget for those pollutants. To document the General Conformity conclusions, a draft Record of Non-Applicability (RONA) is prepared. A RONA is a memorandum required by NEPA policy that reflects the determination of an authorized official that a formal conformity analysis/determination is not required for a proposed action. If not determined exempt, a formal air quality conformity analysis would be required to determine conformity.

The proposed action sites are located within the SDAB, which is a federal nonattainment area for 8-hour O_3, and an attainment/maintenance area for CO (USEPA 2008). Therefore, the General Conformity Rule is applicable to the proposed project for emissions of CO and O_3 precursors: ROG and NO_X. The proposed project would include construction equipment and vehicles that would emit CO, ROG, and NO_X. The applicable General Conformity *de minimis* levels and SDAB's annual emissions budgets for the SDAB's nonattainment and maintenance pollutants are shown in Table 3.12-2.

Table 3.12-2
General Conformity *de minimis* Levels and Emissions Budgets in the SDAB

Non-attainment or Maintenance Pollutant	General Conformity *de minimis* Levels (tons/year)	SDAB Annual Emission Budgets (tons)
CO	100[1]	322,003
NO_X	100[2]	61,612
ROG	100[2]	56,977

[1] Attainment/maintenance area for CO
[2] Basic nonattainment area for 8-hour O_3 precursors NO_X and ROG
Source: 40 C.F.R. Part 93; ARB 2008a

CEQA/NEPA Impact Significance

In addition to General Conformity, determination of significant air quality impacts is required for CEQA and NEPA documents such as this EA/EIR. A CEQA/NEPA air quality significance analysis differs from the General Conformity analysis in that all project criteria pollutant emissions are considered: attainment pollutant emissions, as well as nonattainment and maintenance pollutant emissions considered under General Conformity. Therefore, in the SDAB, project attainment emissions of oxides of sulfur (SO_X), PM_{10}, and $PM_{2.5}$, would be considered for impact significance for air quality in addition to CO, ROG, and NO_X considered under General Conformity.

The San Diego APCD has not established APCD air quality significance thresholds. However, General Conformity *de minimis* levels are appropriate thresholds for determining CEQA/NEPA significance when there are no district thresholds. Therefore, 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 significance thresholds for the project emissions generated in the SDAB are shown in Table 3.12-3.

Table 3.12-3
Applicable NEPA Air Quality Significance Thresholds in the SDAB

Pollutant	Emission Threshold (tons/year)
CO	100
NO_X	100
ROG	100
SO_X	100
PM_{10}	100
$PM_{2.5}$	100

Source: 40 C.F.R. Part 93

3.12.4 Regional and Local Air Quality

The SDAB, which is contiguous with San Diego County, currently meets the federal standards for all pollutants except O_3, and California standards for all pollutants except O_3 and PM_{10}. The SDAB is designated by USEPA as a federal nonattainment area for 8-hour O_3 based on current violations of O_3 NAAQS; it was redesignated from a federal CO nonattainment area to a CO attainment/maintenance area based on attainment of CO NAAQS. The SDAB is designated by ARB as a federal and state "serious" O_3 nonattainment area and a state nonattainment area for PM_{10}.

Ambient air pollutant concentrations are measured at 10 air quality monitoring stations in the SDAB operated by the APCD. In the coastal area, O_3 is monitored at Camp Pendleton, Del Mar, and Chula Vista Stations; PM_{10} is monitored at Chula Vista Station. Tables 3.12-5 and 3.12-6 summarize the standards exceedances of O_3 and PM_{10}, respectively, recorded at the coastal monitoring stations nearest the proposed project during the most recent 5 years of available data (2004 through 2008).

As shown in Table 3.12-4, between 2004 and 2008, the federal 1-hour O_3 standard was exceeded once in 2004, and the California 1-hour O_3 standard was exceeded eight times in 2004, once in 2007, and 13 times in 2008. As shown in Table 3.12-5, the federal 8-hour O_3 standard was exceeded six times in 2004 and once in 2007; and the California 8-hour O_3 standard was exceeded multiple times from 2006 to 2008. As shown in Table 3.12-6, the federal Standard for the PM_{10} Annual Arithmetic Mean was not exceeded in 2004 to 2008; the California standard was exceeded in 2004 to 2008. The federal 24-hour PM_{10} standard was not exceeded; the California standard was exceeded in 2005 to 2008.

3.12.5 Sources of Regional and Local Pollution

The primary sources of regional and local pollution are automobiles and other on-road vehicles. O_3 is formed by the reaction of ROGs and NO_X, which are combustion products from gasoline and diesel vehicle engines. Other important sources of ROGs are paints, coatings, and process solvents. The major sources of PM_{10} and $PM_{2.5}$ are construction and demolition emissions, and fugitive dust emissions from vehicle travel on paved and unpaved roads. Localized CO concentrations are a result of vehicle congestion at signalized intersections.

Table 3.12-4
Ozone 1-hour – Number of Days Exceeding the Federal and California Standards
San Diego County – 2004–2008

Monitoring Station	Maximum Concentrations[a]					Number of Days Exceeding Federal 1-Hour Standard Concentration >12 pphm					Number of Days Exceeding State 1-Hour Standard Concentration >9 pphm				
	2008	2007	2006	2005	2004	2008	2007	2006	2005	2004	2008	2007	2006	2005	2004
Camp Pendleton	0.104	0.083	0.086	0.090	0.110	0	0	0	0	0	10	0	0	0	4
Del Mar	0.110	0.117	0.086	0.082	0.129	0	0	0	0	1	2	0	0	0	3
Chula Vista	0.105	0.107	0.084	0.093	0.097	0	0	0	0	0	1	1	0	0	1

Sources: San Diego APCD 2008; ARB 2008b

[a] Concentration units are in parts per million (ppm)

Table 3.12-5
Ozone 8-hour – Number of Days Exceeding the Federal and California Standards
San Diego County – 2004–2008

Monitoring Station	Maximum Concentrations[a]					Number of Days Exceeding Federal 8-Hour Standard Concentration >8.5 pphm					Number of Days Exceeding State 1-Hour Standard Concentration >7 pphm				
	2008	2007	2006	2005	2004	2008	2007	2006	2005	2004	2008	2007	2006	2005	2004
Camp Pendleton	0.076	0.074	0.073	0.074	0.095	0	0	0	0	2	3	1	0	-	-
Del Mar	0.078	0.079	0.074	0.081	0.087	0	0	0	0	3	9	3	1	-	-
Chula Vista	0.083	0.087	0.068	0.070	0.095	0	1	0	0	1	4	2	0	-	-

Sources: San Diego APCD 2008; ARB 2008b

[a] Concentration units are in parts per million (ppm)

Table 3.12-6
PM_{10} – Samples Exceeding the Federal and California Standards
San Diego County – 2004–2008

Monitoring Station	Maximum Concentrations[a]					Annual Arithmetic Mean Federal Standard 50 µg/m^3 State Standard 20 µg/m^3					Maximum 24-hour Sample Federal Standard 150 µg/m^3 State Standard 50 µg/m^3				
	2008	**2007**	**2006**	**2005**	**2004**	**2008**	**2007**	**2006**	**2005**	**2004**	**2008**	**2007**	**2006**	**2005**	**2004**
Chula Vista	53.0	57.0	51.0	52.0	44.0	26	25	26	27	26	53	51	51	52	44

Sources: San Diego APCD 2008; ARB 2008b
[a] Concentration units are in parts per million (ppm)

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3.13 NOISE

This section defines noise and vibration terminology and concepts; describes existing noise levels in the project areas and in the surrounding communities; identifies applicable noise regulations for the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach; and provides a description of noise sensitive receptors in the project areas.

3.13.1 Introduction

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 and may, therefore, be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2009).

Decibels and Frequency

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).

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 doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3-dB decrease.

Perception of Noise at the Receptor and A-Weighting

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, 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 well 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. Table 3.13-1 shows the relationship of various noise levels to commonly experienced noise events.

Table 3.13-1
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 disposal 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, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2009

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dBA or in terms of acoustical energy. Two noise sources do not "sound twice as loud" as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease; that a change of 5 dBA is readily perceptible; and that an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 2009).

Noise Propagation

From the source to the receptor, noise changes both in level and frequency spectrum. The most obvious change is the decrease in noise as the distance from the source increases. The manner in which noise decreases with distance depends on several important factors described in the following discussion.

Geometric spreading from point and line sources: Sound from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates, or drops off, at a rate of approximately 6 dBA for each doubling of the distance. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over a time interval. The sound level attenuates, or drops off, at a rate of 3 dBA per doubling of distance for line sources.

Ground absorption: Hard sites (i.e., sites with a reflective surface between the source and the receptor, such as parking lots or smooth bodies of water) receive no excess ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees, and result in an additional ground attenuation of 1.5 dBA per doubling of distance.

Atmospheric effects: Wind speed will bend the path of sound to "focus" it on the downwind side and create a "shadow" on the upwind side of the source. At short distances (up to 164 feet) the wind has minor influence on a measured sound level. For longer distances, the wind effect becomes appreciably greater. Temperature gradients create effects similar to those of wind gradients, except that they are uniform in all directions from the source. On a sunny day with no wind, temperature decreases with altitude, creating a shadow effect for sound. On a clear night, temperature may increase with altitude, focusing sound on the ground surface.

Shielding by natural and human-made features, noise barriers, diffraction, and reflection: A large object in the path between a noise source and a receptor can substantially attenuate noise levels at that receptor location. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, as well as human-made features such as buildings and walls, can substantially alter noise levels.

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; $L_{eq(3)}$ would be a 3-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, descriptors (DNL and CNEL) were developed that account for human sensitivity to nighttime noise. DNL represents the 24-hour average sound level, with a penalty for noise occurring at night. DNL computation divides the 24-hour day into two periods: daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.). Nighttime sound levels are assigned a 10-dBA penalty prior to averaging with daytime hourly sound levels. CNEL is similar to DNL except that it separates a 24-hour day into three periods: daytime (7:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10:00 p.m.), and nighttime (10:00 p.m. to 7:00 a.m.). Evening and nighttime sound levels are assigned a 10-dBA penalty prior to averaging with daytime hourly sound levels.

Noise-Sensitive Receptors

Noise-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to the stress of substantial interference from noise. Activities usually associated with sensitive receptors include, but are not limited to, talking, reading, and sleeping. Land uses often associated with sensitive receptors include residential dwellings, mobile residences, hotels, motels, hospitals, nursing residences, education facilities, and libraries. Many jurisdictions also recognize parks or recreation areas as noise-sensitive land uses.

All of the receptor sites proposed for RBSP II include recreational beach areas. Specific recreational areas and activities, as well as adjacent land uses for each receiver site, are described in Section 3.6 (Land and Water Use) of this EA/EIR. The descriptions in Section 3.13 below highlight the nonrecreational noise-sensitive uses that would be exposed to noise sources included in the proposed action. These receptors are principally adjacent to the receptor sites.

Noise-sensitive receptors may also be threatened or endangered noise-sensitive biological species. Noise-sensitive avian species in the project area include the endangered California least tern, Belding's savannah sparrow, light-footed clapper rail, and the threatened western snowy plover. The locations of these species relative to the receiver sites and borrow sites are described in Appendix C.

Vibration Terminology

Vibration Descriptors

Groundborne vibration consists of oscillatory waves that propagate from the source through the ground to adjacent structures. The number of cycles per second of oscillation is the vibration frequency, which is described in terms of hertz (Hz). Vibration energy propagates as it travels through the ground, causing the vibration level to diminish with distance away from the source. Vibration in buildings caused by construction activities may be perceived as motion of building surfaces, or rattling of windows, items on shelves, and pictures hanging on walls. Although groundborne vibration is sometimes noticeable in outdoor environments, groundborne vibration is almost never annoying to people who are outdoors (FTA 2006). The primary concern from vibration is its ability to be intrusive and annoying to local residents and other vibration-sensitive land uses.

Vibration-Sensitive Receptors

Vibration-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, who may be subject to substantial interference from vibration. Activities and land uses often associated with vibration-sensitive receptors are similar to those associated with noise-sensitive receptors. The primary vibration source for the proposed action would be construction equipment used for the sand-spreading activities. Sand is a poor medium for the transfer of vibrations. Thus, vibration-sensitive receptors in the project vicinity are generally limited to humans engaged in activities, or utilizing the residences and businesses within approximately 50 feet of sand-spreading activities.

3.13.2 Applicable Standards

The proposed action is a construction project. Most of the jurisdictions in which the project would occur have noise ordinances that establish construction noise standards which would be applicable to the project. A noise ordinance typically includes limitations on the hours that construction work may be performed, maximum allowable noise levels, or both. In addition to the specific requirements, each ordinance typically includes a "General Prohibition" on noise that prohibits disturbing, excessive, or offensive noise that causes discomfort or annoyance to reasonable persons of normal sensitivity. A noise ordinance also usually contains conditions and procedures for obtaining variances from construction noise limitations. Table 3.13-2 summarizes the standards applicable at the receptor sites. As noted in Section 2.7, there are no applicable noise standards at receptor sites within the California State Parks System.

3.13.3 Existing Noise Levels at Receptor Sites

The principal source of noise at each of the receptor sites is the 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 the sand-rock composition. In general, all of the receptor sites have relatively high background noise levels due to constant surf activity. This is typical of a beach environment. The measured noise levels, and additional noise sources associated with the individual receptor sites, are described below.

Noise levels were measured as part of RBSP I at each of the receptor sites between July 26 and September 27, 1999. A Larson-Davis Laboratories Model 712 Type 2 sound level meter was used. The meter calibration was checked before and after use. The following parameters were used: Filter: A-weighted; Response: Slow. Generally, the total measurement time at each position was on the order of 10 to 15 minutes because the ambient noise was relatively constant and longer periods were not necessary to determine an average. Occasionally, measurements were shortened because of extraneous noise sources, such as barking dogs or other conditions that precluded further measurement. Noise measurement locations were chosen at or near sensitive receptors closest to the anticipated noise source locations, or at equivalent points. In some instances, access to representative points was not available, which is noted in the individual site descriptions.

Noise levels were measured for RBSP II on April 20 and 27, 2010, to confirm and update, as appropriate, noise levels measures for RBSP I. A Larson-Davis Laboratories Model 820 Type 1 sound level meter was used. The meter calibration was checked before and after use. The following parameters were used: Filter: A-weighted; Response: Slow. Generally, the total measurement time at each position was on the order of 15 minutes, because the ambient noise was relatively constant, and longer periods were not necessary to determine an average. Noise levels on the beach are similar to those measured for RBSP I because the primary noise source is beach surf, which remains relatively constant over time. Measurement locations were chosen at or near similar points measured in 1999. In some instances, access to representative points was not available and measurements were taken within a proposed receptor site.

Table 3.13-2
Summary of Applicable Construction Noise Standards

Receptor Site	Jurisdiction	Construction Hours Prohibited	Construction Noise Limits
Oceanside	Oceanside	6:00 p.m.–7:00 a.m. weekdays; weekends; Federal holidays[O1]	None
North Carlsbad	Carlsbad	After sunset and before 7:00 a.m.[CB1] any day	None
S. Carlsbad N. S. Carlsbad S. Batiquitos Leucadia Moonlight Cardiff	California Department of Parks and Recreation	None	None
Solana Beach	Solana Beach	7:00 p.m.–7:00 a.m. weekdays; 7:00 p.m.–8:00 a.m. Saturday; Sundays; nine holidays[SB1]	75 dBA $L_{eq(8)}$ at residential properties
Torrey Pines	California Department of Parks and Recreation	The Torrey Pines conveyance plan includes use of Del Mar's beach for pipeline conveyance of sand and a booster pump would be necessary. The use of the City of Del Mar's beach for this purpose may necessitate conformance with the City of Del Mar noise ordinance even though the Torrey Pines receptor site is within State Park's jurisdiction.	
Imperial Beach	Imperial Beach	10:00 p.m.–7:00 a.m.[IB1]	75 dBA

O1 - Applies to grading; Grading Ordinance Section 515. City Engineer may permit operations during specific hours if not detrimental to health, safety or welfare of residents.
CB1 - Applies to grading; Municipal Code Section 15.16.120. City Engineer may permit operations during specific hours if not detrimental to the health, safety, or welfare of residents.
SB1 - Municipal Code Section 7.34, Noise Abatement And Control, Section 7.34.100. Variance procedures in Section 7.34.240–400.
DM1 - Municipal Code Section 9.20.050. Exemption provisions for emergency work or government preempted activities.
SD1 - Municipal Code Section 59.5.0404; the Section also allows exception by permit of the Noise Abatement and Control Administrator.
IB1 - Municipal Code Section 9.32.020H. Section 9.32.060 allows exemption by permit of the City Manager.

Oceanside

Sensitive Receptors

The proposed receiver site is bounded on the east by a riprap slope. The site would extend from approximately Wisconsin Avenue south of Morse Street (see Figure 2-4). Sensitive noise receptors include single- and multi-family residences that are east of the beach and riprap slope, with setbacks on the order of 5 to 10 feet. These residences face South Pacific Street south of Buccaneer Beach Park. The residences on the east side of South Pacific Street are also potential sensitive receptors. These residences are elevated approximately 20 feet above the residences to the west, thus providing partial views to the beach. The North County Transit District railroad tracks, which carry approximately 41 trains per day, are located approximately 700 feet east of the receiver site.

Noise Levels

Noise measurements conducted in 1999 indicated noise levels of 62 to 65 dBA L_{eq} at beachfront residences during periods of little or no activity on the beach, and little or no train or traffic noise. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 50 feet west of the residences and measured a noise level of 69 dBA L_{eq} from wave action. The range of noise levels indicates the variance in noise level associated with distance from the surf line. Noise levels would be greater during periods of greater activity on the beach, principally from people recreating on the beach. Due to distance and interviewing structures, nighttime noise levels at the residences on the east side of South Pacific Street would be approximately 10 dB less, ranging from 62 to 63 dBA L_{eq}. At these residences, daytime noise levels would be higher because of traffic on South Pacific Street.

North Carlsbad

Sensitive Receptors

The proposed receptor site would extend from approximately the Buena Vista Lagoon channel, south to almost Oak Avenue (see Figure 2-5). Sensitive noise receptors include single- and multi-family residences that are adjacent to the beach. Some of these residences have riprap protection. The east façades of these residences front Ocean Street. The Army and Navy Academy, a preparatory school, is also adjacent to the beach south of Pacific Avenue.

Noise Levels

Based on noise levels measured in 1999 at the North Carlsbad receptor site, it may be assumed that residents of this area experience noise levels of approximately 68 to 69 dBA L_{eq} during periods when there is little or no activity on the beach. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 50 feet west of the residences, and the sound level meter measured a noise level of 69 dBA L_{eq} from wave action. The limited range of noise levels indicates the variance distance from the surf line is minimal in this area. Noise levels would be greater during periods of greater activity on the beach, principally from people recreating on the beach.

South Carlsbad North

Sensitive Receptors

The proposed receptor site would extend from approximately the intersection of Palomar Airport Road and Carlsbad Boulevard, on the north, southward for a distance of approximately 2,800 feet near Sea Breeze Drive (see Figure 2-6). In this area, there are no residences or other sensitive noise receptors adjacent to the beach. The nearest sensitive noise receptors include single-family residences that are east of Carlsbad Boulevard on Oceanview Drive, at a distance of approximately 400 feet.

Noise Levels

Based on the noise levels measured in 1999 at the South Carlsbad North receptor site, noise levels average 66 dBA L_{eq} at the north end of the residential area, and 54 dBA L_{eq} at the south end of the area. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 60 feet west of the bluff on the beach, which measured a noise level of 69 dBA L_{eq} from wave action. The limited range of noise levels indicates the variance distance from the surf line is minimal in this area. Noise levels would be greater during periods of greater activity on the beach. The large range for noise levels at the north end reflects the variability in traffic noise, which is the dominant source.

South Carlsbad South

Sensitive Receptors

The proposed receptor site would be located approximately 550 feet south of the South Carlsbad North receptor site and would extend approximately 2,100 feet south to approximately Lankai Lane. Most of the area is adjacent to the South Carlsbad State Beach Campground. The east side of the campground faces Carlsbad Boulevard. Sensitive noise receptors include camp sites in the northern part of the campground. North of the campground, there are no sensitive receptors west of Carlsbad Boulevard. The area between the receiver area and campground is a steep bluff, and the campground is approximately 60 feet above the beach.

Noise Levels

Based on the noise levels measured in 1999 at the campground area atop the bluff, noise levels range from 63 to 65 dBA L_{eq} at the campsites. The dominant noise source on the west side of the campground is a combination of traffic noise from Carlsbad Boulevard and surf noise, along with occasional noise from within the campground. Along the east side of the campground, traffic noise is the dominant noise source. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 60 feet west of the bluff on the beach, which measured a noise level of 69 dBA L_{eq} from wave action. The range of noise levels is due to the variance in distance from the surf line and the greater topography of the campground.

Batiquitos

Sensitive Receptors

The proposed receptor site would be located south of Batiquitos Lagoon, with the northern part in Carlsbad and the southern part in Leucadia within the City of Encinitas. The northern part includes Ponto Beach, a popular recreation area. There are no sensitive noise receptors near the northern or central part of the receptor site. The closest receptors are residences on the bluffs approximately 60 to 80 feet above the site. The eastern face of these residences fronts Parliament Road. There is a restaurant with access from Coast Highway 101/Carlsbad Boulevard overlooking Ponto Beach.

Noise Levels

No measurements were taken at the Batiquitos receptor site in 1999 but were assumed to be similar to the Leucadia site, where noise levels ranged from 63 to 66 dBA L_{eq}. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 60 feet west of the bluff on the beach, which measured a noise level of 68 dBA L_{eq} from wave action. The range of noise levels is due to the distance from the surf line to the top of the bluff.

Leucadia

Sensitive Receptors

The proposed receptor site would be located approximately 0.5 mile south of the Batiquitos receptor site, between Grandview Street and Jasper Street in Leucadia within the City of Encinitas. Sensitive receptors include residences on the bluffs approximately 60 to 80 feet above the beach. The east façades of these residences front Neptune Avenue.

Noise Levels

Based on the noise levels measured near the residences above the beach in 1999, noise levels of 63 to 66 dBA L_{eq} may be considered typical for nighttime ambient noise at these bluff residences. In April 2010, a 15-minute daytime noise level measurement was taken at the receiver site location approximately 25 feet west of the bluff on the beach, which measured a noise level of 69 dBA L_{eq} from wave action. The range of noise levels is due to the distance from the surf line to the top of the bluff.

Moonlight Beach

Sensitive Receptors

The proposed receptor site would extend from approximately A Street to D Street in the City of Encinitas. The Moonlight Beach recreation area and parking lot are east of the site. Sensitive noise receptors include single- and multi-family residences that are adjacent to the beach at the north end. The east façades of these residences front 5th Street. The southernmost house is nominally at beach level, with a porch adjacent to the receptor site. There is riprap protection approximately 10 feet high and 8 feet deep at these residences. At the south end of the receiver area, there is a day use park on a bluff approximately 20 feet above the beach, and residences to the east of the park, on the east side of Moonlight Lane.

Noise Levels

Based on the noise levels measured in 1999 near the receptors north and south of the beach, noise levels from surf activity in early morning without other noise sources ranged from 65 to 66 dBA L_{eq}. Noise levels east of the beach where local residences provide shielding were 54 dBA L_{eq}. In April 2010, a 15-minute noise level measurement was taken at the receiver site location approximately 90 feet west of the bluff on the beach, which measured a noise level of 70 dBA L_{eq} from wave action. The range of noise levels is due to the distance from the surf line to the residences. Nighttime noise levels at the residences close to the beach are estimated at 67 to 68 dBA L_{eq}.

Cardiff

Sensitive Receptors

The proposed receptor site would be parallel to Coast Highway 101 and San Elijo Lagoon. Three restaurants are built adjacent to the beach just north of the receptor site. The east façade of the restaurants fronts Coast Highway 101. Two restaurants have outdoor dining areas facing the ocean. The rear of the restaurants are 10 to 15 feet above the beach and are protected by heavy rock riprap. The nearest residential receptors are east of Coast Highway 101 and the railroad, more than 1,000 feet from a visible part of the site.

Noise Levels

Based on the 1999 measured noise levels at the rear of one of the restaurants, typical noise levels during restaurant use hours for surf and highway noise would be approximately 68 dBA L_{eq} at the top of the bluff and 64 dBA L_{eq} within the rest area. In April 2010 a 15-minute daytime noise level measurement was taken at the receiver site location approximately 35 feet west of the bluff on the beach, which measured a noise level of 69 dBA L_{eq} from wave action.

Solana Beach

Sensitive Receptors

The proposed receptor site would extend south from the west end of Plaza Street (the western extension of Lomas Santa Fe Drive) to approximately 900 feet south of Dahlia Drive. Alternative 2 would extend north approximately 900 feet to Estrella Street, and south approximately 1,750 feet. Sensitive receptors include single- and multi-family residences on the bluffs approximately 60 feet above the beach. The eastern façades of these buildings front Helix Avenue and South Sierra Avenue.

Noise Levels

No measurements were taken at the Solana Beach receptor site in 1999 because of lack of access; however, noise levels at the residences on the bluffs above the beach were estimated to be similar to those at the Leucadia site, which ranged from 63 to 66 dBA L_{eq}. In April 2010, a 15-minute daytime noise level measurement was taken at the receiver site location approximately 35 feet west of the bluff on the beach, which measured a noise level of 69 dBA L_{eq} from wave action.

Torrey Pines

Sensitive Receptors

The proposed receptor site would extend approximately 2,000 feet along the beach centered on the Torrey Pines Beach parking lot. There are no adjacent receptors.

Noise Levels

No noise levels were measured at this receptor site in 1999. In April 2010, a 15-minute daytime noise level measurement was conducted in the receptor site location approximately 20 feet west of a rockberm at beach level. The sound level meter measured a noise level of 69 dBA L_{eq} from wave action.

Imperial Beach

Sensitive Receptors

The proposed receptor site is bounded on the east mostly by a riprap slope approximately 10 feet high. The receiver area would extend from Elder Avenue to approximately Descanso Avenue, on the south. Alternative 2 would extend the receiver site approximately 1,750 feet north and 1,700 feet south (see Figure 2-13). Sensitive noise receptors include single- and multi-family residences that are east of the beach and riprap slope, with setbacks of approximately 5 to 10 feet. The Naval Auxiliary Landing Field, Imperial Beach, is located 0.75 mile east of the southern portion of the receiver site and is used for helicopter flights.

Noise Levels

Based on the 1999 noise levels measured at the Imperial Beach receiver site, typical noise levels at the residences closest to the beach were estimated to be 65 to 67 dBA L_{eq} during periods of little or no activity on the beach. In April 2010, a 15-minute daytime noise level measurement was taken at the receiver site location approximately 30 feet west of the residences, which measured a noise level of 70 dBA L_{eq} from wave action. Noise levels may be at the higher end of the range at the northern and southern portions of the site than at the central portion because the surf line is closer to the residences and the proximity to the pier. Residences south of Descanso Avenue are also subject to helicopter noise from the Naval Auxiliary Landing Field, Imperial Beach. A measurement was also conducted in 2010 approximately 400 feet south of the receiver site to represent ambient noise levels in wildlife habitat along the coast line. Noise levels in this area were approximately 70 to 71 dBA L_{eq}. These noise levels are 1 to 3 dBA higher than other locations measured for RBSP II as this beach is generally narrower and the meter was closer to the surf line.

3.14 CLIMATE CHANGE

This section presents a discussion of existing climate conditions, the current state of climate change science, and greenhouse gas (GHG) emissions sources in California. Potential climate change impacts are addressed in terms of compliance with federal, state, and local regulations as applicable to the specific borrow and receiver sites proposed in this project.

3.14.1 Existing Environmental Setting

Climate Change

Certain gases in Earth's atmosphere, classified as GHGs, play a critical role in determining Earth's surface temperature. Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of Earth's climate, known as global climate change or global warming. Climate change refers to persistent, recorded changes in the average weather of the earth, measured by variables such as wind patterns, storms, precipitation, and temperatures that evolve over a long period of time (e.g., decades or centuries). Scientific research on climate change indicates with very high confidence (i.e., at least 90%) that the current rate and magnitude of global temperature increases are primarily anthropogenic (i.e., human-caused) and will lead to adverse effects around the globe (IPCC 2007). It is extremely unlikely that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007).

GHGs persist in the atmosphere long enough to disperse around the globe, and therefore impacts of GHGs are borne globally. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known.

The proposed receiver and borrow sites are located in San Diego County. A GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center for San Diego County (Anders et al. 2008). The inventory for 2006 estimated the region's 34 million metric tons of carbon dioxide equivalent (CO_2e) emissions derived primarily from on-road transportation (46%) and electricity (25%), which shows the unique characteristics of the region compared to the state. Additional information regarding the physical scientific basis for climate change as well as the sources of GHGs can be found in Appendix F.

Sea Level Rise

There is widespread scientific agreement that climate change is causing a rise of sea level due primarily to the melting of land-based glaciers and thermal expansion due to increasing sea temperatures, which can be attributed to global climate change. According to the Intergovernmental Panel on Climate Change (IPCC), global average sea levels have risen approximately 0.3 feet to 0.8 feet. over the last century and are predicted to continue to rise at about twice the rate during this century, resulting in between 0.6 feet and 2.0 feet over the next century (IPCC 2007). More recent studies have shown that sea level rise has outpaced IPCC predictions (California Climate Change Center 2009). Potential effects from sea level rise include erosion, loss of shorefront, and increased storm surges. With over 50% of Americans living within a coastal county (Woods and Poole 2009), these effects have the potential to adversely impact human populations and infrastructure.

3.14.2 Applicable Regulations, Plans, and Policies

Numerous federal, state, regional, and local laws, rules, regulations, plans, and policies define the framework that regulates or will potentially regulate climate change. The following discussion focuses on climate change requirements applicable to the proposed project.

Federal Plans, Policies, Regulations, and Laws

Supreme Court Ruling

USEPA is the federal agency responsible for implementing the federal CAA. The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that USEPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the proposed project.

Endangerment Finding for Greenhouse Gases under the Clean Air Act

On December 7, 2009, USEPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding states that six key GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations, and that emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. The findings allowed USEPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.

Council on Environmental Quality Guidance

On February 18, 2010, the CEQ Chair issued a memorandum titled *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (U.S. Council on Environmental Quality). The draft guidance recognizes that many federal actions would result in the emission of GHGs, and that, where a proposed federal action may emit GHG emissions “in quantities that the agency finds may be meaningful,” CEQ proposes that an agency’s NEPA analysis focus on aspects of the environment that are affected by the proposed action and the significance of climate change for those aspects of the affected environment. In particular, the guidance proposes a reference point of 25,000 metric tons per year of direct GHG emissions as a “useful indicator” of when agencies should evaluate climate change impacts in their NEPA documents. CEQ notes that this indicator is not an absolute standard or threshold to trigger the discussion of climate change impacts.

When a proposed federal action meets an applicable threshold for quantification and reporting of GHG emissions, the draft guidance proposes the agency should consider measures and reasonable alternatives to reduce emissions. CEQ also recognizes the limitations and variability of climate change models to reliably project potential impacts. Thus, agencies should disclose these limitations when explaining the extent to which they rely on particular studies or projections.

State Plans, Policies, Regulations, and Laws

The California ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act, which was adopted in 1988.

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006

AB 32, the California Global Warming Solutions Act of 2006, was signed in September, 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill (SB) 97

SB 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. The California Office of Planning and Research (OPR) was directed to prepare and submit proposed CEQA amendments for GHG emissions to the California Natural Resources Agency for certification or adoption. The amendments became effective on March 18, 2010, and include requirements for determining the significance of impacts from GHG emissions.

On December 30, 2009, the California Natural Resources Agency adopted new CEQA guidelines regarding GHGs. The guidelines include requirements for determining the significance of impacts from GHG emissions (section 15064.4). In particular, the "determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of GHG emissions resulting from a project." The section also provides that a lead agency has the discretion to determine whether to undertake a quantitative or qualitative analysis, or otherwise rely on performance based standards. Finally, the lead agency may consider the following factors when assessing the significance of GHG emissions: (1) the extent to which the project increases or reduces emission levels, when compared to the existing setting; (2) the extent to which the emissions resulting from the project exceed a threshold of significance that the lead agency determines applies to the project; and, (3) the extent to which the project complies with adopted regulations or requirements adopted to implement a statewide, regional or local plan for the reduction or mitigation of GHG emissions. Other sections address measures relating to GHG emissions; the consideration of GHG emissions in the cumulative impacts analysis; the consistency of proposed projects with GHG reduction plans; and, the tiering and streamlining of environmental review through the analysis and reduction of GHG emissions at a programmatic level.

Senate Bill 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning

Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy, which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB must set regional GHG targets for passenger vehicles and light trucks for 2020 and 2035 by September 30, 2010, for the 18 MPOs in the state. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

California State Coastal Conservancy: Policy Statement on Climate Change

The Climate Change Policy, adopted June 4, 2009, describes the concerns about the effects of global warming on coastal, marine, and near-coast resources within the Conservancy's jurisdiction. The policy of primary importance to the proposed project includes that, prior to the completion of the National Academies of Science report on sea level rise, consistent with Executive Order S-13-08, the Conservancy will consider the following sea level rise scenarios in assessing project vulnerability and, to the extent feasible, reducing expected risks and increasing resiliency to sea level rise of 16 inches by 2050, and 55 inches by 2100 (4.6 feet).

Several Executive Orders have been issued regarding climate change and sea level rise, including Executive Order S-3-05, proposing GHG emissions reductions to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050; Executive Order S-1-07, which establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020; and Executive Order S-13-08, which enhance the State's management of potential climate effects from sea level rise, increased temperatures, shifting precipitation, and extreme weather events. Additional information regarding California's Executive Orders can be found in Appendix F.

<u>Regional and Local Plans, Policies, Regulations, and Ordinances</u>

For purposes of this project, the borrow and receiver sites are located within the SDAB under the local jurisdiction of the San Diego APCD. Currently, the San Diego APCD has no regulations relative to GHG emissions.

The project's lead agency, SANDAG, has not established thresholds of significance for GHG emissions but is in the process of developing the first RTP subject to the provisions of SB 375. This will include an SCS to demonstrate how development patterns and the transportation network, policies, and programs can work together to achieve the GHG emission targets for cars and light trucks that will be established by ARB. On July 23, 2010, the SANDAG Board voted to submit a proposed final target of 7% per-capita reductions from passenger vehicles and light trucks for 2020 and 13% per-capita reductions for 2035 (relative to 2005 levels). ARB staff is expected to approve a final target by September 30, 2010. SANDAG's RTP is scheduled for adoption by the SANDAG Board of Directors in summer 2011.

3.14.3 Sources of Regional and Local Pollution

As described in Section 3.14.1, GHG emissions and sea level rise are a global phenomenon. Therefore, local or regional measurements at or near ground level are not relevant to the issue. No existing sources of GHGs are located at any of the proposed project sites. Regional and global sources of GHG emissions are described in Section 3.14.1.

CHAPTER 4.0
ENVIRONMENTAL CONSEQUENCES

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 C.F.R. § 1508.27). CEQA regulations generally define a significant effect on the environmental as a substantial or potentially substantial adverse change in the physical environment (CEQA Guidelines § 15064, 15126.2). The NEPA definitions of significance are generally less conservative than under CEQA. The CEQA-based significance criteria utilized in this analysis therefore addresses both CEQA and NEPA requirements. Consistent with the above regulations and guidelines, the impact analyses contained in this chapter follow a step-by-step format where each potential impact within an issue area is addressed separately. For each impact, there is a separate subsection on significance thresholds and criteria. The significance threshold is a set of criteria used to judge whether a given consequence of a specific project alternative is significant. The impact analysis presentation is organized by alternative. Following the analysis, the level of significance is identified. An impact is deemed to be not significant, adverse but not significant, or significant. In the latter category, impacts may be mitigable (i.e., measures are available to reduce the impact to below a level of significance), or unmitigable (i.e., the impact cannot be reduced to below a level of significance by mitigation measures, although mitigation may be proposed to lessen the intensity of the impact). For this project, several measures have been incorporated into project design to minimize potential impacts and monitor during construction and postconstruction, as described in Sections 2.4 and 2.5.

Chapter 1 (Introduction) discusses the successful design and implementation of RBSP I in 2001. The proposed RBSP II is designed to be similar to RBSP I. The RBSP I EIR/EA concluded, based on model interpretations and best professional judgment, that there would be no significant impacts. Subsequent monitoring during and after project implementation confirmed that significance conclusion. The impact conclusions reached in this evaluation are based on current modeling, current professional judgment, and the directly applicable monitoring conclusions from RBSP I. Where applicable, results from the implementation of RBSP I are included to facilitate comparison between the two projects and provide support for anticipated impact conclusions.

As described in Chapter 2 (Alternatives Considered), the following three alternatives are considered in detail in this section:

- Alternative 1: Replenishment of 10 receiver sites using a maximum volume of approximately 1.8 mcy of dredged sediment from three borrow sites.
- Alternative 2: Replenishment of 11 receiver sites using approximately 2.7 mcy of dredged sediment from three borrow sites.
- No Project/No Federal Action Alternative: No implementation of dredging activities or beach replenishment.

As noted in the Preface, subsequent to completion of the evaluation of Alternatives 1 and 2 for the Draft EIR/EA, a Preferred Alternative was identified and defined as Alternative 2-R. This Preferred Alternative is the proposed project and is summarized in the Preface of this EA/Final EIR. Potential impacts are discussed by issue area in that preface. The analysis of Alternatives 1 and 2 remains in this chapter of the EA/Final EIR, with minor clarifications based on public input and agency coordination that occurred after release of the Draft EIR/EA.

Detailed analyses of coastal geomorphology and biological resources are contained in technical appendices G and C, respectively. The appendices reflect studies of the proposed alternatives, as well as a 3.2 mcy Alternative (referred to as Alternative 3), which is not analyzed in detail in this EA/EIR. As discussed in Section 2.3, this alternative was rejected prior to the distribution of the EA/EIR but after some technical analyses were completed.

4.1 GEOLOGY AND SOILS

The following analysis of coastal geology and littoral processes related to beach replenishment is based on studies performed in *Draft Shoreline Morphology Study, San Diego Regional Beach Sand Project II* (Moffatt & Nichol 2010b).

4.1.1 Significance Criteria

The protection of unique geologic coastal features and the minimization of erosion are considered when evaluating potential impacts of a proposed action. For this analysis, an impact to geologic resources would be significant if it would:

- destroy, permanently cover, or modify any unique geologic or physical features;
- increase erosion of soils, either on- or off-site; or
- cause erosion of beach sand.

4.1.2 Alternative 1

Impacts of Alternative 1

Receiver Sites

For all receiver sites, sediment deposited on the beach would be spread alongshore and cross-shore through natural littoral transport. Shoreline positions were modeled based on the anticipated sediment movement and were predicted for periods of 1, 2, 3, 4, and 5 years after sand placement.

Borrow materials would be similar to the receiving beach because the fill material has been the subject of grain size analyses and was found to be compatible with the receiver sites' existing sediments (Moffatt & Nichol 2010a). The slope of the existing beach profile would steepen temporarily as the design profile is constructed at a slope of 10:1 (horizontal to vertical) compared to the existing profile of approximately 30:1. In addition, coarser grained sand would be placed over the beach compared to existing sand grain sizes to increase sand retention time. This increase in slope would be subtle and temporary, and would result in less than significant impacts. The rate of sand dispersion on high energy beaches is high, thereby causing beach slopes to revert to equilibrium profile conditions after approximately one season (Moffatt & Nichol 2010b). Appendix G includes a more detailed discussion of shoreline processes.

For all receiver sites, seismic activity associated with the Rose Canyon fault and other nearby faults may lead to liquefaction, ground failure, sand volcanoes, and seaward slumping of beach material. The impact of beach replenishment would be of no greater significance than conditions expected in the absence of additional sediment.

Coastal Geology

Similar coastal geology processes for each receiver site would occur regardless of the season the replenishment activity occurs. After placement of sand onto a receiver site, the existing beach area north and south of the receiver site would widen as a result of longshore and cross-shore spreading. The results of the modeling indicating the length of time that the beach fill would return to its pre-fill condition at physical profile locations are shown in Table 4.1-1. Seasonal cross-shore movement would transport the fill material offshore in the winter and back onto the beach in the summer, repeating this trend over subsequent seasons. Also, the longshore transport changes direction seasonally, moving the sand north in the summer and south in the winter. Seasonal loss of the beach would occur from natural littoral processes. Placing the material on the beach in spring instead of summer would increase the chance that more material would be available on the shore during the peak recreation period. Placing it in late summer/fall increases the opportunity for winter storms to remove the material prior to heavy summer usage the following year.

Near each receiver site, sediment would move from the beach to an offshore sandbar during the winter season. Sediment movement after beach fill placement would follow natural seasonal and littoral trends. A minor increase in the sand thickness at the nearshore bar is anticipated for each receiver site. Table 4.1-2 provides a summary of the location of the existing seasonal offshore sandbar and the increase in depth of that bar resulting from the project at the end of the first and second years. Values for the fifth year are negligible and are therefore not shown. No long-term significant impacts to coastal geology are anticipated due to sediment transport or the increased sediment thickness at the existing, seasonal offshore bar.

Table 4.1-1
Predicted Retention Time of Beach Fill at Each Receiver Site

Receiver Site	Approximate Time for Receiver Site to Return to Pre-Fill Condition (years)
Oceanside	Greater than 5 years
North Carlsbad	Greater than 5 years
South Carlsbad North	Greater than 5 years
South Carlsbad South	Greater than 5 years
Batiquitos	4 years
Leucadia	Greater than 5 years
Moonlight Beach	Between 3 and 4 years
Cardiff	Greater than 5 years
Solana Beach	Greater than 5 years
Torrey Pines	Greater than 5 years
Imperial Beach	4 years*

* Imperial Beach was analyzed using a different method (dispersion analyses) than North County sites.
Source: Moffatt & Nichol 2010b

Table 4.1-2
Estimated Location of Offshore Sandbar and Project-Related Increase in Sandbar Depth

Receiver Site (Representative Profile)	Feet (') Above Average Historical Bar[(1)]				
	Offshore Bar Range (feet from back of beach)	Alternative 1		Alternative 2	
		Year 1	Year 2	Year 1	Year 2
Oceanside (OS-0915)	470 to 1,210	0.8 at 840'	0.9 at 840'	0.8 at 840'	0.9 at 840'
North Carlsbad (CB-0865)	490 to 1,100	1.1 at 1,020'	0.9 at 1,020'	1.1 at 1,020'	0.9 at 1,020'
South Carlsbad North (CB-0775)	500 to 1,340	0.6 at 770'	0.5 at 690'	1.2 at 690'	1.0 at 700'
South Carlsbad South (CB-0776)	350 to 1,060	0.9 at 480'	0.8 at 480'	2.4 at 480'	2.1 at 480'
Batiquitos (CB-0710)	560 to 1,330	0.7 at 830'	0.6 at 820'	0.7 at 820'	0.6 at 840'
Leucadia (SD-0690)	560 to 1,230	0.7 at 880'	0.7 at 860'	0.6 at 830'	0.7 at 860'
Moonlight Beach (SD-0670)	580 to 1,210	0.4 at 720'	0.3 at 720'	0.4 at 720'	0.3 at 720'
Cardiff (SD-0630)	530 to 1,160	0.3 at 760'	0.2 at 760'	0.3 at 770'	0.2 at 770'
Solana Beach (SD-0600)	410 to 1,330	0.5 at 580'	0.4 at 570'	1.1 at 560'	0.9 at 540'
Torrey Pines (TP-0520)	320 to 1,390	0.6 at 730'	0.6 at 730'	1.0 at 370'	1.0 at 370'
Imperial Beach (SS-0020)	300 to 800	0.5 at 700'	0.4 at 700'	1.8 at 748'	1.3 at 748'

(1) At end of year 1, assuming average wave conditions

Littoral Processes

For each receiver site situated within the Oceanside Littoral Cell (i.e., Oceanside to Torrey Pines), sediment placed onshore would be distributed along the coast by net littoral sand transport to the south at approximately 100,000 to 250,000 cy per year. This downcoast net transport movement is the difference between upcoast and downcoast sand transport rates, which are predominantly driven by the angle of wave approach to shore. Minor reversals in the dominant sediment transport direction occur seasonally, and sometimes extend over longer periods of years.

Oceanside. Alternative 1 involves placing approximately 420,000 cy of dredged sediment at the Oceanside receiver site. Previous placement of fills on the beaches in Oceanside have not shown dramatic changes in the littoral process. Since 1955, over 13 mcy of fill have been placed onshore or nearshore in Oceanside by the USACE and the City, and annual sand placement of approximately 250,000 cy occurs from harbor dredging, with no adverse geologic or soils impacts recorded. These past beach fill quantities have been in the same range as the proposed fill or greater in quantity. Therefore, based on past fill events, placement of sediment onshore at the Oceanside receiver site would not be anticipated to impact the littoral transport process.

North Carlsbad. Alternative 1 would involve placing approximately 225,000 cy of dredged sediment at the proposed North Carlsbad receiver site. Previous placement of fills on beaches in Carlsbad has not shown dramatic changes in the littoral process. Over 12 million cy of fill has been placed onshore in Carlsbad (since 1955) as a result of maintenance dredging of Agua Hedionda Lagoon and enhancement of Batiquitos Lagoon. No adverse impacts to littoral transport have occurred. These past beach fills were in the same range or greater than the proposed fill quantity. Therefore, based on past fill events, placement of sediment onshore at North Carlsbad would not change the littoral transport process.

Remaining Oceanside Littoral Cell Receiver Sites. For the other receiver sites in the Oceanside Littoral Cell, no significant impacts would occur to the littoral process (i.e., South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, and Torrey Pines). The existing offshore sand berm would increase some amount after the first year, but that thickness would be less than a foot and typically in the range of less than one-half foot. Only minor increases in thickness to the respective offshore bars is anticipated. No significant impacts are anticipated. This alternative would also serve to temporarily stabilize fragile bluffs near the South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, and Torrey Pines receiver sites.

Imperial Beach. Alternative 1 would place approximately 120,000 cy of dredged sediment at the Imperial Beach receiver site. The length of the shoreline that is affected by the beach fill increases each year. The initial beach fill length is approximately 2,310 feet, and at post-project equilibrium the length of beach widening increases to approximately 8,000 feet. At the end of the first year the length of coast affected increases to approximately 10,000 feet and remains constant to the fifth year (Moffatt & Nichol 2010b).

The net longshore sediment transport at this receiver site is to the north, away from the Tijuana River inlet. This effect is caused by wave refraction over the relict Tijuana River delta offshore and to the north of the river and south of Imperial Beach, driving wave-induced currents northward at the project site (USACE 1991). Based on wave refraction effects occurring at Imperial Beach and longshore transport estimates provided by the USACE (1991), the fill would likely disperse northward. A sand berm would be expected to form in the shallow subtidal areas as a result of sediment transported into these zones, but no significant changes to the littoral process are expected as a result of implementation of Alternative 1.

<u>Borrow Sites</u>

For all three offshore borrow sites, dredge site deepening would alter local bathymetry; however, the proposed dredging action has been designed in accordance with recommendations based on geotechnical investigations of the proposed borrow sites and accepted engineering practice. As described in Section 1.1, the proposed dredging activities would take sand from borrow sites outside (deeper than) the depth of closure and place sand within the most eroded two of the three littoral cells. The new sand being introduced to the system is expected to generally remain within the respective littoral cells and enter the seasonal cycle of beach loss and gain. As such, the borrow sites would not intercept sand that typically rebuilds beaches in the summer.

No substantial effects on waves are anticipated from dredging at any borrow site. All three dredge sites are designed to be shallow and broad with gentle side slopes for a subtle bathymetric change. Because they would all be located outside of the closure depth (the zone of sediment transport) they are, by definition, outside of the zone of substantial wave energy impinging on the seabed. By being outside of this wave energy zone, waves are anticipated to pass over the seabed unattenuated by the moderate bathymetric depression made by dredging.

The prior RBSP I project offers a case-study of a borrow site with abrupt bathymetric change but still no measurable wave effect. The SO-7 borrow site off Batiquitos Lagoon provided approximately 1.1 mcy of material for RBSP I with sand dredged and placed on North County beaches from Oceanside through Encinitas. The dredge area was approximately 2,500 feet directly offshore the Batiquitos Lagoon mouth. It was 25 feet deep and conical in shape over a relatively small area. This is in contrast to the proposed shallower dredge areas for RBSP II. The beaches adjacent to SO-7 were monitored after construction and up to the present. No discernible changes have occurred to the beaches, to waves approaching the beaches, or to the lagoon mouth. Similarly, no substantial changes to wave energy or wave properties are anticipated to occur from RBSP II project dredging.

No significant geology or soils impacts are anticipated to occur to the dredge borrow sites or the shoreline with implementation of Alternative 1.

Mitigation Measures for Alternative 1

As no significant impacts have been identified, no mitigation measures would be necessary.

4.1.3 Alternative 2

Impacts of Alternative 2

Receiver Sites

Under this alternative, 11 receiver sites would receive sand (refer to Table 2-2). At the receiver sites proposed under Alternative 1, impacts would be similar. South Carlsbad South would also receive sand under this alternative, but similar to the discussion above for South Carlsbad North, no significant impacts to the littoral process are anticipated. Table 4.1-1 shows time estimates for the erosion of sand replenishment fills. Even though different amounts of sand are proposed for some receiver sites under Alternative 2, the information given in the table for the receiver sites proposed under Alternative 2 is not expected to substantially differ from Alternative 1. Increases in the offshore sandbars for the receiver sites where more sand is proposed than under Alternative 1 (i.e., South Carlsbad North, Solana Beach, and Imperial Beach) would be short term and would not cause significant geology and soils impacts. Accordingly, impacts would not be significant. Sand placement in spring would have the same benefits as described for Alternative 1.

Borrow Sites

Similar impacts to geology and soils would occur under this alternative as described for Alternative 1. The same borrow sites would be used under this alternative but at different quantities. The proposed dredging activities would take sand from borrow sites outside (deeper than) the depth of closure and place sand within the most eroded two of the three littoral cells. The new sand being introduced to the system is expected to remain within the respective littoral cells and enter the seasonal cycle of beach loss and gain. As such, the borrow sites would not intercept sand that typically moves back and forth to the beach; they would not detract from normal littoral processes that typically rebuild beaches in the summer. No significant geology and soils impacts are anticipated to occur to the dredge borrow sites with implementation of Alternative 2.

Mitigation Measures for Alternative 2

No significant impacts have been identified, and no mitigation measures are necessary for Alternative 2.

4.1.4 No Project/No Federal Action Alternative

Under the No Project Alternative, no fill would be dredged from the offshore borrow sites, and no sand would be placed on the proposed receiver beaches. The receiver beaches would continue to erode.

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4.2 COASTAL WETLANDS

Coastal wetlands (creeks, rivers, estuaries, lagoons) in north San Diego County vary from having inlets that are always open, intermittently open, or closed to tidal flows. Coastal wetlands are natural sediment sinks for littoral sands moving along the coast and also receive sediment from surrounding watersheds. Ongoing maintenance programs are implemented at many of the coastal wetlands in the region to remove excess sediment if it results in inlet closure (Section 3.2). Inlet closures reduce water quality and may degrade habitat quality and alter ecological communities when persistent. Accelerated rates of sedimentation also may degrade habitat quality and reduce biological diversity. Impacts are evaluated based on the potential for water quality impacts during construction and predicted estimates of sedimentation attributable to the project (Appendix C; Appendix G). In addition, the estimates are compared with results of monitoring from RBSP I.

Potential sedimentation due to the project was predicted based on a methodology developed in coordination with the lagoon entities concurrent with release of the Draft EIR/EA for public review. Each lagoon was evaluated individually in a series of meetings with each lagoon management entity. Generally, sedimentation predicted at each lagoon identified volumes from adjacent receiver sites that were assumed to travel alongshore north and south depending on general overall current patterns. It is anticipated that these volumes predicted to move alongshore would eventually reach the lagoon mouth, and a specific percentage of sand is anticipated to be entrained into each lagoon inlet based on the hydraulic conditions at each lagoon mouth, as reflected by historic dredging and survey records. Predicted volume estimates are conservative and could occur over the course of the project lifespan (sand was anticipated to reach lagoon inlets within 6 years after project implementation) and were not identified specific to timing. SANDAG has committed to provide funding to offset these potential predicted volumes, similar to RBSP I, in lieu of monitoring actual sedimentation accumulation, which could be difficult to distinguish from natural sand transport. Ultimate funds would be based on actual sand volumes placed at each receiver site, as calculated using the agreed upon methodology described above. Funding would be provided to each entity and/or agency responsible for lagoon maintenance upon completion of construction and no later than the end of 2012. Predicted potential sedimentation volumes ande compensation estimates are identified in Table 4.2-1. Specific meetings and the methodology are discussed in more detail in Appendix G.

Table 4.2-1
Potential Estimated Lagoon Shoaling and Compensation Estimates

Lagoon	Alternative 1		Alternative 2	
	Estimated Sand Shoaling Volume (cubic yards)	Estimated Cost to be paid to Lagoon Management Entity[1]	Estimated Sand Shoaling Volume (cubic yards)	Estimated Cost to be paid to Lagoon Management Entity
Agua Hedionda	0	0	0	0
Batiquitos	25,700	$245,800	40,700	$389,362
San Elijo	10,000	$32,600	10,000	$32,600
San Dieguito	4,200	$20,076	10,300	$49,234
Los Peñasquitos	10,200	$24,650	10,200	$24,650

[1] Funding amounts have been calculated based on proposed placement volumes, which may differ than those ultimately placed. Final compensation would be based on actual volumes placed at each relevant receiver site and would be provided to the appropriate management entity upon the completion of construction.

The current general lagoon condition observation and analysis program would be continued to provide updated information regarding lagoon inlet conditions and maintenance, but would be reduced relative to RBSPI based on lessons learned. Lagoon monitoring would rely primarily on an assessment of lagoon closure and maintenance records as a proxy for a change in sedimentation or lagoon performance relative to the historical condition. Direct observations in the form of semi-annual aerial photography and monthly ground photographs also would be obtained.

4.2.1 Significance Criteria

Potential impacts to coastal wetlands would be significant if sand accretion attributable to the project:

- increases the rate of inlet closures or frequency of inlet maintenance above historical occurrences at any lagoon, river, or creek mouth;
- substantially increases the volume of sedimentation beyond that which historically occurs based on ongoing maintenance activities; or
- increases turbidity and results in adverse effects to water quality in the water body.

Although incremental shoaling may occur, the first two criteria would identify an effect as significant only if that shoaling results in additional maintenance frequency (not removal of larger volumes) or substantially increased sedimentation. With respect to the last criterion, occasional or infrequent exceedances of water quality objectives that do not result in adverse effects to biological resources would not be considered significant.

4.2.2 Alternative 1

This analysis focuses on the coastal lagoons and river mouths along the coast that would be located near the potential receiver sites and is organized by water body, in geographic order from north to south. Nearby receiver sites are identified as appropriate.

No direct impacts to coastal lagoons would occur from the project, which proposes to dredge sands from offshore borrow sites and replenish beaches away from lagoon mouths. Any potential impacts would be related to indirect sedimentation or turbidity. The season of construction, spring or late summer, would not change the conclusions in the analysis.

Impacts of Alternative 1

San Luis Rey River

No impacts to water quality of the San Luis Rey River are anticipated from the project. The receiver site is more than 1 mile downcoast of the river and turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet.

The same volume of sand would be placed at the Oceanside receiver site with RBSP II as placed with RBSP I. It is anticipated that Alternative 1 would have little effect on sedimentation at the river mouth. Approximately 6 inches of sand deposition would occur at the river mouth (10 cy) following construction, assuming 40% of the fill quantity moves north from the Oceanside receiver site and disperses evenly over an area of beach approximately 7,500 feet long and 1,000 feet wide between Wisconsin Avenue and the river mouth. The changes in beach width and sand volume are expected to be with the range of historically observed values and would be within natural seasonal and annual variability. A sandbar normally forms at the mouth and culverts under the existing Pacific Street crossing are designed to carry tidal and low flow drainage as well as stormwater flows. The City of Oceanside maintains the Pacific Street stormwater outlet on an as-needed basis for flood control. The project would not be expected to increase ongoing maintenance requirements. Therefore, potential impacts from sedimentation would be less than significant.

Loma Alta Creek/Slough

Loma Alta Creek is a seasonal freshwater creek that discharges into the ocean near the south end of the proposed Oceanside receiver site. The City of Oceanside constructs a sand berm in front of the creek to prevent flow between Memorial Day and Labor Day, and during the wet season excavates a temporary channel to facilitate stream flows to the ocean for flood control. Turbidity generated during construction of the receiver site would not affect the creek. The sand slurry would be pumped behind a training dike that would slow down and direct the flow of return waters seaward. Because the City currently maintains the creek outlet on an as-needed basis and keeps it closed during the summer, no impact to creek habitat from sand placement on the fronting beach would occur.

Temporary post-project beach widening may require the City to excavate a relatively longer winter discharge channel. Historically, beach widths near the outlet of the creek have ranged from 42 to 103 feet since 1984 and the beach was 74 feet at that location in fall 2000. Short-term (less than 5 years) beach widening on the order of 30 to 100 feet compared to pre-project conditions occurred after implementation of RBSP I (Coastal Frontiers 2006). The fall 2009 beach width was similar to pre-RBSP I widths (Coastal Frontiers 2010). Similar temporary beach width changes are anticipated since the proposed Alternative 1 sand volume is similar to the RBSP I volume. Such changes are within historical range of beach widths and would not substantially affect ongoing creek maintenance practices. Therefore, potential impacts from sedimentation would be less than significant.

Buena Vista Lagoon

Buena Vista Lagoon is closed to tidal influence by a man-made weir. The City of Oceanside maintains a discharge outlet to the ocean for flood control. Similar to the evaluation for Loma Alta Creek, no impacts to water or habitat quality within Buena Vista Lagoon would occur. Historically, beach widths located near the weir have ranged from 74 to 139 feet since 1989 and width was 120 feet at that location in fall 2000. Sustained beach widening of approximately 30 to 40 feet has occurred at that location since RBSP I (Coastal Frontiers 2006, 2010). The Alternative 1 proposed sand volume is the same as the RBSP I volume. Additional beach widening may occur, but width increases on the order of 50 to 100 feet, if they were to occur, would not substantially exceed the historical range of beach widths and would not substantially affect ongoing flood control maintenance practices. Therefore, potential impacts from sedimentation would be less than significant.

Agua Hedionda Lagoon

The jetty stabilized lagoon inlet is continuously open and sedimentation from littoral transport occurs within the lagoon under existing conditions. Routine maintenance dredging typically is conducted every 2 years.

The ocean inlet to Agua Hedionda Lagoon is located approximately 0.7 mile south of the proposed North Carlsbad receiver site and approximately 1.8 miles north of the proposed South Carlsbad North receiver site. Turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet, and are not expected to affect the lagoon.

Under Alternative 1, the same volumes would be placed at Oceanside, North Carlsbad, and South Carlsbad North receiver sites as implemented with RBSP I. Based on an assessment of dredging records for maintenance activities conducted prior to and following RBSP I, Alternative 1 is not expected to increase sand influx to the lagoon. During the seven years prior to RBSP I, the lagoon was dredged on four occasion (quantities ranged from 197,000 to 443,000 cy), yielding an annualized average of 182,000 cy/year (Coastal Frontiers 2010). Maintenance dredge volumes after RBSP I ranged from 229,000 to 375,000 cy, representing an annualized average of 168,000 cy/year over the 8-year period between 2001 and 2009. Comparison of the two dredging rates, which can be used as a proxy for sedimentation rates, suggests that the impact of RBSP I was negligible.

Based on the forgoing assessment, the estimated sand influx from Alternative 1 would not increase sand inflow to the lagoon and no substantial change to ongoing dredge maintenance volumes or practices is anticipated.

Batiquitos Lagoon

A major restoration project was conducted at Batiquitos Lagoon between 1994 and 1997, and consisted of stabilizing the entrance with jetties and dredging 2.0 mcy of sand from the wetlands. The ocean inlet at Batiquitos Lagoon remains open continuously and is subject to sedimentation under existing conditions. Maintenance dredging is performed periodically.

The Batiquitos receiver site boundaries range from approximately 0.1 to 0.5 mile downcoast of the lagoon entrance. Turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet. There is a low potential for turbidity to enter the lagoon under northward current flow. The potential for this would be greater when construction occurs at the site's northern boundary and would diminish toward the southern boundary with greater distance from the inlet. If project-related turbidity enters the lagoon, particulate concentrations would be low given the distance to the lagoon and rapid settling rate of the predominantly sandy material. In addition, elevated turbidity levels would be temporary. The construction period would span 12 days and the potential for turbidity to enter the lagoon would not span more than a few days. Therefore, potential impacts to water quality would be less than significant.

The same volumes would be placed at the Batiquitos receiver site with Alternative 1 as implemented with RBSP I. The major restoration effort was completed at this site shortly before RBSP I, and basin modifications were implemented approximately two years after RBSP I. As a result, comparison of dredging rates during the four years preceding RBSP I (16,000 cy/yr) and the six years following RBSP I (24,000 cy/yr) does not provide a meaningful basis to evaluate the impact the project (Coastal Frontiers 2010).

Alternative 1 is not anticipated to significantly increase sand influx to the lagoon beyond the range of natural conditions because significant additional shoaling was not observed from RBSP I. The lagoon may be dredged in 2011 and have more capacity to receive sand than presently exists, but additional sand from RBSP II should only nominally affect shoaling. An estimated 25,700 cy of sand over 6 years for Alternative 1 is predicted. While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to CDFG to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant. Potential cumulative effects of sand placement on the beach downcoast of the lagoon are described in Section 5.2.2.

San Elijo Lagoon

The ocean inlet at San Elijo Lagoon is not stabilized and is subject to closure due to its relatively small tidal prism and frequent blockage by cobbles. Periodic dredging is conducted by the San Elijo Lagoon Conservancy to mechanically open or enlarge the lagoon entrance channel. The San Elijo Lagoon Conservancy experimented with different types of inlet openings between 1994 and 1999 prior to RBSP I, and received an endowment in 2000 to maintain the inlet open to tidal flushing.

The ocean inlet is located more than 1,100 feet upcoast of the proposed Cardiff receiver site. As with the other lagoons, turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet. While there is a low potential for turbidity to enter the lagoon under northward current flow, particulate concentrations in the lagoon would be low given the distance to the lagoon and rapid settling rate of the predominantly sandy material. Therefore, potential impacts to water quality would be less than significant.

The same volume of sand would be placed at the Cardiff receiver site with Alternative 1 as placed under RBSP I. Inlet maintenance and closure records suggest a negligible impact attributable to RBSP I. While the annualized average maintenance dredge volume was greater after (22,000 cy/year) compared to before (15,000 cy/year) RBSP I, that difference is related in part to an increase in funding level rather than attributable to the project (Coastal Frontiers 2010). When only the endowment-funded dredging episodes are considered, the annualized average maintenance volumes are nearly identical (23,000 and 22,000 cy/year before and after RBSP, respectively). The lagoon was open 92% of the time during the 8-year period following RBSP I, greatly exceeding the historical average of 43% (Coastal Frontiers 2010). The frequency of channel closures following RBSP I (4.1 closures per year) was slightly lower than the historical average (4.4 closures per year). Similarly, frequency of channel maintenance (openings and enlargements) following RBSP I was lower than the historical average (1.5 and 2.9 times per year, respectively). The improved performance is likely attributable to the increased dredging within the lagoon made possible by the endowment funds.

Increased sedimentation to the lagoon from RBSP II is estimated at 10,000 cy of sand over 4 years (due to possible lagoon restoration at year 5). While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to the Lagoon Conservancy to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant.

San Dieguito Lagoon

San Dieguito Lagoon has an intermittently open inlet that is frequently subject to closure under existing conditions. Historically, the inlet has been opened on an as-needed basis for flood control. Recent restoration of the lagoon includes maintaining an open tidal inlet.

The inlet is located more than 3,000 feet downcoast of the proposed Solana Beach receiver site. Turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet, and are not expected to affect the lagoon. If project-related turbidity enters the lagoon, particulate concentrations would be very low given the distance to the lagoon and rapid settling rate of the predominantly sandy material. Therefore, potential impacts to water quality would be less than significant.

The same volume of sand would be placed at the Solana Beach receiver site with Alternative 1 as implemented with RBSP I. RBSP I monitoring results suggest that material from the Del Mar fill migrated north during summer 2001 (shortly after placement), and may have contributed to the closure of the San Dieguito entrance channel in November 2001. A similar outcome is not anticipated for RBSP II because the Del Mar fill is not included in the project. Despite the early closure in 2001, which may have been attributable to material from the Del Mar fill, the lagoon stayed open approximately the same time period before (77%) and after RBSP I (75%) (Coastal Frontiers 2010). The frequencies of channel closure (1.6 times per year) and mechanical opening (0.8 times per year) during the eight-year period following RBSP I exceeded the corresponding historical averages (0.6 times per year in both cases). The comparatively high closure frequency resulted largely from the nine closures that occurred during the 2006 Monitoring Year (Coastal Frontiers 2010). The entrance channel opened naturally soon after eight of these closures, with the lagoon closed to tidal exchange for a total of only 24 days.

Based on the findings from RBSP I, it is anticipated that impacts at San Dieguito Lagoon attributable to Alternative 1 would be less substantial than RBSP I by virtue of elimination of the Del Mar fill from RBSP II. Any sand inflow from RBSP II would be small, an estimated 4,200 cy over 6 years. While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to Southern California Edison to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant.

Los Peñasquitos Lagoon

The ocean inlet at Los Peñasquitos Lagoon is not stabilized and is subject to closure due to its relatively small tidal prism and frequent blockage by cobbles. The Los Peñasquitos Lagoon Foundation maintains an open lagoon mouth through the use of mechanical openings. The amount of excavated material varies between 2,000 and 15,000 cy.

The ocean inlet to Los Peñasquitos Lagoon is located approximately 1,200 feet north of the proposed Torrey Pines receiver site. As with the other lagoons, turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet. While there is a low potential for turbidity to enter the lagoon under northward current flow, particulate concentrations would be low given the distance to the lagoon and rapid settling rate of the predominantly sandy material. Therefore, potential impacts to water quality would be less than significant.

The same volume of sand would be placed at the Torrey Pines receiver site with Alternative 1 as implemented with RBSP I. The RBSP I monitoring results suggest that the project did not have a substantial effect on ongoing maintenance activities at Los Peñasquitos Lagoon. Comparison of the duration of time the lagoon was open to tidal flushing before (93%) and after (88%) RBSP I were similar (Coastal Frontiers 2010). The frequency of channel closure (1.6 times) and mechanical opening (1.4 times per year) after RBSP I were slightly less than prior to RBSP I (2.3 and 1.6 times per year, respectively).

Based on the findings from RBSP I, it is anticipated that impacts at Los Peñasquitos Lagoon attributable to Alternative 1 also would be minor. Due to proximity of the receiver site (Torrey Pines) to the lagoon, there may be an incremental increase in sediment flow toward the lagoon, an estimated 10,200 cy over 6 years. While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to the Lagoon Conservancy to offset estimated project-related sedimentation upon the completion of construction, if sand is placed at the Torrey Pines receiver site. Impacts would remain less than significant.

Tijuana Estuary

No impacts to water quality within the Tijuana Estuary are anticipated from the project. The receiver site is more than 1 mile north of the inlet and turbidity plumes from receiver site construction are anticipated to be localized, generally less than 300 feet. Migration of sand toward the Tijuana River mouth would be unlikely given the net longshore sediment transport rate being to the north. Therefore, no impacts to the estuary are anticipated from project related sedimentation.

Mitigation Measures for Alternative 1

Turbidity would not significantly affect any coastal lagoons; therefore, no mitigation would be necessary. Sedimentation estimates for RBSP II indicate that sediment transport from receiver sites would contribute to shoaling at specific coastal wetlands, but incremental shoaling is not anticipated to increase the frequency of required routine maintenance at individual lagoons. As discussed, SANDAG has committed to providing funds to individual lagoon management entities to offset estimated project-related sedimentation, and impacts would remain less than significant. No mitigation measures are required.

4.2.3 Alternative 2

Impacts of Alternative 2

Impacts to coastal wetlands associated with Alternative 2, which would place up to 2,703,000 cy, generally would be the same as those associated with Alternative 1, with the exception that additional sand volume would be placed at the South Carlsbad North, South Carlsbad South, Solana Beach, and Imperial Beach receiver sites.

Potential water quality and sedimentation impacts would be the same for all wetlands as described above for Alternative 1 except for Batiquitos Lagoon and San Dieguito Lagoon, as described below.

Batiquitos Lagoon

Under this alternative, South Carlsbad would receive an approximate 56% increase in sand, with about 60% placed at the South Carlsbad North receiver site and 40% placed at the South Carlsbad South receiver site. These receiver sites are located more than 1.5 miles upcoast from the lagoon entrance; therefore, turbidity during construction would not be expected to differ from that described for Alternative 1. Impacts would remain less than significant. However, these receiver sites in combination with other sites in Encinitas have the potential to influence sediment influx to the lagoon due to longshore transport.

Additional sand is proposed upcoast for Alternative 2 under RBSP II than Alternative 1. However, the quantity is relatively small (142,000 cubic yards) and the distance is far (1 mile). The net sand transport direction in North County is to the south, with a fairly substantial seasonal northward component. Therefore, only a portion of the added sand placed to the north may reach Batiquitos Lagoon, and increased effects from Alternative 2 are anticipated to be nominal. Additional sand from RBSP II is expected to total an estimated 40,700 cy over 6 years. While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to CDFG to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant.

San Dieguito Lagoon

Under this alternative, the fill at Solana Beach would increase by a factor of nearly 2.5. The expansion of the Solana Beach receiver site is to the north and the south, and the footprint is shifted closer to the lagoon relative to Alternative 1. However, the distance (approximately 2,000 feet) is still sufficient to reduce turbidity reaching the lagoon and impacts of turbidity to lagoon water quality would be less than significant.

The quantity of the Alternative 2 Solana Beach fill is comparable to the combined total of the RBSP I Solana Beach and Del Mar fills. As indicated previously, the Del Mar fill receiver site has been omitted from RBSP II. The RBSP I monitoring results suggest that the impact of 329,000 cy of nourishment (combined total of Solana Beach and Del Mar fills) placed in the vicinity of San Dieguito Lagoon was modest and short-lived (Coastal Frontiers 2010). However, in recognition that the net littoral transport is to the south, it is anticipated that the additional nourishment quantity at Solana Beach proposed under Alternative 2 may increase the possibility of entrance closures in the short term; a shoaling estimate of 10,300 cy over 6 years. While volumes dredged during routine maintenance may increase by a corresponding amount, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to Southern California Edison to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant.

San Luis Rey River, Loma Alta Creek, Buena Vista Lagoon, Aqua Hedionda Lagoon

The volume of sand at receiver sites at Oceanside and North Carlsbad and predicted impacts to these wetlands would be the same as under Alternative 1. Impacts to water quality would not be significant. No change to ongoing dredge maintenance volumes or practices is anticipated and impacts would be less than significant.

San Elijo Lagoon, Los Peñasquitos Lagoon

The volume of sand at receiver sites impacting these sites, Cardiff and Torrey Pines, would be the same as under Alternative 1. As such, impacts to water quality and lagoon maintenance requirements are anticipated to be identical to Alternative 1. Impacts to water quality would not be significant. While volumes dredged during routine maintenance may increase due to incremental shoaling, as discussed under Alternative 1, the project would not result in an increase in the required frequency of maintenance dredging. SANDAG has committed to providing funds to each lagoon to offset estimated project-related sedimentation upon the completion of construction. Impacts would remain less than significant.

Tijuana Estuary

Under this alternative, Imperial Beach would receive five times more material than under Alternative 1. However, the increased sediment would not significantly affect the estuary due to the prevailing northward current and no impacts are anticipated.

Mitigation Measures for Alternative 2

Turbidity would not significantly affect any coastal lagoons; therefore, no mitigation would be necessary. Sedimentation estimates for RBSP II indicate that sediment transport from receiver sites would contribute to shoaling at specific coastal wetlands, but incremental shoaling is not anticipated to increase the frequency of required routine maintenance at individual lagoons. As discussed, SANDAG has committed to providing funds to individual lagoon management entities to offset estimated project-related sedimentation, and impacts would remain less than significant. No mitigation measures are required.

4.2.4 <u>No Project/No Federal Action Alternative</u>

Under this alternative, there would be no potential for turbidity impacts or change to lagoon sedimentation volumes or lagoon mouth closures above the current patterns.

4.3 WATER RESOURCES

Impacts to water resources from the proposed project are addressed by evaluating the potential for changes to the physical and chemical characteristics of water and sediments at the borrow and receiver beach sites, as well as those associated with potential leaks or spills from in-water construction equipment. The complete technical analysis is included as Appendix C. This section summarizes the potential impacts in terms of receiver sites, borrow sites, and other construction issues.

4.3.1 Significance Criteria

An impact to water resources would be significant if it would result in conditions that:

- consistently exceed numerical or narrative water quality objectives in the Basin Plan, dredging permit, or water quality certification, otherwise interfere with beneficial uses; or
- cause toxicity, bioaccumulation of pollutants to levels that are harmful to aquatic life or humans.

With reference to the first criterion, occasional or infrequent exceedances of water quality objectives that do not result in adverse effects to marine organisms would not be considered significant. This is because some variability in the magnitude of changes to water quality is expected, due to the natural range in the texture of dredged materials and rates of dispersion, as related to wave and current conditions.

4.3.2 Alternative 1

Impacts of Alternative 1

Borrow Sites

Alternative 1 would remove up to 1,755,000 cy of sediments from three offshore borrow sites. Two types of hydraulic dredges are being considered for the project: cutterhead suction dredge and hopper dredge, as described in Section 2.4. All dredging projects resuspend bottom sediments (Bridges et al. 2008). Resuspension is defined as the process by which bedded sediments are dislodged from the seafloor and dispersed into the water column. Sediment resuspension occurs as a direct result of the dredge, as well as related activities associated with anchor (e.g., for mono buoy) or pipeline placement, spillage/overflow, and prop wash. With a cutterhead dredge, plumes are generated in near-bottom water layers, whereas with a hopper dredge, plumes are generated in near-bottom waters as well as surface waters as a result of overflows. Resuspension rates vary with dredge type. For a cutterhead dredge, maximum resuspension rates are generally less than 0.5% (Bridges et al. 2008).

Suspended sediments form plumes that are transported in a downcurrent direction away from the dredging site. The behavior and fate of suspended sediment plumes can vary substantially depending on the nature of the dredging operations, characteristics of the bottom sediments, and current patterns and oceanographic conditions. Regardless, transport of suspended sediments generally can be characterized at three zones (Bridges et al. 2008):

- *Initial mixing zone*: the area where dredging 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 dredge;
- *Far-field zone*: the area where the total load in the plume is slowing and advective diffusion is the same order of magnitude as particle settling.

Plumes dissipate with time and distance from the dredging site due to particle settling and mixing/dilution with the adjacent water masses. In general, the initial mixing zone is associated with the area in the immediate vicinity of the dredge, whereas the transition between the near-field to the far-field zones typically occurs within 330 feet of the dredging operation. The location in the far-field zone at which the plume is no longer distinguishable from background conditions varies in relation to the magnitude of the differences in turbidity and suspended sediment levels in the plume and adjacent receiving waters. Turbidity plumes and sedimentation are greatly influenced by grain size characteristics of the dredged material. Generally, sand-sized particles settle much more rapidly than silty sediments.

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, particularly when the bottom sediments consist of coarse-grained, rapid-settling particles and a natural density gradient (i.e., pycnocline) is present in the water column that limits vertical mixing. In contrast, fine-grained bottom sediments disturbed during winter, when the seasonal pycnocline is absent, may be distributed over a relatively greater portion of the water column. Similarly, plumes generated by overflow from a hopper dredge can extend throughout the water column as particles settle at varying rates depending on particle size and depth-varying current speeds.

Sediment plumes have elevated suspended solids concentrations that result in higher turbidity levels, reduced water clarity/light transmittance, and discoloration. In general, resuspended sediments with a high chemical oxygen demand and/or elevated contaminant concentrations can result in reduced dissolved oxygen concentrations, release of chemical contaminants, or resolubilization of nutrients. However, as discussed in Section 3.3, the borrow site sediments are primarily clean sands that would not generate an oxygen demand or release contaminants, nutrients, or bacteria to adjacent waters. Thus, the primary changes to water quality expected from dredging operations associated with Alternative 1 are expected to be related to temporary and localized increases in turbidity and suspended sediment concentrations.

Given the similarities between borrow sites in the physical and chemical characteristics of the bottom sediments, impacts discussed below are expected to apply to each borrow site, and site-specific differences in water quality impacts are expected to be negligible.

Turbidity and Suspended Sediment Concentrations

Bottom sediments suspended by dredging operations would result in plumes with relatively elevated turbidity levels and suspended sediment concentrations compared with those in adjacent water masses. Suspended, sand-sized particles would tend to settle through the 40- to 85-foot depths of the water column at the borrow sites and reach the bottom within minutes, whereas finer silt/clay particles could take up to several hours to settle at the depths of the borrow sites. However, total suspended sediment concentrations would be expected to be relatively low due to the relatively low percentages of fines (2 to 6%) in borrow sediments.

The maximum typical downcurrent extent of turbidity plumes generated by Alternative 1 was estimated based on the range of the median grain size diameters of the borrow site sediments, representative current speeds and water depths, and the assumption that the particles would be resuspended to the surface as with a hopper dredge (Table 4.3-1). Additionally, an average plume transport distance was calculated based on the overall mean of the median grain size diameters and an average current speed of 0.2 knots. Under these conditions, typical near-surface turbidity plumes generated from a hopper dredge are estimated to extend about 50 to 250 feet downcurrent from the dredge (Table 4.3-1). Under maximum current conditions, plumes could extend up to 300 to 600 feet from the dredge site, although suspended sediment concentration would substantially decrease

Table 4.3-1
Estimated Range and Average Turbidity Plumes as a Result of Dredging the Borrow Sites

Borrow Site	Depth (feet) MLLW	Range of Median Grain Size Diameters (mm) *	Range of Settling Velocities (feet/sec)	Estimated Downcurrent Plume Distance (feet) Range[1,2] According to Depth and Current Speed, Knots (feet/sec): Typical 0.1 (0.17) to 0.4 (0.66)	Maximum 0.5 (0.85) to 1.0 (1.5)	Overall Mean Grain Size Diameter (mm) **	Mean Settling Velocity (feet/sec)	Estimated Average Downcurrent Plume Distance (feet) [1,2] Range According to Depth and Average Current Speed, Knots (feet/sec): Average 0.2 (0.34)
SO-6	60–80	0.26–0.59	0.10–0.29	50–250	230–600	0.35	0.15	95–130
SO-5	50–80	0.43–0.63	0.18–0.29	20–120	110–300	0.59	0.27	40–65
MB-1	55–65	0.34–0.62	0.15–0.29	40–220	220–500	0.51	0.23	85–110

Settling velocities based on Graf 1971.
*Range of median grain size diameters for sand and finer materials reported for cores (and/or core layers) characterizing the dredge target area.
** Overall median of the mean grain size diameters reported for cores (and/or core layers by taking into account depth of layer) characterizing the dredge target area.

Note 1: Estimated plume distance on any given day will vary according to the grain size characteristics of the material dredged during that day, turbulence, current speed, and to what depth in the water column the particles are resuspended. Use of the overall mean grain size diameter represents an indication of average plume extent. Silt/clays resuspended during dredging will travel longer distances than indicated in the table. The estimated plume distances were calculated by the following formula: water depth/particle settling velocity x current speed (feet/sec).

Note 2: The extent of the turbidity plume will vary according to equipment used. Turbidity will be more localized to the dredge location and the lower water column with a cutterhead suction dredge, and will cover a greater distance throughout the water column with hopper dredge overflows. The estimated plume distance assumes particles are initially resuspended to the surface. The estimated downcurrent plume distances may be reasonable for the hopper dredge with overflows at the dredge location. If the hopper dredge overflows while in transit to the mono buoy location, the plume will have a greater width that will decrease in downcurrent distance as water depth decreases. The downcurrent plume distance estimate is probably overly conservative for the cutterhead dredge, which resuspends little material to the surface. If it is assumed that particulates will mainly be confined to half the water depth at the borrow site using a cutterhead dredge, then the estimated plume distances would be approximately half the amounts given in the table for the cutterhead dredge.

with increasing distance from the dredge. The horizontal extent of turbidity plumes would be substantially less with a cutterhead dredge since resuspension would be largely confined to the lower water column.

While the estimates provide an indication of the potential areal extent of expected turbidity, the actual behavior and fate of turbidity plumes could vary on any given day depending on differences in characteristics of the borrow site sediments, type of dredge used and dredging production rate, and oceanographic conditions. For the most part, turbidity plumes would be transported in directions parallel to the shoreline and aligned with the local bathymetry given the predominant longshore current flows. However, tidal and wind-driven surface motions, cross-shelf flows, and localized discharges from coastal wetlands would promote plume dispersion in cross-shelf directions.

During RBSP I, dredging at borrow sites SO-6, SO-5, and MB-1 resulted in surface turbidity plumes within 250 to 500 feet downcurrent of the hopper dredge (AMEC 2002). Turbidity measurements within the plume sometimes were greater than 20% above ambient, and transparency (as measured by a Secchi disk) was less than 3 feet during sampling events at SO-6, SO-5, and MB-1. However, the extent of reduced transparency was localized and the magnitude of the turbidity levels within 200 to 500 feet from the dredge was low (less than 20 nephelometric turbidity units [NTU]). Turbid conditions generally dissipated below the criteria within 5 to 10 minutes after the hopper dredge moved from the borrow area. Additionally, the surface areas of the plumes were below the 2.47-acre USFWS criteria for protection of least tern foraging (AMEC 2002). These empirical measurements from previous dredging events at the borrow sites are consistent with the estimates of plume size predicted for the proposed alternatives.

Typically, dredging permits require real-time monitoring of turbidity levels at specified distances (e.g., 250, 500, 1,000, 1,500 feet) up- and downcurrent of the dredging activity, and specify limits based on elevated levels relative to background conditions; for example, turbidity levels at a distance of 1,000 to 1,500 feet downcurrent from the dredging operation cannot exceed background levels by more than 20%. For RBSP I, the 404 and 401 permits specified that turbidity levels could not be more than 20% above ambient conditions and light transmittance could not be reduced to the extent that a Secchi disk suspended 3 feet below the water surface was not visible within an area greater than 2.47 acres (AMEC 2002). Using the estimated dispersion distances described above, as well as the empirical results from water quality monitoring during RBSP I, it is likely that turbidity plumes would extend within 300 to 500 feet from the dredging operation, although the ability to distinguish the plume from the natural background would likely vary depending on a number of factors related to local weather and oceanographic conditions at the borrow site and the dredging operations.

Given the settling velocities of the coarser grain size fractions represented by the borrow site sediments, and the water depths at the borrow sites, sediments suspended by the dredging operations are expected to settle to the bottom within a period of minutes to less than 1 hour.

Because of the continuous operation of the cutterhead dredge, reductions in water clarity would occur within the area influenced by the turbidity plume for the period the dredge is operating. The dredging area within the borrow sites is generally large, so while dredging would be continuous it is unlikely that a turbidity plume would cover any given area for more than a few days given the variability in the subtidal current patterns.

In contrast, dredging would not be continuous with a hopper dredge but instead would involve cycles of dredging interspersed with transit time to the mono buoy location to pump sands to the beach. When sands are dredged at the borrow sites, the turbidity plume would dissipate once the hopper dredge moved away from the site given the rapid settling velocities of the majority of the dredged material (e.g., most particles reaching the bottom within minutes). Thus, while the hopper dredge has the potential to reduce water clarity over a greater area than the cutterhead dredge due to surface overflows, the time intervals between dredge cycles and associated transit would result in turbidity pulses of shorter duration in a given area. It should be kept in mind that overflow of the hopper dredge while underway to the mono buoy location would extend the width of the plume shoreward; however, the downcurrent extent of the plume would be much less than at the borrow site where most overflows occur and water depths are greater.

The duration of the turbidity plumes also would relate to the total volume of material to be dredged, daily production rate, and schedule of the dredging operation (see Table 2-5). Although some borrow sites would serve more than one receiver beach site and would require several weeks to dredge, the dredging would not be continuous. A 2- to 4-day mobilization effort would be required prior to sand placement at each receiver beach site; therefore, dredging at the borrow sites would be conducted in blocks of time associated with each receiver site, as identified in Table 2-5. Thus, turbidity in nearshore waters would dissipate and return to background levels between dredging intervals for the different receiver sites.

Dissolved Oxygen

Resuspension of bottom sediments can consume oxygen, resulting in decreases in dissolved oxygen concentration. However, sediments at the borrow sites consist primarily of coarse-grained sands with low oxygen demand, as indicated by low TOC concentrations and nondetectable levels of dissolved sulfides. Water quality monitoring at the borrow sites during RBSP I did not detect any exceedances in permit limits for dissolved oxygen concentrations (AMEC 2002). Given the similarity, resuspension of bottom sediments during dredging for Alternative 1 of RBSP II would not substantially reduce dissolved oxygen concentrations in site waters. Further, natural mixing from currents, winds, and waves would minimize the potential for dredging operations at the borrow sites to reduce the dissolved oxygen concentrations below Basin Plan levels.

pH

Dredging clean marine sediments from the borrow sites would not add or reintroduce any materials to the ocean with the potential for altering the pH of borrow site waters. Further, natural mixing from currents, winds, and waves would minimize the potential for dredging operations at the borrow sites to alter the pH of site waters to an extent that would exceed the Basin Plan limits. Water quality monitoring at the borrow sites during RBSP I did not detect any exceedances in permit limits for pH (AMEC 2002). Thus, dredging at the borrow sites for Alternative 1 would not cause significant changes in pH levels.

Contaminants

The borrow site sediments consist of clean sands with background metal concentrations and nondetectable levels of trace organic contaminants. Consequently, the potential for sediment resuspension to result in higher dissolved or particulate contaminant concentrations in borrow site waters, significant toxicity to marine organisms, or exposure of marine organisms to bioaccumulative materials is negligible. This indicates little potential for biological effects (i.e., toxicity or contaminant bioaccumulation) or human health effects from contaminant releases during sediment dredging operations. Thus, dredging at the borrow sites would not cause exceedances of Basin Plan limits.

Nutrients

Sediment samples collected in October–November 2009 were not analyzed for nutrient concentrations. Nevertheless, given the predominantly sandy nature of the borrow site sediments and mixing and diluting capacities of the coastal environment, any increases in nutrients associated with dredging-induced resuspension of bottom sediments would be short term and unlikely to result in objectionable plankton blooms.

Bacteria

Sediment samples collected in October–November 2009 were not analyzed for fecal indicator bacteria concentrations. The borrow sites are located inshore and thousands of feet from wastewater outfalls. Site SO-6 is the closest and is over 4,000 feet inshore and northeast of the discharge location of the San Elijo outfall. Other borrow sites are located more than 2 to greater than 5 miles (MB-1) from wastewater outfalls. Because of the distance between the borrow sites and bacterial sources (i.e., wastewater outfalls), the poor survival of fecal indicator bacteria in the marine environment, and the grain size characteristics of the borrow site sediments, there is little potential for release of pathogens due to dredging. Monitoring during RBSP I showed that bacteria concentrations in the nearshore waters adjacent to the receiver beaches typically were below permit limits (AMEC 2002).

In summary, dredging of sands from the borrow sites would result in elevated turbidity levels and suspended sediment concentrations, but no appreciable changes in other water quality parameters, including dissolved oxygen, pH, nutrients, bacteria, or chemical contaminants. Factors considered in this assessment include the relatively localized nature of the expected turbidity plumes for the majority of the dredging period and rapid diluting capacity of the receiving environment. Water quality monitoring would be required as part of the Section 404 dredging permit and Section 401 water quality certification. If monitoring indicated that suspended particulate concentrations outside the zone of initial dilution exceeded permit limits, dredge operations would be modified to ensure compliance with the permit.

Receiver Sites

Sands dredged from the offshore borrow sites would be placed on the receiver beaches via pipelines discharging a sand/water slurry behind temporary training dikes constructed of sand. The training dikes would promote settling of sand out of the slurry and minimize turbidity of waters running off receiver sites into the surf zone. Because the borrow site sediments consist of clean sands, runoff from the receiver beaches would not contain contaminants, bacteria, excess nutrients, or other materials with a high oxygen demand, or otherwise degrade water quality in the surf zone. However, runoff waters may contain some suspended particles that did not settle out before the waters were released from behind the training dikes. Suspended sediments in the runoff may contribute to increased turbidity levels and discoloration of surface waters within the surf zone immediately adjacent to and downcurrent from the receiver beach.

The areal extent of turbidity plumes would depend on the runoff flow volumes, magnitude of the residual suspended particle concentrations in the runoff, wave and current conditions at the receiver beach, and background suspended sediment concentrations/turbidity levels in nearshore waters. Given the high sand content of the borrow site sediments, particle settling from the slurry is expected to be relatively rapid. Also, the background suspended sediment concentrations and turbidity levels of nearshore waters at the receiver beaches are expected to reflect turbulence levels related to wave and surf conditions; tidal and longshore current strengths and rip currents; and discharges from adjacent coastal rivers, lagoons, and stormdrains. In particular, discharges from coastal rivers following a winter storm event can generate plumes with elevated suspended sediments and turbidity levels that extend over tens to hundreds of square miles of the SCB (Nezlin et al. 2007).

Turbidity plumes associated with runoff from the receiver beaches would largely be confined to the surf zone area. However, in the presence of riptides or current jets from river or wetland discharges, some of the suspended sediments could be transported in an offshore direction and beyond the surf zone. Under these conditions, the plume would be transported and dispersed in a downcurrent direction, but likely at a lower speed due to reduced turbulence levels. Slower current speeds and reduced turbulence levels would also promote more rapid settling of suspended particles compared with those in the surf zone.

Estimates of plume dispersion distances from the receiver beaches, under typical and maximum current conditions, are shown in Table 4.3-2. The estimated plume distances were calculated for a range in water depths, particle settling velocities, and current speeds, as further described in Appendix C.

Under typical current conditions, the plumes would generally extend 100 feet or less from the receiver beach. The plume transport distance would be expected to be less than 300 feet. Estimated plume distance on any given day is expected to vary according to the grain size characteristics of the material dredged during that day, turbulence, current speed, and to what depth in the water column the particles are resuspended. Nevertheless, the estimated transport distances shown in Table 4.3-2 are considered reasonable conditions. Because none of the receiver beaches are in or adjacent to (i.e., within 3,100 feet) an Area of Special Biological Significance (ASBS), sand placement on the receiver beaches would not be expected to affect the natural water quality within an ASBS, even under maximum current conditions.

Table 4.3-2
Estimated Range and Average Turbidity Plumes as a Result of Construction of the Receiver Sites

Receiver Site	**Depth (feet) MLLW**	**Range of Median Grain Size Diameters (mm) from Borrow Site***	**Range of Settling Velocities (feet/sec)**	**Estimated Downcurrent Plume Distance (feet) Range[1] According to Depth and Current Speed** Knots (feet/sec) **Typical** 0.1 (0.17) to 0.9 (1.4)	**Maximum** 1.0 (1.5) to 2.0 (3.1)	**Overall Mean Grain Size Diameter (mm)**	**Mean Settling Velocity (feet/sec)**	**Estimated Average Downcurrent Plume Distance (feet)[1] Range According to Depth and Average Current Speed** Knots (feet/sec) **Average** 0.5 (0.85)
Oceanside, North Carlsbad	5–20	0.26–0.63	0.10–0.29	6–100	50–210	0.35–0.59	0.15–0.27	15–60
South Carlsbad, Batiquitos, Leucadia, Moonlight, Cardiff, Solana Beach, Torrey Pines	5–20	0.43–0.63	0.18–0.29	5–50	25–115	0.59	0.27	15–35
Imperial Beach	5–20	0.34–0.62	0.15–0.29	5–65	30–135	0.51	0.23	15–40

Settling velocities based on Graf 1971.
* Gravel-sized particles, which would rapidly settle, were not considered in the calculations.

Receiver site surveys conducted during RBSP I monitored turbidity in the surf zone during beach construction activities based on estimates of the length and distance offshore of the plumes as determined by an onshore observer. Turbidity plumes typically were confined to the surf zone adjacent to the receiver beaches, except when rip currents were present that transported portions of the plume offshore. In most cases, the horizontal extent of the plumes was less than 2.47 acres, which was the permit-specified areal limit for turbidity plumes to protect least tern foraging. Plume dimensions generally ranged from 100 to 328 feet long and 66 by 164 feet wide; on one occasion a plume of 984 feet long by 656 feet wide was measured but was short-lived after the training dike was lengthened and water content of the discharge was adjusted. Median grain sizes were less than proposed with this project. Therefore, empirical observations during RBSP I indicate that turbidity calculations for Alternative 1 appear reasonable. Additionally, bacteria concentrations in the nearshore waters adjacent to the receiver beaches typically were below the permit limits (AMEC 2002).

The water quality certification for the project may define limits for specific water quality parameters in receiving waters adjacent to the receiver beaches, in which case real-time monitoring would be required to document that the project complies with permit limits. If turbidity levels exceed the permit limits, measures would be taken to ensure compliance with the permit. Corrective measures may include modification of pumping rates to the beach or reconfiguration of the training dikes to increase the residency time of the slurry waters as a way to manage the suspended sediment concentrations in the runoff waters.

Turbidity plumes associated with runoff from the receiver beaches would persist for the duration of the sand placement operations. However, particle settling, mixing, and dilution processes occurring in the naturally energetic surf zone area would rapidly reduce the plumes to background conditions once the placement operations were completed. Thus, impacts to water quality from sand placement operations would be less than significant. Further, given the similarities in grain size between the borrow site and receiver beach sediments, and the general absence of chemical contaminants in the borrow site sediments, the sand placement operations would not result in significant changes or degradation of sediment quality at the receiver beaches. Consequently, the potential for significant toxicity to marine organisms, or exposure of marine organisms to bioaccumulative materials would be negligible. This indicates little potential for biological effects (i.e., toxicity or contaminant bioaccumulation) or human health effects with sand placement operations. Thus, sand placement at the receiver beaches would not cause exceedances of Basin Plan limits.

Oceanside and North Carlsbad

Impacts to water and sediment quality from placement of sands dredged from SO-6 at the Oceanside and North Carlsbad receiver beaches would be the same as for the general case described above. Given the similarities between the grain size distributions of the borrow site and receiver beach sediments, sand placement operations would not alter the texture or quality of the beach sands. Impacts are considered less than significant.

South Carlsbad (North and South), Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, Torrey Pines

Impacts to water and sediment quality from placement of sands dredged from SO-5 at the South Carlsbad, Encinitas, Solana Beach, and Torrey Pines receiver beaches would be the same as for the general case described above. Given the similarities between the grain size distributions of the borrow site and receiver beach sediments, sand placement operations would not alter the texture or quality of the beach sands. Impacts are considered less than significant.

Imperial Beach

Impacts to water and sediment quality from placement of sands dredged from MB-1 at the Imperial Beach receiver beach would be the same as for the general case described above. Given the similarities between the grain size distributions of the borrow site and receiver beach sediments, sand placement operations would not alter the texture or quality of the beach sands. Impacts are considered less than significant.

<u>Combined Turbidity (Borrow and Receiver Sites)</u>

Both the dredging and sand placement operations associated with Alternative 1 would generate turbidity plumes that would disperse due to particle settling, and natural mixing and dilution processes. Elevated suspended sediment concentrations, reduced water clarity (light transmittance), and discoloration of surface waters would be associated with the plumes. However, the suspended sediments would not contain toxic contaminants that would harm or bioaccumulate in aquatic organisms or humans, or otherwise affect beneficial uses. The spatial extent of the plumes would be limited, and changes to water quality associated with the plumes would not persist once dredging operations were completed, similar to the changes in water quality measured during RSBP I (AMEC 2002). Therefore, impacts to water quality from Alternative 1 would be less than significant.

Other Construction Issues

Use of a hopper dredge would require placement of anchor lines for the mono buoy. Regardless of the type of dredge used, pipelines would be required to transport the dredged sediments onto the receiver beaches. The use of the hopper dredge requires a pipeline from the mono buoy to the beach. The cutterhead dredge requires a pipeline from the dredge target area to the beach. The pipelines would be submerged through the surf zone. Anchoring and pipeline placement would disturb bottom sediment and result in short-term, localized turbidity given the sandy nature of nearshore sediments. Short-term impacts to water resources from anchoring or pipeline placement would be less than significant.

Operation of dredges and support vessels has the potential for introducing contaminants to the water at the borrow site location from minor spills and leaks from the vessel, and/or in the case of the hopper dredge while in transit to the mono buoy location. The potential for accidental discharge also could result from collision with or by another vessel. The probability of both types of accidental discharges is considered low. The dredging contractor would be required to develop a Spill Prevention Control and Counter-Measures Plan (SPCC) prior to initiating dredging and pumping operations. If a spill occurred, the contractor would utilize best management practices (BMPs) to prevent long-term degradation of water quality. For these reasons, impacts from accidental discharges would be expected to be less than significant, if they were to occur at all.

Mitigation Measures for Alternative 1

Dredging and sand placement operations for Alternative 1, conducted in compliance with permit conditions, would not result in significant impacts to water resources. Therefore, no mitigation measures are warranted.

4.3.3 Alternative 2

Impacts of Alternative 2

Impacts to water resources associated with Alternative 2, which would remove up to 2,703,000 cy of sediments, generally would be same as those associated with Alternative 1, with the exception that the duration of dredging operations at borrow sites SO-5 and MB-1 would be longer and the volumes of sands placed on some of the receiver beaches (South Carlsbad North and South, Solana Beach, and Imperial Beach) also would be greater.

Borrow Sites

Similar to Alternative 1, dredging operations associated with Alternative 2 would not cause toxicity or bioaccumulation of pollutants to levels that would be harmful to aquatic life or humans, or otherwise interfere with beneficial uses. Operations would result in formation of suspended sediment plumes, which would cause elevated turbidity, reduced water clarity, and discoloration. These plumes would disperse horizontally and vertically from the dredging site as influenced by natural current patterns and particle settling characteristics. The primary difference in water quality impacts at the borrow sites from Alternative 2 would be the comparatively longer dredging periods at borrow sites SO-5 and MB-1 required to dredge the larger sand volumes needed to satisfy the sand requirements for the individual receiver beaches.

Receiver Sites

Impacts to water resources associated with placement of dredged sands on receiver beaches for Alternative 2 would be the same as described for Alternative 1, with the exception that elevated turbidity conditions in the surf zone at some receiver beaches would persist for a proportionally longer period due to the greater sand volumes.

Due to the comparatively longer dredging period for Alternative 2, there would be a corresponding increase in the risk of a leak or spill of oil or fuels from the dredge and support vessels. Nevertheless, as with Alternative 1, the dredging contractor would be required to have an SPCC prior to initiating dredging and pumping operations. Consequently, impacts to water resources from Alternative 2 would be less than significant.

Mitigation Measures for Alternative 2

Dredging and sand placement operations for Alternative 2, conducted in compliance with permit conditions, would not result in significant impacts to water resources. Therefore, no mitigation measures are warranted.

4.3.4 No Project/No Federal Action Alternative

Under the No Project Alternative, dredging sediments from the borrow sites and sand placement at the receiver beaches would not occur. Consequently, there would not be any impacts to water or sediment quality.

4.4 BIOLOGICAL RESOURCES

Direct impacts to marine biological resources may occur through burial or smothering of organisms during sand placement at receiver sites, equipment damage to habitats or animals during construction activities, or removal of sediment and organisms at borrow sites during dredging. Indirect impacts may result from decreases in marine water quality associated with dredging and sand placement activities, sediment transport related to movement of sands from the receiver sites, noise from construction equipment, or interference of normal movement or behaviors of animals due to construction activities or operational effects. Indirect impacts may result in reduction in habitat quality, interference with foraging or impaired growth, diminished reproduction, or interruption of wildlife movement. Direct and indirect impacts from the project on biological resources are assessed in this section. Terrestrial noise impacts are addressed in more detail in Section 4.13.

Most effects would be similar regardless of when the project is constructed, although some effects are more sensitive depending on the time of year. This is because certain areas of coastal San Diego are breeding areas for species that are listed as endangered or threatened under state or federal endangered species acts. These impacts were considered in this impact assessment. The complete analysis is contained in Appendix C and summarized below.

4.4.1 Significance Criteria

Impacts to marine resources would be considered significant if:

- an individual or population of a threatened or endangered species is adversely affected as a result of the project;
- the project interferes substantially with the movement of resident or migratory fish or wildlife species;
- essential fish habitat (EFH) is lost or substantially degraded;
- long-term adverse impacts from sediment transport would result in the irreversible removal, disturbance, or destruction of sensitive aquatic habitats. Such sensitive habitats are defined to include high-relief reefs and vegetated low-relief reefs with one or more of the following indicator species: feather boa kelp (*Egregia menziesii*), giant kelp (*Macrocystis pyrifera*), surfgrass (*Phyllospadix* spp.), large sea fans (*Muricea* spp.), or sea palms (*Eisensia arborea*).

To determine whether an impact would be significant, the estimated impact acreages are compared to total hard bottom habitat within the same reef habitat categories offshore the jurisdictions in the study area, and the percentages of sensitive habitats potentially impacted are calculated for each alternative. The percentages of potentially impacted sensitive hard bottom habitats provide the basis of the qualitative assessment of whether the impact estimates are substantial. If a substantial reduction in sensitive habitat indicators occurs over the 4-year monitoring period due to long-term adverse impacts from sediment transport, a significant project-related impact would occur.

4.4.2 <u>Alternative 1</u>

The impact assessment is organized below according to receiver and borrow 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.

Beach nourishment would result in direct impacts due to sand placement within the receiver site footprints. Other direct impacts may result from construction vehicle or equipment damage during construction activities. Indirect impacts would occur from turbidity generated during construction of the receiver sites, construction noise and activity disturbance to wildlife, and transport of sand away from the site via natural coastal processes up and down the coast. After construction, sandy beach organisms would recover from the disturbance. For some beaches, the sandy beach habitat would be enhanced relative to preexisting conditions. Generally, wider beaches and deeper sand across seasons provide greater sandy beach habitat quality. These wider, more persistent beaches support functions for fish and wildlife more effectively than beaches where habitat quality is more variable, as a result of seasonal sand erosion and accretion cycles.

Receiver Sites – Direct Impacts

The primary direct impact associated with beach nourishment is burial of beach invertebrate animals (e.g., clams, sand crabs, worms) living within the substrate at the receiver site. Impacts to California grunion individuals or eggs have the potential to occur if sand placement or site mobilization activities take place within 10 to 14 days of a spawning run and grunion are present. Other direct impacts may result from equipment damage associated with placement of pipelines to pump sediment to the beaches, operation of vehicles to move and spread sand at the receiver sites, and movement of vehicles and equipment during access to and from the receiver site.

The area of direct impact to beach habitat and invertebrate resources was conservatively estimated by calculation of area that includes the entire fill site from the top of the back beach to the toe of the slope. Actual impact to biological resources would be less at some sites given that 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 150 acres of beach habitat would be disturbed by construction. 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 affect a single receiver site at any one time; therefore, receiver 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.

Sand Placement

Construction of the beach receiver sites would result in burial impacts to marine biota. During beach nourishment, large volumes of sand are placed above and through the intertidal zone, smothering benthic organisms. The loss of benthic organisms within the receiver site footprint is an expected and unavoidable impact of beach replenishment projects. Most invertebrates within the receiver site footprint are not expected to survive, but some mobile animals would be able to burrow out from the outer or leading edges of the beach fills where overburden depths are 2 feet or less.

Numerous studies have demonstrated that recovery of sandy beach invertebrates begins almost immediately after cessation of construction. Recovery occurs via two mechanisms—one by animals that migrate to the affected area from surrounding habitat, and the second from recruitment from plankton. Sandy beaches normally have higher invertebrate abundance in spring and summer coincident with 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. Recovery (e.g., species, abundance, biomass) periods on the order of weeks have been reported with projects completed in winter–early spring prior to the onset of the spring–early summer peak recruitment period. Complete recovery may take several months if construction is completed in summer–fall and recruitment is delayed until the next season. An indirect effect of the temporary reduction in sandy beach invertebrate populations would be a reduction in forage base for fish and shorebirds that feed upon invertebrates under appropriate tidal conditions. Nevertheless, colonization of the sands would begin almost immediately and the development of the invertebrate prey base would proceed naturally via the two mechanisms mentioned above and would be complete in less than 1 year (e.g., weeks to months). Due to the relatively small area affected, and the widespread occurrence and relatively rapid recovery rates of sandy beach invertebrates, direct impacts to marine invertebrates within the receiver site footprints are expected to be less than significant.

California grunion spawn on sandy beaches in the San Diego region March through August and have the potential to be affected by sand placement or construction activities. While grunion are not listed as threatened or endangered, efforts are recommended to minimize impacts to this managed fishery species. As described in Section 2.5, a habitat suitability survey would be conducted prior to construction and monitoring would occur during construction, as appropriate, to minimize impacts to the species. If grunion spawning is observed, SANDAG would coordinate with NMFS, CDFG, CCC, and USACE and proceed based on their direction.

It should be noted that additional or enhanced spawning habitat was provided by placing sand at several beaches with RBSP I (SAIC 2006), and RBSP II has the potential to again enhance or increase persistence of sandy beach habitat at erosive beaches. This would be beneficial for grunion at receiver sites where either dense cobble or narrow beach width limits spawning habitat under existing conditions. Incorporation of preconstruction suitability surveys and the monitoring plan into the project design would minimize effects to this species, and less than significant impacts would occur. A similar grunion monitoring program was implemented during construction of RBSP I to avoid significant impacts to grunion.

Pipeline/Equipment Placement

Placement of pipelines would occur across the beach face or along the back of the beach. No sensitive habitats occur in these areas within the onshore receiver sites. Several sites have rocky intertidal or subtidal reef areas in the vicinity, which would be avoided during placement of pipelines (see Section 2.5). A preconstruction survey would be conducted of all pipeline routes to ensure no sensitive resources would be directly impacted by the placement and, if necessary, pipelines would be rerouted to avoid direct impacts. This is consistent with the approach successfully used in RBSP I.

Vehicle access to each receiver site has the potential to result in direct impacts to invertebrates and grunion eggs if present. Vehicle effects on invertebrate biota generally are minor in the low and middle intertidal where invertebrates are buried by sand. During the grunion season, vehicle use has the potential to damage eggs in the upper intertidal, if eggs are present. Preconstruction habitat suitability assessment and monitoring, as described in Section 2.5, would be used to minimize adverse effects to grunion during their spawning season, and impacts would be less than significant.

Receiver Sites – Indirect Impacts

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

- forage reduction or alteration;
- disturbance, displacement, or interference;
- turbidity;
- sedimentation; and
- other construction issues.

In addition, benefits also would occur to sandy habitats after project implementation and placement of additional sand on beaches. Monitoring after RBSP I 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 RBSP II.

Each type of indirect impact is assessed below for habitats and general wildlife. Potential indirect impacts to federally listed or state-listed endangered or threatened species are summarized at the end of this section. Many of the impacts can be generalized across the project receiver 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 according to receiver site below.

<u>Forage Reduction, Alteration, or Modification</u>

There is potential for indirect effects to shorebird foraging from burial of invertebrates within the footprint of the receiver site. This impact would be less than significant since each receiver site has unaffected shoreline nearby and recolonization of the receiver 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 RBSP I and other beach nourishment projects. The birds are attracted to the sand-slurry pumped onto the beach or its return water, where they opportunistically forage on 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 hydraulic dredge-pump sediment projects, 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 and less than significant.

No adverse effects on seabird or waterbird foraging were observed with implementation of RBSP I (AMEC 2002). Bird surveys in areas of the borrow and receiver sites identified no obvious effects of dredging or discharge turbidity on bird foraging behavior or locations. Because turbidity plumes are expected to be similar or smaller than with RBSP I, project-related effects on seabird and waterbird foraging are expected to be less than significant.

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 receiver 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 receiver site that provides foraging opportunities, and the forage base at the receiver site would rapidly recover.

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 RBSP I. 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. Impacts to grunion would be less than significant because habitat suitability assessments and monitoring during construction would be used to minimize impacts to the species (Section 2.5).

<u>Turbidity</u>

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 (NTU) were below or within ranges measured during storm or high wave conditions (SAIC 2007). As discussed in Section 4.3, turbidity would be expected to be localized to the discharge location, generally within 500 feet or less. Plumes would be expected to be largely confined within the surf zone but may be incorporated by rip currents and carried farther offshore. Because the borrow sediments are sandy with relatively large average grain size, project-related turbidity would quickly settle and plumes would be temporary.

Most receiver sites would be constructed within 10 to 15 days. North Carlsbad and Oceanside would take longer to build, ranging from 23 to 40 days, respectively. If a hopper dredge is used, elevated turbidity would occur in pulses and would be expected to return to background conditions during cycle times of the dredge moving between the borrow and receiver site. Elevated turbidity has the potential to be more prolonged with use of a cutterhead dredge, which would pump sediments directly from the borrow site. The duration of exposure at any offshore location would vary from relatively higher to lower as the beach building moves along the length of the receiver site. 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. This design feature was implemented during RBSP I and found to be effective for minimizing turbidity plumes at the receiver 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 receiver site configurations.

Plankton, Pelagic Fish, and Marine Mammals

As discussed above, 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 receiver sites, and any marine mammals that ventured close to shore, would not be expected to be adversely affected because the turbidity would remain localized and short term, and similar to conditions that may be experienced during storm events. No significant impacts are anticipated to plankton, fish, or marine mammals as a result of turbidity.

Kelp

Kelp beds occur from about 1,200 to 4,000 feet offshore at several of the receiver sites, which is outside the distance that turbidity plumes would be expected to travel offshore unless carried by rip currents. In the unlikely event that turbidity did extend that far offshore, the particulate concentration would be expected to be so low as to have a negligible effect on the kelp bed. Therefore, no significant indirect impacts to kelp beds are anticipated from turbidity generated from receiver site construction.

Vegetated Reefs

Nearshore vegetated reefs have the potential to be impacted by reduced light transmittance and siltation associated with turbidity plumes. Turbidity also has the potential to cause physiological stress, reduced feeding, or displacement of mobile marine invertebrates or fish in reef areas. Actual 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. Therefore, turbidity impacts would be expected to be less than significant on reef habitat and resources offshore of the receiver sites and within the distance of the expected turbidity plumes.

<u>Sedimentation</u>

Fill material placed on individual receiver sites would eventually be washed by waves and redistributed offshore and alongshore through natural processes. There is the potential for sand introduced into the system to indirectly impact sensitive habitats and resources if sand deposits on those resources occur at sufficient depth and persistence to result in burial or degradation of those resources. To estimate potential impacts to sensitive habitats, a suite of indicator species of relatively higher quality reef habitats has been identified. As defined in Section 4.4.1, sensitive indicator species consist of surfgrass, feather boa kelp, sea fans, sea palms, and giant kelp.

Evaluating potential indirect sedimentation impacts is complex and impact conclusions must be determined in light of the dynamic ocean system, where seasonal and annual changes in sand elevation naturally occur, and an understanding must be developed of the life history of sensitive species and their relative distribution on nearshore reefs. A key feature of the shoreline morphology analysis was consideration of the results of the coastal numerical modeling predictions of the influence of the project on sand elevation in the vicinity of the receiver sites over time (Appendix G). Additionally, empirical observations from RBSP I and other biological surveys conducted in the project area were considered to inform the conclusions.

The approach for analysis of indirect sedimentation impacts involved the following steps:

(1) Review of project-specific modeling predictions to identify sand elevation changes over time after project implementation at historical beach profile locations in the study area.

(2) Review of historical average sand elevation differences between spring and fall beach profiles according to distance offshore.

(3) Review of empirical observations of nearshore reef heights and biological resources based on dive surveys conducted between 2006-2010 in the project area.

(4) Review of empirical data on reef heights from the 2004 LiDAR bathymetry survey.

(5) Comparison of average sand level increase predictions with reef heights and resources to identify the potential for increased sedimentation impacts.

(6) Comparison of the RBSP II modeling predictions and impact estimates with those of RBSP I.

(7) Review of the results of the RBSP I monitoring of nearshore reefs and kelp beds relative to impact estimates.

Detailed evaluation of potential impacts associated with sediment transport, based on the above steps, is included in Appendix C. This summary is provided to briefly describe the methodology and results.

Evaluating potential indirect sedimentation impacts is complex and must be estimated in light of the dynamic ocean system. Modeling was used to predict the influence of the project on sand elevation in the vicinity of the receiver sites over time. From this modeling and existing data, estimates were made of areas that could be at risk for indirect sedimentation from sand placed as part of RBSP II. That is, project sand in excess of natural sand movement along the shore and on nearshore reefs.

Table 4.4-1 identifies acreages of areas determined to be at risk for various levels of sedimentation above the non-project condition. Partial burial indicates that predicted sand level increases could exceed reef heights with sensitive indicators for 1 or more years (spring and fall). Seasonal scour indicates that either spring or fall predicted sand increase could be at the same height, or could overtop, reef heights with sensitive indicators in localized areas for one season, representing 6 months or less.

Site conditions vary by receiver site, as described in Section 3.3, and sedimentation would have different effects on each site depending on these conditions. The effect of predicted additional sand influence on resources located in proximity to each receiver site is discussed in detail below.

Oceanside

The Alternative 1 volume of sand to be placed at the Oceanside receiver site is essentially the same as with RBSP I. However, the location of the fill has been shifted approximately 1,800 feet upcoast. A localized area of hard-bottom occurs at the southern end of Oceanside approximately 1,600 feet or more downcoast of the receiver site. The hard-bottom area, primarily consisting of low-relief (≤1 foot) rocks and cobble with algal turf, ranges up to 2 feet and supports localized occurrence of surfgrass and other sensitive indicator species (giant kelp, feather boa kelp, sea palm, sea fan). The 2000 RBSP I preconstruction survey and the 2002 habitat mapping survey did not detect surfgrass and its occurrence in 2009 was very sparse, consisting of few shoots in two locations, suggesting persistent surfgrass beds are not supported at this location.

Modeling predictions for RBSP II are similar to those of RBSP I. The RBSP II modeling predicts increased sedimentation of up to 0.9 to 1 foot in spring and 0.4 to 0.5 foot in fall at distances within 1,000 feet offshore near the hard-bottom area. Beach profile data on either side of the hard-bottom area indicate that average seasonal sand level changes of up to 1 to 2 feet naturally occur within this offshore distance. This indicates that low-relief rocks would be exposed to seasonal changes in sand level within the range of natural variability, but no substantial burial of rock is predicted. Based on 2009 dive surveys, it is estimated that approximately 25% of the hard-bottom occurring 500 to 1,000 feet offshore has heights of <1 foot with sparse sensitive indicators. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

Table 4.4-1
Estimated Acreage of Potential Impact to Nearshore Reefs Based on Model Predicted Increase in Sand Elevation for Alternative 1

Jurisdiction	Acres of Hard-Bottom Offshore Jurisdiction[1]	Receiver Site	Estimated Sedimentation							Duration
			Surfgrass		Kelp Bed		Understory Algae[2]		Partial Sedimentation (Reef Height Reduced to ≤1 ft)[4]	
			Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour		
Oceanside	6.9 (Cobble, Bedrock)	Oceanside	0	0	0	0	0	0.2	0	Years 1-5
Carlsbad	396 (Bedrock, Cobble)	North Carlsbad	0	0[5]	0	0	0	0.3[5]	1.2[5] (U)	Year 1 (scour), Years 1-5 (height)
		South Carlsbad North	0	0	0	0	0	0	0.8 (0.3 S, 0.5 U)	Years 1, 4-5
		South Carlsbad South	NA	NA	NA	NA	NA	NA	NA	NA
Encinitas	759 (Bedrock, Cobble)	Batiquitos	0	0.1	0	0	0	<0.1	1.3 (0.8 S, 0.5 U)	Year 1 (scour), Years 1-3 (height)
		Leucadia	0	0	0	0	0	0	<0.1 (S, U)	Years 4-5
		Moonlight	0	0	0	0	0	0	0	0
		Cardiff	0	0	0	0	0	0	0	0
Solana Beach	267 (Bedrock)	Solana Beach	0	0	0	0	0	0	0.1 (U)	Year 1
City of San Diego[3]	107 (Bedrock, Cobble)	Torrey Pines	0	<0.1	0	0	0	0.6	2.1 (0.1 S, 2.0 U)	Year 1 (scour), Years 2-4 (height)
Imperial Beach	2,396 (Cobble)	Imperial Beach	0	0	0	0	0	0	0	0
		Total	0	0.1[5]	0	0	0	1.1[5]	5.5[5] (1.2 S, 4.3 U)	

[1] Acreage based on 2002 Nearshore Program Habitat Map; predominant hard-substrate type is listed first (see Table 3.2-6 in Appendix C)
[2] The 2002 understory algae category may include a mix of substrates with sensitive indicators and non-sensitive algal turfs and crusts
[3] Acreage for City of San Diego includes 1 mile up and downcoast of Torrey Pines receiver site
[4] There is relatively greater uncertainty of potential impacts from estimated reef height reduction (S = surfgrass, U = understory algae)
[5] Potential for greater sedimentation in Year 5 after project implementation under low gross transport conditions based on preliminary model results

Therefore, it is anticipated that the impacts of RBSP II on the hard-bottom habitat offshore of Oceanside would be less than significant for the following reasons: (1) the predicted effect of seasonal sand level increase would affect only a small proportion of hard-bottom with sensitive indicators, and (2) hard-bottom conditions in 2009 appear similar to those observed in 2000 suggesting little influence from the RBSP I. Effects may be reduced relative to RBSP I by the modified location of the RBSP II receiver site, which places the site approximately 1,600 feet farther upcoast of hard-bottom, whereas it was directly offshore with RBSP I.

North Carlsbad

The Alternative 1 volume of sand and location of the North Carlsbad receiver site are the same as with RBSP I. Modeling predicts potential increased sedimentation of up to 1 foot in spring and 0.5 to 0.8 foot in fall in areas of nearshore reef that range between 400 and 600 feet offshore of the receiver site and extend at least 600 feet downcoast. Reefs located between 400 and 800 feet offshore are predominantly from 1 to 2 feet in height and range to 4 feet in height, and naturally experience average seasonal sedimentation changes on the order of 1 to 2 feet. Reef heights of <1 foot only had turf algae, whereas heights of 1 to 2 feet and greater had sparse surfgrass, or sparse surfgrass and understory algae within 800 feet offshore. Reefs within approximately 1,000 feet of the receiver site are predicted to receive the greatest sand transport influence under high gross transport conditions, while sand transport influence downcoast also is predicted with the low gross transport model. Reef heights between 1 and 2 feet may experience height reduction with the potential to increase sedimentation influence, but persistent scour or burial is not predicted. Predicted sand level increases are greater in year 1 and decrease through year 5, suggesting that the increased sediment risk would be temporary. Because model-predicted sedimentation would primarily affect low-relief hard-bottom (≤1 foot) that already experiences sand scour under natural conditions, the impact would be expected to be less than significant. There may be some reduction of low-relief hard-bottom (≤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. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

It is anticipated that the impacts of RBSP II on the hard-bottom habitat offshore of North Carlsbad 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 receiver site, (2) reef conditions in 2009 offshore and downcoast of the receiver site appear similar to conditions observed in 2000 prior to RBSP I, and (3) monitoring after RBSP I did not detect a substantial change in sedimentation or surfgrass offshore or within 2,700 feet downcoast of the site attributable to the project. However, results of RBSP I monitoring detected sand influence on reef near the upcoast jetty of Aqua Hedionda Lagoon (profile NC-SS3) suggestive of possible cumulative effects possibly related to multiple sand input sources or possibly the jetty blocking downcoast sand movement.

South Carlsbad North

The Alternative 1 volume of sand and location of the South Carlsbad North receiver site are the same as with RBSP I. Modeling predicts seasonal sand level increases of 0.4 to 0.9 foot with a persistent increase of 0.4 to 0.5 foot within 800 feet offshore. Predicted sand level increases decline with increasing distance offshore. Although the modeling predictions of persistent sand increase are relatively higher than those for RBSP I, the increased sedimentation predicted for RBSP II remains low. Predicted sand level increases for RBSP II would remain below the height of the higher relief reef and rocks with sensitive indicators (e.g., surfgrass, understory algae). Some reduction in low-relief rocks without sensitive indicators may occur. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

It is anticipated that indirect sand transport impacts of RBSP II on hard-bottom habitat offshore and in the vicinity of the receiver site would be less than significant for the following reasons: (1) reef heights extend above the predicted level of persistent sand elevation increase offshore and downcoast of the receiver site, (2) reef quality indicators in 2009 offshore, upcoast, and downcoast of the receiver site were similar to conditions mapped in 1997 and 2002, and (3) monitoring after RBSP I indicated that increased sedimentation at a downcoast monitoring location did not persist or result in substantial change in surfgrass density or cover.

Batiquitos

The Alternative 1 volume of sand and location of the Batiquitos site are the same as with RBSP I. Modeling predictions for RBSP II are similar to those of RBSP I for upcoast profiles but exceed those at the profile 1,000 feet downcoast. Limited impact to reefs is anticipated because modeling predicted that average sand level increases ranging up to 1 foot within 600 feet offshore and 1,000 feet downcoast would be predominantly below reef heights supporting sensitive indicator species. Diver surveys indicate that, in general, reef heights of <1 foot only support turf algae within distances of 450 to 1,000 feet offshore. Sensitive indicators occur on reef heights of <1 foot at distances greater than 1,200 feet offshore; however, predicted sand level increases are very low that far offshore (≤0.1 to 0.2 foot). Increased sedimentation on lower portions of reef where surfgrass occurs may result in sedimentation along the base of the plants, but no substantial burial is predicted. No substantial impacts to kelp beds are anticipated based on model results. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

Surfgrass on the intertidal reef extension (350 to 400 feet offshore) near Grandview stairs is on rock heights of 2 to 3 feet in winter. If the average 1-foot sand elevation change is considered, the predicted additional 1 foot of sand would raise the sand level to the lowest height of rock with surfgrass in summer, but that level would drop again during natural seasonal movement of sand offshore in winter. This could result in shallow sand cover along the base of surfgrass leaves during summer on the lower relief heights of the rock. Surfgrass is naturally adapted to shallow sand burial along the base of the plant; therefore, the surfgrass beds on these intertidal reef extensions would not be expected to be substantially affected.

It is anticipated that the impacts of RBSP II on the hard-bottom habitat offshore and downcoast of the site 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 receiver site, (2) current reef conditions offshore and downcoast of the receiver site appear similar to conditions observed in 2000 prior to RBSP I, and (3) monitoring after RBSP I did not detect a substantial change in sedimentation or surfgrass in the nearshore attributable to the project. Increased sedimentation was noted at kelp monitoring stations but was not attributed to RBSP I. Kelp bed development is greater under existing conditions than prior to or during RBSP I due to regional recovery following El Niño events.

Leucadia

The Alternative 1 volume of sand and location of the Leucadia receiver site are the same as with RBSP I. Modeling predictions of persistent sand increase for RBSP II are similar to those of RBSP I with one exception. 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 (≤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. Predicted sand level increases decline with increasing distance offshore and predicted increases in sedimentation are 0.1 foot or less in kelp bed habitat located more than 1,500 feet offshore.

Sand level increases are predicted to seasonally range from 0.6 to 0.9 foot at 400 to 600 feet offshore, within 1,320 feet of the receiver site by year 4 and year 5 after project implementation as sand moves downcoast over time. This is greater than predicted with RBSP I. However, the predicted sand level is not expected to bury or scour reef tops with sensitive indicators since sensitive indicator species primarily occur on reef that ranges from 1 to 3 feet in height. However, a persistent lowering of reef heights by 0.6 to 0.7 foot may increase the risk of sedimentation to some sensitive indicators that occur on reef heights of 1 foot under existing conditions. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

It is anticipated that the impacts of RBSP II 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 receiver site, (2) reef conditions in 2009 offshore and downcoast of the receiver site appear similar to conditions observed in 2000, and (3) monitoring after RBSP I 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 1 volume of sand and location of the Moonlight Beach receiver site are the same as with RBSP I. Modeling predictions of persistent sand increase for RBSP II exceed those of RBSP I; however, the predicted increases for RBSP II are relatively low. Conditions both before and after RBSP I 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. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

It is anticipated that the impacts of RBSP II on the hard-bottom habitat in the vicinity of the Moonlight Beach receiver 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 receiver site appear similar to conditions observed in 2000 before RBSP I, and (3) monitoring after RBSP I in the vicinity did not detect a substantial change in sedimentation or surfgrass attributable to the project.

Cardiff

The Alternative 1 volume of sand and location of the Cardiff receiver site are the same as with RBSP I. 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 0.5 foot, which 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. No impacts to offshore kelp beds are suggested by the model results, which predict sand level increases of 2 inches or less. Modeling predictions of persistent sand increase for RBSP II are similar or lower than predicted for RBSP I.

Intertidal rock is sand influenced with only 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.

Potential risk of impact from RBSP II may be relatively greater in the vicinity of Cardiff reef than at Seaside or Table Tops reefs because of the receiver site’s proximity to the reef. In addition, the reef is located offshore of the mouth of San Elijo Lagoon, where bathymetry suggests shoaling naturally occurs, which may contribute to a relatively high natural variability in sand level on the inshore portion of Cardiff reef. In addition, reef heights vary from low to high, and substantial low relief occurs in the shallow inshore portion that supports surfgrass. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

It is anticipated that the impacts of RBSP II on the hard-bottom habitat in the vicinity of the Cardiff receiver 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 receiver site are similar to conditions observed in 2000 before RBSP I, and (4) post-RBSP I monitoring reported no substantial change in surfgrass attributed to the project.

Solana Beach

The Alternative 1 volume of sand and location of the Solana Beach receiver site are the same as with RBSP I. Modeling predictions of persistent sand increase for RBSP II are within the range predicted for RBSP I. 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 receiver 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 <1 to >6 feet, with heights of 1 to 2 feet common and 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 (<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. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

Monitoring of RBSP I 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 RBSP I due to regional recovery following El Niño events. Therefore, effects of RBSP I appeared to be localized and not significant.

It is anticipated that the impacts of RBSP II 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 receiver site. Further, monitoring from RBSP I identified localized but not significant effects. The proposed receiver site volume and location are identical under this alternative.

Torrey Pines

The Alternative 1 volume of sand and location of the Torrey Pines receiver site are the same as with RBSP I. A localized reef outcrop with surfgrass occurs offshore of the receiver 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 <1 foot mainly have turf algae, while higher relief reef, generally ranging from 1 to 3 feet, supports surfgrass and understory algae. Modeling predictions of persistent sand increase for RBSP II exceed those of RBSP I; however, the predicted increases for RBSP II are primarily localized to shallow inshore depths within 600 feet offshore. 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 receiver site. Partial sedimentation of reefs may occur but would not be expected to substantially bury reefs with sensitive indicator species. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1.

No monitoring stations were established in the vicinity of the RBSP I receiver site at Torrey Pines. However, intertidal surfgrass was observed in 2000 during minus tide surveys before the RBSP I 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 RBSP II on the hard-bottom habitat in the vicinity of the Torrey Pines receiver 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 receiver site and (2) reef conditions in 2009 did not indicate substantial sand influenced habitat degradation.

Imperial Beach

The Alternative 1 volume of sand to be placed at the Imperial Beach receiver site is essentially the same as with RBSP I. However, the location of the fill has been shifted approximately 1,300 feet upcoast. Historical sand elevation data collected indicate that sand elevation changes of 9 inches to 1 foot occur seasonally. Hard-bottom habitat consists predominantly of low-relief cobble, which supports understory kelp approximately 1,000 to 1,200 feet offshore. Kelp beds occur at distances farther offshore. Modeling predicts that sand level increases at distances of 1,000 to 1,200 feet offshore would be less than 2 inches, which is within the range of variation of sand elevation change under natural conditions. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-1. Very small sand level increases were also predicted for RBSP I.

It is anticipated that the impacts of RBSP II on the hard-bottom habitat offshore of Imperial Beach would be less than significant because predicted sand level increases at offshore distances where sensitive hard-bottom habitats occur are very low and within the range of natural seasonal variability. Effects may be reduced relative to RBSP I by the modified location of the RBSP II receiver site, which places the site approximately 1,300 feet farther upcoast of hard-bottom, whereas it was more offshore with RBSP I.

Summary of Indirect Sedimentation Impacts

In conclusion, Table 4.4-1 indicates that partial sedimentation could occur to 0.1 acre of hard substrate with surfgrass at Batiquitos. No burial of surfgrass for extended periods of time is anticipated under Alternative 1. No burial or partial sedimentation of kelp beds are predicted for this alternative. Partial sedimentation of up to 1.1 acres of reef with sensitive indicators could occur under Alternative 1. This is a conservative estimate that could also include some reef with only nonsensitive algal turfs and crusts. This impact is considered to be less than significant because reefs are not expected to be overtopped by sand for extended periods of time and surfgrass is naturally adapted to shallow seasonal burial similar to that predicted under implementation of RBSP II. There is a potential for slightly greater areas of partial sedimentation at North Carlsbad in year 5 under specific model conditions, but these are highly uncertain due to the dynamic ocean system and seasonal and annual variability.

Borrow Sites

Impacts from dredging include direct effects of removal of sediment and associated organisms, indirect effects associated with that removal on the forage base for other animals, and indirect effects associated with operation of the dredge equipment such as increased turbidity and noise. The movement of sediment from the borrow site to the receiver site also has the potential for direct and indirect effects on biological resources. The following subsections address the potential direct and indirect effects that may occur at the borrow sites and at the nearshore locations where mono buoys and pipelines would be established to pump the materials to the receiver sites.

Direct Impacts of Dredging

Dredging sediments from the borrow sites would impact marine biota by the direct removal of organisms and alteration of habitat. Benthic invertebrates living within or on the sediment would be killed during the dredging process. The extent of impact would be directly proportional to the actual area and amount of sediment removed at each site. There also would be some direct uptake of organisms in the suction field generated by the hydraulic dredge, termed entrainment. This generally occurs if pumps are on when the cutterhead or dragarm (hopper dredge) are above the sediment surface.

Borrow site target dredge areas are larger than that required to provide the approximate 1.8 mcy of sand for Alternative 1. Refer to Section 2.4.1 for additional detail regarding borrow site configurations and volume assumptions.

The borrow site target areas encompass approximately 275 acres of surface area, which if dredged 10 feet below the sediment surface would have the capacity to provide over 4 mcy of sand. That surface area represents approximately 2% of the soft-bottom habitat outside the littoral zone to a depth of -80 feet MLLW (near maximum depth of borrow sites) between Oceanside and Torrey Pines and within 2 miles upcoast and downcoast of the Mission Beach borrow site. Soft-bottom habitat is the dominant habitat type within the study area, accounting for approximately 80% of the total acreage at these inner shelf depths. With Alternative 1, a surface area of less than 125 acres would be needed to provide the approximate 1.8-mcy sand volume. That surface area represents less than 1% of the soft-bottom habitat on the inner shelf within the local region.

Entrainment of aquatic and surface-dwelling organisms within the suction field of the hydraulic dredge may occur when the cutterhead or dragarm (hopper dredge) are above the sediment surface. Entrainment does not occur during actual removal of sediment. Therefore, entrainment rates typically are low. The potential effects of entrainment relate to a number of factors such as organism occurrence or concentration, time of year, and operational characteristics of the dredge.

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 the dredge or where passive organisms may become concentrated. Such conditions do not apply to open waters and would be expected to contribute to very low entrainment rates at the borrow site. Because dredging would affect less than 1% of the soft-bottom habitat within the inner shelf of the project vicinity, entrainment effects would be less than significant on a local or regional level.

There would be a temporary reduction in benthic invertebrate biomass and alteration of the benthic community species composition at the borrow sites associated with the sediment removal. Studies indicate that recovery of the benthic invertebrate community after borrow site dredging depends on several factors such as dredging method, local environmental conditions, hydrodynamics, and sediment infill rates. Recovery is quicker when relatively shallow dredging is conducted rather than creation of deep pits, dredging occurs in areas where sand movement naturally occurs, and sediments at dredged depths are similar to surrounding sediment. The design of the borrow sites for this project includes locating the sites on the inner shelf, which naturally experiences disturbance from oceanic swells and storms, and limitation of dredge depths to a maximum of 10 feet at SO-5 and MB-1 and a maximum of 20 feet at SO-6. Benthic recovery at these depths would be expected to be similar to RBSP I, although recovery would occur more rapidly at shallower dredge depths at SO-5 and MB-1. These design features would minimize the potential to alter sediment characteristics or hydrodynamics and promote recovery rates.

A biological survey of three of the borrow sites used in 2001 was conducted at the same time that proposed borrow sites for RBSP II were surveyed to provide characterization of existing conditions for this project. The survey included sampling of the surface substrate, benthic invertebrate community, and bottom-dwelling fish. In addition, diving biologists swam transects and recorded observations of substrate characteristics, epifaunal macroinvertebrates, and fish along the bottom. Although sampling was limited within the reconnaissance survey, results indicate that borrow sites used for RBSP I had similar sediment characteristics and invertebrate resources in 2009 as the nearby proposed RBSP II borrow site and reference locations (Appendix C). Furthermore, samples collected at the RBSP I SO-5 borrow site in 2009 were similar to conditions surveyed in 1999 to characterize that location. In addition, epifaunal invertebrates and demersal fish were similar between RBSP I, proposed RBSP II, and reference sites. These results suggest that effects of dredging from RBSP I did not result in a long-term alteration of benthic communities. Similar recovery would be anticipated for borrow sites utilized for RBSP II.

The primary direct impact of dredging would be removal of approximately 1.8 mcy of sediment and associated benthic organisms within a surface area of approximately 125 acres, which would represent less than 1% of the soft-bottom habitat of the inner shelf within the study region. The impact would be less than significant on a regional level. It is anticipated that the impact also would be less than significant on a local level given that no long-term alteration of the benthic community was found 9 years after implementation of RBSP I. Although full recovery of the benthic community after dredging may take a few years (Merkel & Associates 2010), the forage base would begin to establish almost immediately after cessation of dredging by migration of invertebrates from unaffected surrounding areas as well as settlement from the plankton.

Indirect Impacts of Dredging

Dredging would result in turbidity, noise, and disturbance effects with the potential to affect organisms or habitats. As noted in Section 4.3, dredging of the borrow sites 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. Sedimentation associated with the settlement of suspended sediment from turbidity plumes has the potential to impact organisms or plant recruitment in hard-bottom habitats if nearby. Sedimentation generally is less of a concern for soft-bottom habitats unless within spawning grounds.

The location and footprint of the dredge area for each borrow site have been designed to minimize indirect impacts to sensitive habitat areas from dredging operations. A minimum 500-foot buffer has been provided between the dredge area and natural hard-bottom habitats at SO-6, SO-5, and MB-1. A number of artificial substrate habitats occur in the vicinity of MB-1; all are located 500 feet or more away except for the NOSC Tower, which is a sunken oil rig and popular local dive spot. A relatively small portion of the eastern (landward) boundary of the MB-1 site is within 300 feet of the NOSC Tower; however, the majority of the target dredge area is located more than 500 feet away. As noted in Table 4.3-1, turbidity plumes would be expected to be localized within 220 feet of the dredge under typical current speeds but may extend up to 500 feet under maximum current speeds under certain oceanographic conditions. While turbidity would not be expected to substantially affect water clarity or suspended particulate concentrations at the NOSC Tower during typical oceanographic conditions, the potential would exist for adverse effects to water quality and biota if dredging were to occur along a portion of the east site boundary. A 500-foot buffer has been incorporated as a project design feature to minimize the potential for adverse turbidity effects on any type of hard-bottom substrate in the vicinity of the borrow sites. With this feature, turbidity effects to hard-bottom habitats would be less than significant.

The minimum 500-foot buffer between dredging and hard-bottom areas also would minimize the potential for adverse effects associated with increased noise levels. Mobile epifaunal invertebrates or demersal fish that reside near the bottom would be expected to move from the borrow site area during dredging to avoid elevated turbidity and noise levels. Underwater noise levels associated with hopper dredges may range from 140 to 160 dB at a distance of 50 feet. These values are below thresholds that cause injury in marine fishes and mammals, and therefore no impacts from noise are expected both within and outside the borrow site.

Other Construction Issues

The placement of temporary pipelines, anchoring, installation of mono buoys, and vessel transport have the potential to impact sensitive resources. Table 4.4-2 summarizes the type of resources offshore of the receiver sites at depths of potential mono buoy locations and along inshore routes if sinker pipelines are used. 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 mono buoy to avoid sensitive resources in the area. Implementation of these design features would minimize potential impacts to below a level of significance.

Operation of equipment on the beach or dredges and support vessels has the potential to introduce contaminants to the marine environment from minor spills and leaks. The potential for accidental discharge also could result from collision with or by another vessel. The probability of both types of accidental discharges is considered low. The dredging contractor would be required to develop an SPCC prior to initiating construction. If a spill occurred, the contractor would utilize BMPs to prevent long-term degradation of water quality (see Section 4.3). For these reasons, impacts to biological resources from accidental discharges would be expected to be less than significant, if they occurred at all.

Threatened and Endangered Species

California least tern

Most receiver and borrow sites are located far from nesting site locations that may be seasonally used by endangered least terns during their April–September breeding season. Dredging at the

Table 4.4-2
Potential Sensitive Habitats or Constraints Offshore of Receiver Site

Borrow Site	Receiver Site	Resources at Potential Mono Buoy Location -25 to -40 MLLW	Potential Resources along Sinker Pipeline Route
SO-6	Oceanside	sand, wastewater pipeline	sand, wastewater pipeline
	North Carlsbad	sand, hard-bottom, kelp	sand, hard-bottom, kelp, surfgrass, understory algae
SO-5	South Carlsbad North	sand, wastewater pipeline	sand, hard-bottom, surfgrass, understory algae
	South Carlsbad South	sand, wastewater pipeline	sand, hard-bottom, surfgrass, understory algae
	Batiquitos	sand, hard-bottom, kelp	sand, hard-bottom, kelp, surfgrass, understory algae
	Leucadia	sand, hard-bottom, kelp	sand, hard-bottom, kelp, surfgrass, understory algae
	Moonlight Beach	sand, hard-bottom, kelp	sand, hard-bottom, kelp, surfgrass, understory algae
	Cardiff	sand, wastewater pipeline	sand, wastewater pipeline
	Solana Beach	sand, hard-bottom, kelp	sand, hard-bottom, kelp, surfgrass, understory algae
MB-1	Imperial Beach	sand, hard-bottom, kelp	sand, hard-bottom, kelp, understory algae

borrow sites and placement of sand at the receiver sites would generate turbidity that would be expected to be localized and rapidly dissipate based on the sandy nature of the sediment. Plumes at the borrow sites would be expected to be smaller than those generated during RBSP I based on sediment characteristics. Monitoring demonstrated that turbidity plumes during RBSP I complied with RWQCB 401 certification requirements as well as specified environmental permitting conditions to protect least tern foraging (USFWS 2000). The environmental conditions required that water clarity in the upper 3 feet of surface waters not be reduced by more than 2.47 acres in the vicinity of borrow or receiver sites. Monitoring documented that plumes were typically much smaller than 2.47 acres and were mainly restricted to the surf zone except when carried offshore by localized rip currents (AMEC 2002).

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 (see Table 3.4-3): Oceanside, North Carlsbad, South Carlsbad North, Moonlight Beach, Cardiff, Solana Beach, and Torrey Pines.

Three receiver sites are located at distances less than 1 mile from nesting sites: Batiquitos, Leucadia, and Imperial Beach. The Batiquitos receiver site is within 380 feet of the closest nest site. The Imperial Beach receiver site is 0.5 mile from the closest nesting area and distance increases as one moves north along the receiver site. The Leucadia receiver site is 0.8 mile from the closest nest site and distance increases as one moves along the receiver site. Use of training dikes to promote sand deposition and reduction of suspended sediments in return water would reduce turbidity plumes during beach construction. This design feature was found to be effective at reducing turbidity plumes during RBSP I and ensuring that the project met the USFWS specified environmental conditions of the permit. This design feature has been incorporated into the project description for RBSP II and would be expected to achieve similar performance objectives. Dredging and sand placement operations for Alternative 1, conducted in compliance with permit conditions, would not result in significant impacts to water resources (see Section 4.3).

During RBSP I, other design features were implemented to protect foraging and nesting habitat. Similar design features would be used for RBSP II, as appropriate. Design features could include monitoring and managing turbidity plumes, and shielding and directing construction lighting at the Batiquitos receiver site toward the ocean and away from back beaches or lagoon, as necessary. Coordination with the contractor would be conducted to schedule construction of the Batiquitos site outside the least tern breeding season (April 1 through September 15 or after August 1 with confirmation of cessation of nesting at the W-2 nest site) to minimize potential impacts to foraging. In addition, no sand placement would occur within designated or proposed western snowy plover critical habitat. With implementation of the described features, the project would not result in significant impacts to the species.

Western snowy plover

The Batiquitos, Torrey Pines, and Imperial Beach sites are located in proximity to critical habitat for snowy plover. This species nests at Batiquitos Lagoon and downcoast of the Imperial Beach receiver site. Snowy plover has been observed to forage at the beach in the vicinity of the Batiquitos receiver site. The Imperial Beach receiver site is located 0.6 mile or more from nest sites and most of the receiver site has limited suitability for snowy plovers due to narrow beach widths.

During RBSP I, design features were implemented to protect foraging and nesting habitat. Similar design features would be used for RBSP II, as appropriate. Design features could include monitoring, and shielding and directing construction lighting at the Batiquitos receiver site toward the ocean and away from back beaches or lagoon. Coordination with the contractor would be conducted to schedule construction of the Batiquitos site outside the breeding season (April 1 through September 15 or after August 1 with confirmation of cessation of nesting at the W-2 nest site) and to ensure no sand is placed within designated or proposed critical habitat to minimize potential impacts to snowy plover. With implementation of the described features, the project would not result in significant impacts to the species.

Essential Fish Habitat

As discussed in Section 3.4, the proposed project would encompass designated EFH, including nearshore areas adjacent to receiver sites, as well as the borrow sites located farther offshore. In addition to EFH designations, certain areas may also be designated as HAPCs. HAPCs are discrete subsets of EFH that provide important ecological functions or are vulnerable to degradation (50 C.F.R. 600.815[a][8]). Regional Fishery Management Councils may designate a specific habitat area as an HAPC in the FMP based on one or more of the following reasons: (1) importance of the ecological function provided by the habitat; (2) the extent to which the habitat is sensitive to human-induced environmental degradation; (3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and (4) rarity of the habitat type (50 C.F.R. 600.815[a][8]). The HAPC designation does not confer additional protection or restrictions upon an area but can help prioritize conservation efforts.

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 (50 C.F.R. 600.810(a)). By definition, the 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). This is distinctly different from an adverse impact determination made under NEPA, which takes into account the context and intensity of a project impact. Therefore, this section refers to impacts to EFH in terms of compliance with the Magnuson-Stevens Act and does not reflect impact severity as defined under NEPA, although a significant or permanent adverse impact to EFH would qualify as a significant impact under NEPA.

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 receiver and borrow 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 dredging or loss of prey items at borrow or receiver sites due to dredging or nourishment). Similarly, temporary adverse impacts to lifestages 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, and are discussed in Section 2.5.

Mitigation Measures for Alternative 1

Design of RBSP II considered lessons learned from RBSP I, including design features to minimize impacts to biological resources and to avoid direct impacts to sensitive habitats or resources. Incorporation of these design features, as described in the analysis above, would avoid significant impacts. Postconstruction monitoring of RBSP I did not detect long-term significant impacts. Because no significant impacts have been identified for RBSP II, no mitigation measures are necessary.

4.4.3 Alternative 2

Receiver Sites – Direct Impacts

The area of direct impact to beach habitat and invertebrate resources would be larger than that identified under Alternative 1 due to the larger footprints proposed at several of the receiver sites. As noted under Alternative 1, actual impact to biological resources would be less at some sites given that 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 217 acres of beach habitat would be disturbed by construction. 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 receiver site at any one time; therefore, receiver 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.

Oceanside, North Carlsbad, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Torrey Pines

These receiver sites have the same footprint with Alternative 2 as with Alternative 1 and effects would be similar to those described for Alternative 1.

South Carlsbad North, South Carlsbad South, Solana Beach, Imperial Beach

Footprints at these receiver sites would be larger than those proposed under Alternative 1; however, despite the larger direct impact to sandy beach habitat, the nature of the impact would be similar to Alternative 1 and would not constitute a significant impact. Similarly, any impacts to grunion would be minimized and would remain less than significant.

At Imperial Beach, subadult-sized Pismo clams and relatively large, clam shells were observed north of the pier within the receiver site footprint. The occurrence or extent of adult Pismo clams in the adjacent subtidal zone is not known. The location may or may not qualify as a clam bed. If adult clams were present subtidally, there would be the potential for impacts to some individuals along the seaward edge of the fill. Because clams are mobile, some individuals would be expected to move out of the construction footprint as sand placement occurs.

A preconstruction assessment of the minus tide zone north of the Imperial Beach Pier would be conducted to confirm the presence or absence of legal-sized adult Pismo clams (minimum of 4.5 inches and their density. If presence of a clam bed is confirmed (density greater than 0.07 individuals per square foot), measures such as a slow discharge rate or modification to the seaward edge of the fill, would be implemented to minimize impacts to that adult clam bed. Any minimization measures would be documented by the Environmental Coordinator, and the agencies notified.

Receiver Sites – Indirect Impacts

Many of the indirect impacts associated with Alternative 2 are anticipated to be similar to Alternative 1 and RBSP I, specifically where volumes would remain the same or no increased sedimentation is predicted. Specific acreages of areas at risk for sedimentation are summarized in Table 4.4-3. The table distinguishes between different degrees of sand influence on resources that could be caused by the project. Site conditions vary by receiver site, as described in Section 3.3, and sedimentation would have different effects on each site depending on these conditions. The predicted potential additional sand influence on resources located in proximity to each receiver site is discussed in detail below.

Table 4.4-3
Estimated Acreage of Potential Impact to Nearshore Reefs Based on Model Predicted Increase in Sand Elevation for Alternative 2

Jurisdiction	Acres of Hard-Bottom Offshore Jurisdiction[1]	Estimated Sedimentation								Duration
		Receiver Site	Surfgrass		Kelp Bed		Understory Algae[2]		Partial Sedimentation (Reef Height Reduced to ≤1 ft)[4]	
			Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour	Partial Burial	Seasonal Scour		
Oceanside	6.9 (Cobble, Bedrock)	Oceanside	0	0	0	0	0	0.2	0	Years 1-5
Carlsbad	396 (Bedrock, Cobble)	North Carlsbad	0	0[5]	0	0	0	0.3[5]	1.2[5] (U)	Year 1 (scour), Years 1-5 (height)
		South Carlsbad North	0	0.7	0	0	0.8	0.9	2.5 (0.5 S, 2 U)	Years 1-2, 5 (burial), Years 1-5 (scour, height)
		South Carlsbad South	0	0.1	0	0	0.1	0.7	0.5 (0.1 S, 0.4 U)	Years 1-2 (burial), Years 1-5 (scour, height)
Encinitas	759 (Bedrock, Cobble)	Batiquitos	0	0.1	0	0	0	<0.1	1.3 (0.8 S, 0.5 U)	Year 1 (scour), Years 1-3 (height)
		Leucadia	0	0	0	0	0	0	<0.1 (S, U)	Years 4-5
		Moonlight	0	0	0	0	0	0	0	0
		Cardiff	0	0	0	0	0	0	0	0
Solana Beach	267 (Bedrock)	Solana Beach	0	<0.1	0	0	0.5	0.4	1.5 (0.6 S, 0.9U)	Years 1-3 (burial), Years 1-5 (height, scour)
City of San Diego[3]	107 (Bedrock, Cobble)	Torrey Pines	0	<0.1	0	0	0	0.6	2.1 (0.1 S, 2 U)	Year 1 (scour), Years 2-4 (height)
Imperial Beach	2,396 (Cobble)	Imperial Beach	0	0	0	0	1.1	0.1	2.5 (U)	Years 1-5
		Total	0	0.9[5]	0	0	2.5	3.2[5]	11.5[5] (2 S, 9.5 U)	

[1] Acreage based on 2002 Nearshore Program Habitat Map; predominant hard-substrate type is listed first (see Table 3.2-6 in Appendix C)
[2] 2002 map category may include a mix of substrate with sensitive indicators and non-sensitive algal turfs and crusts; S = surfgrass, U = understory algae
[3] Acreage for City of San Diego includes 1 mile up and downcoast of Torrey Pines receiver site
[4] There is relatively greater uncertainty of potential impacts from estimated reef height reduction
[5] Potential for greater sedimentation acreage in Year 5 after project implementation under low gross transport conditions based on preliminary model results

Oceanside, North Carlsbad, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Torrey Pines

Receiver site footprints and sand volumes are the same for Alternative 2 as for Alternative 1. Similar to the assessment described under Alternative 1, impacts from construction of these beaches under Alternative 2 would be less than significant with incorporation of project design features.

South Carlsbad North, South Carlsbad South

Alternative 2 includes placement of 362,000 cy at South Carlsbad North and South Carlsbad South. The North site is similar to Alternative 1 and RBSP I but would extend farther north. The South site would be located 500 feet downcoast. The impact assessment for Alternative 2 considers the model predictions associated with the 57% increase in sediment associated with this alternative compared to Alternative 1. Modeling results predict that both seasonal and persistent sand elevations in areas where hard-bottom occurs would average higher than predicted under Alternative 1. Predominant reef heights range between 1 to 2 feet and surfgrass, which is a sand-tolerant species, dominates the inshore portion of the reef. The predicted sand level increases have the potential to reduce the exposed profile of the inshore part of the reef and tide pool areas. Surfgrass and understory algae occur on a high-relief rock outcrop (winter heights of 3 to 5 feet) that would not be expected to be affected by the increased sediment. The additional sand level would be expected to overtop low-relief rocks that were mapped in the area in 2002. Comparison of the 2002 historical habitat map with the 1997 map suggests that degree of exposure of low rock cover is naturally variable.

Seasonal sand level increases of 1 to 2 feet with a persistent increase of 1 foot over 5 years are predicted within 600 feet offshore. Seasonal increases up to 1 foot are predicted within distances of 1,000 feet offshore. It is assumed that the increased sand levels would extend throughout the vicinity of the receiver site and farther downcoast based on predictions of seasonal increases in sedimentation of 0.4 to 1 foot. Partial sedimentation associated with Alternative 2 has the potential to be greater than described above under Alternative 1 for offshore areas and in the vicinity of the receiver site. Because the predominant reef heights range between 1 and 3 feet, the effects of partial sedimentation of the reef would be expected to be less than significant. Monitoring would be implemented to confirm that no significant impacts occur, as described in Section 2.5.

Solana Beach

Alternative 2 includes placement of 360,000 cy at an extended receiver site to the north and south relative to the Alternative 1 receiver site. The impact assessment for Alternative 2 considers the model predictions associated with the 60% increase in sediment associated with this alternative compared to Alternative 1. Conservative model-predicted sedimentation results suggest that indirect sand transport to hard-bottom habitat offshore and in the vicinity of the receiver site has the potential to be greater than described under Alternative 1.

The model results predict sand movement upcoast to Table Tops reef, including persistent sand elevation increases from 0.5 to 0.8 foot. The increased sedimentation is predicted to primarily affect the inshore portions of the reef. The model predicts persistent sand level increases of approximately 1 foot and seasonal increases ranging a bit higher extending 600 feet offshore. This has the potential to result in partial sedimentation of Pill Box reef and other reef features, although reef heights on which surfgrass occurs largely range higher. Measured reef heights range from <1 foot to more than 6 feet offshore of Solana Beach; therefore, the predicted sand level increases would not result in substantial burial of reefs and impacts are anticipated to be less than significant. The extent of partial sedimentation would depend on environmental conditions and actual reef heights in the area of sedimentation. Monitoring would be implemented to confirm that no significant impacts occur, as described in Section 2.5.

Imperial Beach

Alternative 2 includes placement of 650,000 cy at an extended receiver site to the north and south relative to the Alternative 1 receiver site. Model-predicted sedimentation suggests that indirect sand transport impacts of RBSP II on hard-bottom habitat offshore and in the vicinity of the receiver site have the potential to be greater than described above under Alternative 1.

Cobble and low-relief rock support understory algae approximately 1,000 feet offshore of the southern half of the site and kelp beds at distances approximately 2,000 or more offshore. Predictions of additional sand cover at distances of 1,000 to 1,200 feet offshore range from 0.8 to 1.6 feet, with persistent increases of 0.8 to 1.1 feet. These levels of increase would be expected to result in burial of some of the cobble-rock habitat, which is subject to sand influence under existing conditions. Additional sand cover predictions at distances of 1,200 to 1,400 feet offshore range from 0.3 to 0.5 foot and are less than 2 inches at distances farther offshore. Because partial sedimentation would predominantly affect the inshore portions of low-relief rock subject to sand influence under existing conditions and kelp canopy is not persistent in this area, the impact would be less than significant.

Summary of Indirect Sedimentation Impacts

In conclusion, partial sedimentation could occur to 0.9 acre of hard substrate with surfgrass at South Carlsbad (North and South) and Batiquitos, with minimal areas of sedimentation at Solana Beach and Torrey Pines. No burial of surfgrass for extended periods of time is anticipated under Alternative 2. No burial or partial sedimentation of kelp beds is predicted for this alternative. Partial sedimentation of up to 3 acres of reef with sensitive indicators could occur under Alternative 2, and burial of up to 2.5 acres of such reef could also occur. This is a conservative estimate that could also include some reef with only nonsensitive algal turfs and crusts. This impact is considered less than significant because reefs are not expected to be overtopped by sand for extended periods of time and surfgrass is naturally adapted to shallow seasonal burial similar to predicted levels under RBSP II. There is a potential for slightly greater areas of partial sedimentation at North Carlsbad in year 5 under specific model conditions, but the likelihood of these conditions occurring are highly uncertain.

Borrow Sites

Implementation of Alternative 2 would require dredging of a higher volume of sediment and would total approximately 180 acres. This area would constitute approximately 1.3% of shelf habitat. Effects would therefore be similar to those described above for Alternative 1 and would remain less than significant.

The duration of turbidity effects associated with dredging would be greater for Alternative 2 compared to Alternative 1 as a result of larger sand volumes being placed at South Carlsbad North, Solana Beach, and Imperial Beach. In addition, additional dredging would occur to provide sand for the South Carlsbad South receiver site. However, due to the design features incorporated into the project, as described under Section 2.5, impacts would be less than significant.

Mitigation Measures for Alternative 2

No significant impacts are anticipated to occur. Project design features described in Section 2.5 would be incorporated into project implementation to minimize impacts associated with turbidity, sedimentation, grunion, pismo clams, least terns, and snowy plover. If Alternative 2 is implemented, focused postconstruction monitoring would be conducted at South Carlsbad (North and South) and Solana Beach as described in Section 2.5, to confirm no significant impacts occur as a result of project implementation.

If significant impacts are identified via that monitoring, SANDAG (funded by the city in which monitoring had occurred) would provide mitigation through habitat restoration of sensitive marine habitats at a 2:1 ratio. Mitigation would be restoration of like habitat as a first priority, then out-of-kind artificial reef restoration if like habitat restoration is found not to be feasible, unless a functional assessment is approved as noted above. Feasibility of surfgrass restoration must be determined by implementation of an experimental pilot program.

Similar to RBSP I, SANDAG would try to negotiate a “not-to-exceed” cap on mitigation costs as a key part of the permit conditions related to mitigation. The potential worst-case acreage for 2:1 enhancement/replacement would be based on the acreage of sensitive habitat potentially subject to partial burial. If monitoring identifies significant long-term impacts, SANDAG, in cooperation with the city in which impacts occur, would prepare a mitigation plan in coordination with the agencies and implement required mitigation. As noted above, that mitigation would involve restoration of like habitat as a first priority. In the case of surfgrass mitigation, feasibility would be determined by an experimental 5-year pilot project of at least 25% of the area confirmed to have been impacted, or not less than 0.1 acre, or some minimum size otherwise acceptable to the resource agencies. If that experimental project was determined not to be successful or full areal mitigation not likely to be feasible, then 2:1 mitigation of out-of-kind habitat would be implemented via augmenting an existing natural reef. The decision regarding implementating out-of-kind mitigation would be done in consultation with the regulatory and resource agencies. For context, as part of RBSP I permit negotiations, SANDAG committed to funding mitigation for significant impacts confirmed through monitoring at a 1:1 ratio. Mitigation would have been restoration of like habitat as a first priority, with consideration given to the construction of artificial reefs if like habitat restoration efforts were determined to not be feasible. No experimental pilot program was required for surfgrass. No mitigation was ultimately required, however, since monitoring confirmed no significant impacts occurred with implementation of the project.

4.4.4 No Project/No Federal Action Alternative

Under the No Project Alternative, dredging sediments from the borrow sites and sand placement at the receiver beaches would not occur. Consequently, there would be no impacts to biological resources. In addition, no beneficial effects to functions supported by sandy beach would occur, including enhanced grunion habitat.

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4.5 CULTURAL RESOURCES

Section 3.5 indicates that at the receiver sites, the potential for impacts is limited due to (1) the absence of any known identified cultural resources within the sites, and (2) the low potential for the placement of sand to affect existing cultural resources that have not been identified. However, there is potential for impacts at the proposed project borrow sites. This evaluation therefore focuses on potential impacts to cultural resources at the borrow sites.

4.5.1 <u>Significance Criteria</u>

The federal criteria used to evaluate resources that may be affected by this project are those provided in the NHPA. The NRHP criteria are presented in 36 C.F.R. 60 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 California Register of Historical Resources (CRHR). These criteria define an "important" archaeological resource as one which:

> A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
>
> B. Is associated with the lives of persons important in our past; or

C. 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

D. Has yielded, or may be likely to yield, information important in prehistory or history.

4.5.2 Alternative 1

Impacts of Alternative 1

Receiver Sites

No impacts to NRHP or CRHR-eligible cultural resources at the receiver sites would occur as a result of Alternative 1.

Borrow Sites

Evaluations of potential impacts to cultural resources within proposed borrow sites can be considered in terms of (1) prehistoric resources, where previously exposed river valleys were available for human habitation and remaining artifacts would be contained in now buried materials; and (2) historic resources, where shipwrecks and other more modern human artifacts may be located.

The potential for the presence of cultural resources within each dredge area is summarized in Table 4.5-1. As indicated in the table, sensitivity for prehistoric resources within each borrow site may vary laterally based on the occurrence of submerged landforms, and vertically, based on the types of sediments revealed by the vibracore samples. Because the sensitivity assessments are generalized from the relatively limited data provided by vibracores and seismic studies, it is possible that cultural deposits are preserved in contexts that are assessed generally as of low sensitivity.

Table 4.5-1
Summary of Cultural Resource Sensitivity for Borrow Sites

Borrow Site	Potential for Occurrence of Prehistoric Materials in Dredge Area	Potential for Occurrence of Historic Resources in Dredge Area
SO-6	Low to 8 feet; moderate below 8 feet	No side scan sonar available
SO-5	Low	Low
MB-1	Low throughout south half; moderate in north half to 8 feet; high below 8 feet	Low to moderate

To avoid potentially significant impacts, a monitoring program would be implemented that is designed to identify cultural resources encountered during dredging operations. Monitoring procedures would be specified in a monitoring plan that is approved before dredging is initiated and would be similar to the successful monitoring performed for RBSP I. As was done in the 2001 program, the monitoring would be conducted by a qualified archaeologist and would be instituted as material is dredged from each borrow site. Monitoring would consist of periodic spot-checking of materials dredged from low and moderate-sensitivity contexts and continuous monitoring of materials from high-sensitivity contexts. If monitoring reveals cultural materials indicating that dredging had entered into an archaeological deposit, then the dredging operation would be permanently relocated away from that site and a 250-foot-wide buffer would be established around the site. Because no cultural sites were discovered in RBSP I, no buffers were necessary.

Mitigation Measures for Alternative 1

<u>Receiver Sites</u>

Because no impacts to significant cultural resources would occur at the receiver sites, no mitigation would be necessary under this alternative.

<u>Borrow Sites</u>

As described above, a monitoring program would be implemented prior to and during the dredge operation to verify that no impacts to submerged NRHP or CRHR-eligible archaeological resources occur. If such resources are identified, they would be recorded and avoided. No further measures would be necessary under this alternative.

4.5.3 Alternative 2

Impacts of Alternative 2

Receiver Sites

The impacts at the receiver sites under this alternative would be similar to those of Alternative 1. Because no impacts to NRHP or CRHR-eligible cultural resources would occur at the receiver sites, no mitigation would be necessary under this alternative.

Borrow Sites

Potential impacts to cultural resources within the borrow sites within this alternative are similar to those of Alternative 1.

Mitigation Measures for Alternative 2

Receiver Sites

Because no impacts to NRHP or CRHR-eligible cultural resources would occur at the receiver sites, no mitigation would be necessary under this alternative.

Borrow Sites

Because no significant impacts would occur at the borrow sites, no mitigation would be necessary under this alternative.

4.5.4 No Project/No Federal Action Alternative

No dredging would occur under this alternative and therefore no impacts to NRHP or CRHR-eligible cultural resources would occur.

4.6 LAND AND WATER USE

This analysis of land and water use impacts addresses the alternatives' compatibility with existing and planned land and water uses, conformance with local land use plans, and compatibility with recreational uses.

Compatibility with existing land and water uses is assessed to determine whether the proposed project (i.e., dredging and beach replenishment) would conflict with existing, planned, and adjacent uses. Conformance with land use plans is based on consistency between the proposed use and adopted plans such as the general plans discussed in Section 3.6. Permitting requirements are discussed in Section 2.7 of this EA/EIR. Noise-related land use issues are described in Section 4.13 (Noise). Information regarding potential impacts to commercial fishing operations is found in Section 4.8 (Socioeconomics).

4.6.1 Significance Criteria

The significance of potential land and water use impacts associated with implementation of the proposed action is based on the level of land use sensitivity in areas that would be affected. In general, land and water use and recreational impacts would be significant if they would:

- be inconsistent or noncompliant with applicable land or water use patterns or policies;
- preclude the viability of existing or planned land or water use activities (including surfing);
- preclude continued use or occupations of an area;
- be incompatible with adjacent or vicinity land or water use to the extent that public health or safety is threatened; or
- result in long-term impacts to the quality or quantity of existing recreational opportunities.

4.6.2 Alternative 1

Impacts of Alternative 1

Receiver Sites

Land Use Policies

As described in Section 3.6, the general plans, community plans, and LCPs of all applicable jurisdictions recognize the need to implement beach replenishment activities and the proposed project would be consistent with guiding documents at all receiver sites. In fact, several jurisdictions have adopted policies and goals specifically in support of a regional approach to sand replenishment and erosion control. Artificial nourishment with excavated sand is clearly identified as an acceptable response for erosion control.

In addition, as described in Section 3.6, the final MPA regulations covering California's South Coast Study Region have been adopted as of December 15, 2010. The Moonlight Beach and Cardiff receiver sites and SO-6 are encompassed by the Swami's SMCA. Regulations specific to the Swami's SMCA include an exception to allow sand replenishment and sediment management activities, however, and no impacts or conflicts are anticipated.

Access and Safety

Recreational activities at all receiver sites include some or all of the following: surfing, stand up paddle boarding, swimming, diving, surf fishing, sport fishing, sailing, picnicking, and sun bathing. Several beaches support adjacent public campgrounds, recreational park facilities, or piers. During replenishment, there would be temporary beach closures of portions of each receiver site; however, following project completion, total recreational beach area would be increased. Both short-term partial closures and long-term benefits are addressed below.

Because of public safety concerns associated with heavy equipment operations on the beach, replenishment operations would require that portions of each the receiver site and offshore area be closed temporarily to the public during construction. As discussed in Section 2.4.3, the total reach of beach within receiver sites would not be closed for the entire duration of construction. Closure areas would shift as replenishment activities move along the shoreline, and would be maintained on a 24-hour basis within immediately affected portions of the receiver sites. Temporary beach closures would be limited to short lengths of beach in which active construction is occurring. The length of beach closure at any time is anticipated to be between 100 and 325 linear feet of beach at any given time, as described in Table 2-6. The cumulative length of closure would vary by receiver site; greater volumes of sand would require longer periods of restricted access. Table 2-5 identifies the total construction period associated with each receiver site, including mobilization and demobilization. Access restriction would result in a temporary redistribution of beach activities to surrounding areas.

Once sand has been placed in the active construction zone, closure fencing would be shifted down the beach and that area just replenished would be immediately open for public use. Pipeline segments remaining in open portions of the beach would be covered at consistent intervals to facilitate access across, however, partial burial of the pipeline along the beach and the size of the pipeline allow people to cross along the length of the pipeline. During implementation of RBSP I, observations of recently opened stretches of beach indicated that public use of replenished beach areas was immediate and occurred directly up to the construction limits. In addition, remaining pipeline segments were easily crossed and used by the public (e.g., as surfboard racks, backrests). Horizontal access along the back beach or adjacent public corridors would be maintained to either side of the active sand placement area at most of the receiver sties. Some sites may require temporarily restricted horizontal access if sand placement must extend to the back beach and no alternative horizontal access exists (e.g., where a wet beach directly abuts bluffs). In these locations, such as Solana Beach, consistent vertical access will remain open to allow the public to access beach to either side of the active sand placement area as long as public safety is not compromised. In addition, closures along the back of the beach would be limited to the extent practicable during daytime hours. These beaches typically do not contain a large dry beach and are characterized by wet sand beaches. Therefore, sand placement along the footprint will immediately enhance the ability of the public to use the beaches for recreational purposes.

The potential effect to beach users would be greatest during summer periods of high activity so initiating construction during spring instead of late summer would result in more potential conflicts. However, sand placement in spring would maximize the available material during the peak usage period because it would be less likely washed away by winter storms. SANDAG would coordinate the schedule at individual receiver sites to the extent possible to avoid major holidays and special events.

The worst-case situation would occur at the Oceanside receiver site, which would receive 420,000 cy of material over a 40-day period. Within that month, the typical length closed on a given day would be 175 feet. Receiver sites at South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, and Imperial Beach would have localized restrictions over an estimated 10 to 15 days. Construction at the Torrey Pines and North Carlsbad receiver sites would occur over approximately 20 days. At all receiver sites, access restriction would be a temporary localized effect and would not result in a permanent significant condition. Conversely, without beach replenishment, beach use could decline as beaches continue to deteriorate (i.e., erode).

Surfing

Surfing could potentially be impacted by any of the following: modification of existing sandbars and reefs by sand placement and deposition, access being denied during construction, poor water quality caused either by turbidity generated during and after construction of the beach fill, or contaminants being released into the surf zone by the fill material. These potential impacts are discussed below.

Modification of Existing Sandbars and Reefs by Sand Placement and Deposition. The project could add a relatively large sand volume to the system over a short time frame, thereby modifying existing sandbars and reefs by changing bottom conditions at the receiving beach sites as well as nearby beaches. Addition of sand to a beach break can steepen the nearshore beach profile, which can result in waves that closeout rather than peak on a more shallowly sloped nearshore bar. This impact could be adverse and significant if surfing is precluded by sand deposition causing waves to closeout over a long period of time (months) or result in a perpetual shorebreak at the beach rather than a nearshore bar for waves to break over. Shorebreak or close-out conditions may exist over a temporary short-term period while the sand is naturally redistributed over the bottom. The slight difference in grain size of sand proposed for placement as part of RBSP II and existing beaches is not anticipated to substantially change these processes.

Although only one or two receiving beaches have reef breaks located immediately offshore (Leucadia for both Alternatives, and Fletcher Cove for Alternative 2), some placement sites are located in proximity to reefs that may be temporarily impacted by sand. In particular, placement of sand at Leucadia, Moonlight, Cardiff, and Solana Beach receiving beaches could result in sand being transported to nearby reef breaks. Some sediment accumulation is anticipated in reef areas; however, natural transport processes continually move sediments through these reef areas under normal conditions. Additional sand placed as part of the proposed project would not substantially alter sand transport patterns in these areas. Some sand may accumulate in localized portions of existing reefs on a seasonal or short-term basis, which could temporarily affect confined portions of existing reef surf breaks. While there may be short-term changes to the wave characteristics at individual surf breaks, these effects would be temporary as the sand is naturally distributed and would be less than significant. No long-term effects to surfing should occur from the project.

The project may cause potentially beneficial impacts to surfing by contributing sand to the nearshore that would be deposited in bars throughout the receiving beach cities. More sand in the system provides material for enhanced sandbar formation and may result in larger or longer-lasting bars, and improved surfing conditions. Informal qualitative observations regarding changes in surfing conditions after implementation of RBSP I have been offered by various beach users and city representatives. At Beacon's, surfers noted that the reef was temporarily overtopped, modifying surfing conditions for a period (Weldon 2011). Several other locations were noted to have shown improved surfing conditions due to sandbar formation offshore (Gonzalez 2009; Dedina 2010). Permanent impacts would not occur from sand placement as bathymetric changes are short term and should ultimately revert to pre-project conditions after a relatively short period (such as one season).

Access Denied during Construction. Access to portions of the receiving beaches would be restricted during construction, but this restriction would be short term and temporary, with access restored at completion of the project. Also, the surf zone would not be closed during construction. Surfers would be able to access surfing sites entering the water from either end of the construction area. Impacts would be less than significant.

Poor Water Quality Caused Either by Turbidity Generated during and after Construction of the Beach Fill, or Contaminants Being Released into the Surf Zone by the Fill Material. Offshore sand sources were tested for chemistry in fall 2009 to verify material was free of contaminants (Moffatt & Nichol 2010a). The sediment testing results were compared to the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SQUIRT) Guidelines (Buchman 2008). The borrow site materials were found to be acceptable and the materials appropriate for beach nourishment. The consistency determination is pending formal approval by the USEPA and USACE in coordination with the RWQCB. Therefore, health threats to surfers would not occur from material sand on the beach.

Turbidity would be generated by the project, which could result in temporary impacts to water clarity as discussed in Section 4.3. Turbidity would be monitored during construction in accordance with the project's RWQCB permit. Short-term turbidity would very likely occur during construction but would primarily be a public perception issue and not a health problem. This condition would only last as long as project construction and would return to normal shortly after completion. Impacts to surfing from poor water clarity would be temporary and less than significant.

The proposed project would not include development or require construction or expansion of existing recreational facilities and, therefore, would not have an adverse physical effect on the environment. However, the proposed beach fill would increase the beach area, which would be a beneficial effect and could lead to increased recreational usage of the beach fill sites.

Once the receiver sites have been replenished, recreation activities would resume and be enhanced. Replenishment would create additional recreational beach area as calculated in Appendix G. Following 2 months after replenishment (representing an "equilibrium beach berm condition" after reworking by waves and tides for a portion of a season), an estimated 38 acres of new recreational area would be created across all of the proposed receiver sites. It should be noted that the benefit is also temporary. At the majority of locations, the added recreation beach would either not persist for 5 years, or added beach area would be less than 1 acre after 5 years. Where beach area would be created, an estimated 187 acres of recreational beach currently exists. Postconstruction, total recreational beach area would be approximately 225 acres.

No direct impacts would occur to the City of Encinitas Marine Life Refuge because there would be no sand placement in that area. Potential impacts to reefs and biological resources in the vicinity are discussed in Section 4.4.

Finally, the replenishment action would be restricted to sand placement on the beach and would not preclude the viability of any planned land use, either onshore or offshore.

Borrow Sites

At proposed borrow sites, kelp harvesting operations would not be affected. Borrow locations have been specifically sited to avoid these resources. For information on impacts to kelp, refer to Section 4.4 (Biological Resources). Impacts to commercial fishing are discussed in Section 4.8 (Socioeconomics).

Whale watching activities would not be adversely affected near any of the proposed borrow sites. As described in Section 4.4 (Biological Resources), marine mammals such as whales would not be adversely affected. While some access restrictions would be in place during active dredging, these would be localized to the specific borrow sites and would not preclude boating in other offshore areas. Therefore, the dredging and replenishment operations would not negatively affect whale watching operations.

Similarly, recreational fishing activities would not be significantly affected by the proposed dredging or replenishment operations. Boaters would be restricted from areas directly in the vicinity of dredge sites and pipelines, but this would be a short-term effect to localized areas. Specific land and water use issues are discussed for each borrow site below.

SO-6

The San Diego-La Jolla Underwater Park is located approximately 4 miles south of SO-6. Due to the short-term nature of dredging and distance from the San Diego-La Jolla Underwater Park, no significant long-term impacts to the features within the lease area are anticipated.

SO-5

The San Diego-La Jolla Underwater Park is located approximately 2 miles south of SO-5, which is adequate distance to avoid any adverse impacts to the park. No other land or water use impacts would occur under Alternative 1.

MB-1

MB-1 is within the MBAR (which includes Wreck Alley) and is adjacent to the SDURA. As illustrated in Figure 2-3, there are no artificial reefs within the dredge area itself. The closest artificial reef utilized primarily by sport fishermen is the Mission Bay Bridge Wreckage Site No. 1, located approximately 1,000 feet to the south. The closest sunken structures or wrecks frequently utilized by sport SCUBA divers are the NOSC Tower, the *Ruby E*, and the *Yukon*, located approximately 1,150, 2,200, and 4,100 feet from the dredge site, respectively. While these are the most popular local wrecks for dive charter businesses as well as recreational divers, these artificial reefs/dive sites would not be directly impacted during dredge operations. Turbidity plumes are not projected to reach the dive sites. There may be increased underwater noise experienced by those visiting nearby underwater sites, and dive and fishing vessels transiting between features may have to maneuver to avoid dredge operations, but dredging operations at this borrow site would be short term (approximately 14 days). Impacts would be less than significant.

Mitigation Measures for Alternative 1

No significant impacts have been identified; accordingly, no mitigation measures are necessary.

4.6.3 Alternative 2

Impacts of Alternative 2

Receiver Sites

Under Alternative 2, land use and recreation impacts would be similar to those described for Alternative 1, although the length of time and locations of receiver site access restriction would vary, as described in Tables 2-5 and 2-6. Sand volumes would increase at the South Carlsbad North, Solana Beach, and Imperial Beach receiver sites. In addition, the South Carlsbad South receiver site would be included with this alternative. The maximum duration of restricted access would occur at the Imperial Beach receiver site, which would require a cumulative period of 70 days to complete sand placement. Other sites with more sand would experience construction (and restricted access) for several additional days compared to that proposed under Alternative 1. As noted in Section 4.6, access restrictions would apply to a localized portion of the beach and not the entire length of the receiver site. Recreation impacts would be short term and would be less than significant at all receiver sites.

Surfing impacts under Alternative 2 would be similar to Alternative 1. The increased volume of sand delivered to specific receiver beaches may increase the risk of the creation of a close-out beach break for a longer period of time. However, the sand would disperse and these impacts would be temporary. Conversely, the addition of sand may result in a long-term benefit to surfing in the region by contributing more sand to the nearshore that would be deposited in bars throughout the receiving beach cities. More sand in the system provides material for enhanced sandbar formation and may result in larger or longer-lasting bars, as well as improved surfing conditions.

An increased volume of sand delivered to these beaches could result in more sediment accumulation at nearby reef breaks. Some sand may accumulate in localized portions of existing reefs on a seasonal or short-term basis, which could temporarily affect confined portions of existing reef surf breaks. While there may be short-term changes to the wave characteristics at individual surf breaks, these effects would be temporary as the sand is naturally distributed and would be less than significant. Sand accumulation and transport through these reefs occur under natural transport processes under normal conditions and are not expected to be substantially altered with implementation of Alternative 2.

Replenishment under this alternative would also provide benefits by creating new recreational beach area. Approximately 57 acres would be created for a total postconstruction recreational beach area of approximately 244 acres. Long-term (5 years) beach area of 1 acre or greater is anticipated to persist at Oceanside, off Agua Hedionda, South Carlsbad North, Leucadia, Cardiff, Solana Beach, Del Mar, Torrey Pines, and Imperial Beach.

Borrow Sites

Under this alternative, water use and recreation impacts would be similar to those described for Alternative 1. The overall impact would be short term and less than significant.

Mitigation Measures for Alternative 2

No significant impacts have been identified; therefore, no mitigation measures are necessary.

4.6.4 No Project/No Federal Action Alternative

No dredging or beach replenishment activities would occur under the No Project Alternative. There would be no land and water use or recreation impacts under this alternative and no mitigation measures would be necessary. No recreational beach area would be created and this alternative would not fulfill the goals and policies of the various general plans and LCPs, as described in Section 3.6, nor satisfy the project purpose and need.

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4.7 AESTHETICS

4.7.1 Significance Criteria

San Diego's coastal beaches are some of the region's most important visual resources. For this reason, the coastal areas of the San Diego region are considered a highly sensitive visual resource. Coastal beaches offer scenic views that are considered a trademark of the Southern California area. Additionally, all of the 11 possible receiver sites would be visible to residents, scenic drivers, or recreationalists, and in some cases all three types of viewers. For these viewer types the scenic quality affects the value of an activity and they are considered sensitive viewers. Therefore, construction or operation that would cause permanent degradation of existing views along coastal beaches would be considered significant. Degradation may result from scale and size of project features, site design, color and texture contrast, or permanent introduction of light and glare.

4.7.2 Alternative 1

Impacts of Alternative 1

Receiver Sites/Temporary Pipeline Routes

Under Alternative 1, beach nourishment activities could occur anytime within 24 hours a day, 7 days a week. Lights may be necessary to allow for sand placement on the receiver site after the sun sets. Lighting for the project would be shielded and directed away from residences and habitat, to the extent practical.

Oceanside

The proposed project would alter existing views along the receiver site during proposed beach replenishment operations because a pipeline would discharge sand, grading equipment (typically two large machines) would construct a training dike and move the sand and pipelines around the site, and several construction personnel would operate the equipment. If a hopper dredge is used, it would make periodic deliveries to the site. This boat would be anchored just offshore while the load of sand is delivered via pipeline to the site. If a cutterhead dredge is used, delivery would be made entirely via pipeline. Construction lights would be placed at the work place to allow for construction after daylight hours. The City of Oceanside has a Light Pollution Ordinance (Ordinance No. 091-46) that prohibits certain types of outdoor lights and restricts outdoor lighting between 11:00 p.m. and sunrise. The intent of this ordinance is to support Palomar

Observatory by restricting certain light fixtures that emit undesirable light rays into the night sky. There are exemptions for various activities and types of lighting. One exemption allows outdoor facilities to remain illuminated to complete specific organized activities that are in progress and under illumination at 11:00 p.m. The proposed construction lighting would be short term in nature and exempt.

The proposed project is anticipated to take up to 40 days at the Oceanside receiver site. Sand placement operations during this time would temporarily degrade existing coastal views in the area. Residents along the site and users of Buccaneer Beach Park would have clear views of the activity when the sand placement would occur near those specific uses. More distant views would be available for persons on the pier or the Strand. Sand placement would not affect the entire length of the receiver site for the 40-day construction period. Instead, approximately 175 LF would be affected in any single day. Sand placement activities at the southern end of the receiver site would be a little less than a mile from the Strand, which would reduce the visual contrast of the action for those viewers. Subsequent to beach replenishment operations, the receiver site beach would be enhanced. Sand replenishment would widen the existing beach, thereby eliminating views of the eroded beach south of Wisconsin Avenue. Operations would be short term overall and the daily construction area would travel down the beach, which would reduce the visual contrast to any one sensitive viewer. The end result would be enhancement of this important resource, and visual impacts would be considered less than significant.

Core samples have been taken from borrow sites SO-5 and SO-6, which are anticipated to supply the material for this receiver site (URS 2009). The beach fill material from this borrow site would be nearly identical in color to the existing beach sand as evident from archived samples. As is typical in beach nourishment projects, the material would be washed and reworked by waves, bleached under exposure to the sun, and mixed with existing sand. Any discoloration of the sediment would be short term (USACE 1984) and no permanent adverse visual conditions would result at the receiver beach.

The delivery pipeline associated with the cutterhead dredge would likely extend northward from North Carlsbad across the Buena Vista Lagoon mouth and be located along the back of the beach at the toe of revetments. Alternatively, a direct pipe route from offshore could make landfall south of 9th Street and be placed on the beach to reach the receiver site. During construction, viewers along South Oceanside Beach or the Strand would see trucks and crew assembling the pipeline, which could take 2 to 4 days. In the remaining time period, the pipeline would be inert on the beach. Because the pipeline would serve both the Oceanside and the North Carlsbad receiver sites, the pipeline could be on the beach for approximately 63 days. The pipeline would be clearly visible when placed on the light sand because of its size (up to 3 feet in diameter) and dark color. However, where the pipeline would be placed at the base of the Strand or along dark riprap the contrast would be reduced overall. Views for most residents looking west at the beach would be substantially eliminated because other features such as riprap would intervene. The visual contrast would be considered less than significant due to the presence of other man-made features (i.e., sea walls and riprap) that reduce the visual contrast, the placement of the pipe as far up the beach as possible, and the temporary nature of the pipeline.

North Carlsbad

Similar to the Oceanside receiver site, views of the North Carlsbad receiver site would be temporarily degraded during pumping and construction operations associated with the proposed action. At this site, the sand fill area would be constructed entirely seaward of the 1998 surveyed mean high tide line. Immediately following construction, the beach area directly in front of the existing revetment would remain at the current elevation, approximately 6 feet above MLLW. At an estimated 35 feet seaward of the revetment, a slope would extend up to the top of the replenishment fill at 12 feet above MLLW. Residents would view this higher berm near the middle of the beach and extending seaward; the berm would not block views of the ocean but would present a not-typical beach view. Immediately following sand placement, wave action and tentative beach maintenance would flatten the berm and reduce the elevation difference. Ultimately, replenishment would enhance this degraded beach. Further, beach replenishment operations would be short term (approximately 23 days). No permanent adverse visual impact would occur and impacts to aesthetic resources would not be significant.

The sand source for this receiver site would be either SO-5 or SO-6, which have material nearly identical in color to the existing beach. Over time the fill material would be washed by waves, bleached by the sun, and mixed with the existing material to further reduce any contrast. No permanent visual effects would result and the impact would be less than significant.

The pipeline would extend directly inshore from the ocean. Where it would be located at the base of the walkway or up against the existing slopes, contrast between the pipe and sand would be reduced and much of the view from existing residences would be obscured. Where it would be placed on sand not adjacent to the features, it would be more visible. However, no permanent visual effects would result and the impact would be less than significant.

South Carlsbad North

Views at this receiver site would be available to campers at the state park. During construction, which would last approximately 15 days, the receiver site would be temporarily degraded from pumping and construction operations. In any given day, approximately 200 LF would be affected by direct closure. However, the proposed project would ultimately improve long-term views in the area through the enhancement of the existing beach. Because of the short-term nature of the project and the fact that construction would move along the site, minimizing the visual contrast at any one location, no permanent adverse visual impact would occur.

The dredged fill material for this site would come from SO-5 or SO-6. The material from these borrow sites has been found to be relatively light in color with few organics so the contrast between the fill material and the existing sand would be minimal (URS 2009). Eventually, natural processes including wave washing, sun exposure, and mixture with existing sand would eliminate any noticeable differences between sediment colors.

The pipeline for this receiver site would reach landfall 1,000 feet south of the north end of the South Carlsbad State Beach campground (approximately 2,300 feet south of Encinas Creek mouth). There are no permanent residents to view this temporary pipeline. Because the pipeline would be located at the base of the bluffs it would be outside the field of vision for drivers along Carlsbad Boulevard, except where the roadway is near the lagoon mouth and height differential would not obscure views. The short-term nature of the pipeline and reduced visibility to sensitive viewers support a finding of no significant impact.

Batiquitos

At this receiver site, residents on the bluffs would be able to view construction activity for approximately 12 days. As with the other receiver sites, the short-term nature of the impact would be outweighed by the overall enhancement of the beach. The visual impact of construction would be considered less than significant. Material for nourishment would be from either SO-5 or SO-6, which have relatively light sand color, so the contrast between the existing and new material would be minimal to nonexistent. Any contrast would eventually be eliminated by wave action, exposure to the sun, and seasonal mixing.

The pipeline for this site would reach land from directly offshore and be placed as close to the bluff face as possible. The visual impact is discussed in the borrow site section below.

Leucadia

This receiver site is much like the southern portion of Batiquitos with residents along high bluffs viewing a sand and cobble beach. Construction activities would occur over approximately 12 days and typically cover 325 LF in a day. As with the other receiver sites, the overall contrast of the action at any given sensitive view would vary over time because the construction activity would continually move down the beach. The nourishment material would be from either SO-5 or SO-6, which have relatively light-colored material, resulting in little contrast with the existing beach sand. The short-term visual change would not be considered significant and the enhanced beach would result in a visual benefit.

The pipeline to serve this site would be placed at the base of the bluff, coming directly inshore at the northernmost end of the beach fill site. Alternatively, the pipe could be extended south from the landfall site at Batiquitos to reach Leucadia. While visible, the contrast would be minimized by its location next to a much larger cliff face and dark colored riprap. Additionally, the viewscape of expansive ocean would not be obscured for either beach users or residents. The visual impact would not be significant.

Moonlight Beach

In this location the viewers would include not only residents on the bluff tops but park users at Moonlight State Beach. Construction activity would occur over approximately 10 days with construction in a typical day affecting approximately 150 LF of beach. As with the other receiver sites, the overall contrast of the action would be reduced at any given sensitive view because the construction activity would continually move down the beach. The material for this site would be from either SO-5 or SO-6, which have relatively light material, resulting in little contrast with the existing sand. The short-term visual change would not be considered significant and the enhanced beach would result in a visual benefit.

The pipeline in this location would most likely reach shore at the foot of D Street from directly offshore. Alternatively, the pipeline could be located at the base of the bluffs between the Leucadia receiver site and the Moonlight Beach site. At Moonlight State Beach Park, the pipe would be placed as far landward as possible. The visual contrast would be temporary and less than significant.

Cardiff

This receiver site is characterized completely by cobbles and placement of material would greatly enhance the beach. Construction activities would occur over approximately 10 days. Nearby viewers are drivers, users of the beach, and persons driving at Restaurant Row. There are residential viewers in the hills to the north and south of San Elijo Lagoon. Their views include numerous elements such as the lagoon, beach, and ocean. All material would be piped from borrow site SO-6, which provides light-colored sand very similar to the existing beach color. Overall, the view of sand placement equipment would be short term, there are numerous elements in the viewscape that minimize the overall importance of the receiver site itself, and the enhancement of the beach from cobble to sand would be beneficial. The visual impact would be less than significant.

Solana Beach

This receiver site has sand and cobble below bluffs with residences constructed along the top, as well as a recreation area at Fletcher Cove. Construction activities would occur up to 15 days and typical construction in 1 day would be approximately 200 feet. The activity would move along the length of the beach, which would reduce the visual contrast to any one viewer. The delivery pipeline would come from offshore and would make landfall at a point 1,350 feet south of the south end of Fletcher Cove (where Dahlia Drive would meet the sea if it were extended to the west from its present terminus). However, this pipeline would only serve this single site and would be utilized up to 15 days. The views of construction and dredging equipment would be short term and less than significant.

The borrow site that would serve this receiver site (SO-5) has light-colored sand material that matches the existing beach sand. Any potential color contrast would be reduced by wave action, exposure to the sun, and mixing, and there would be no permanent adverse visual conditions.

Torrey Pines

Foreground viewers of this site are limited to recreational users at the state beach and drivers on North Torrey Pines Road. Distant views are available from residences on the hills north of Carmel Valley Road. Construction activities would occur for up to 22 days and would enhance and widen this thin cobble beach. The nourishment material would be similar to the existing beach and would be washed by waves, exposed to the sun, and eventually mixed with the existing sand to eliminate any potential contrast. The visual impact is regarded as less than significant.

The delivery pipeline would extend directly onshore from an offshore mooring location. In this location it would not be visible from residences along the bluff tops, but would be visible to beach users. Given the presence of other man-made features such as riprap as well as the temporary nature of the feature, the visual impact would be less than significant.

Imperial Beach

The majority of this receiver site is characterized by a cobble beach. Existing residences front the beach behind riprap protection and would have clear, foreground views of construction activity. Construction activity would be approximately 14 days. An estimated 300 LF per day would be affected over the more than 1-mile-long site. The activity would move along the length of the beach, which would reduce the visual contrast to any one viewer. The proposed materials would be from MB-1, the same borrow site as RBSP I. That material is slightly more coarse and light in color than the existing beach but as fill material is placed on the site, it would be washed and bleached to blend with the existing sand. Because of the short-term nature of the activity and the beneficial enhancement of the beach after nourishment, the visual impact would be regarded as less than significant.

Borrow Sites

Visual impacts as a result of dredging activities at all borrow sites would be similar. For this impact analysis, the SO-5 borrow site is addressed as a representative worst-case scenario because it would have the longest duration of construction and has the closest sensitive viewers.

At its closest point, SO-5 would be located approximately 0.6 mile offshore. Residents on the bluffs would have some view of the dredging operation for its entire duration. Because SO-5 would serve eight receiver sites (Table 2-5), dredging would continue within the dredge area for over 95 days. The dredge area is approximately 124 acres in size. Depending on the type of dredge, the view would be slightly different. The cutterhead dredge would appear as a boat working in one area for some time, then moving to another nearby location, and then another within the dredge area and would remain offshore. While possibly visible, it would appear on the horizon much like many other boats (fishing, pleasure, etc.), which are active along the coast. It would not be highly evident or dominate the landscape. The hopper dredge would come to shore periodically at each receiver site, which would make it more visible, but this would not be a permanent or significant visual impact. For viewers in Del Mar, which does not have a receiver site and would only see the dredge while at the borrow site, the visible activity would be limited and intermittent. Typically, a hopper dredge would be visible for 2 to 3 daylight hours, then transit to a receiver site (out of sight).

Similar to SO-5, visual impacts at all borrow sites would be short term. Dredging activities would not be highly evident or dominate the landscape. Accordingly, impacts would be less than significant.

Mitigation Measures for Alternative 1

No significant impacts have been identified, and no mitigation measures would be necessary.

4.7.3 Alternative 2

Impacts of Alternative 2

Receiver Sites/Temporary Pipelines

Under Alternative 2, beach nourishment activities could occur anytime within 24 hours a day, 7 days a week. Lights may be necessary to allow for sand placement on the receiver site after the sun sets. There would be one more receiver site (South Carlsbad South) under this alternative than under Alternative 1. Under this alternative, beach replenishment activities at the Oceanside, North Carlsbad, Batiquitos, Leucadia, Moonlight Beach, Cardiff, and Torrey Pines receiver sites would be identical to Alternative 1 and the impacts would be identical—short-term views of construction resulting in long-term beach enhancement. Three receiver sites, South Carlsbad North, Solana Beach, and Imperial Beach, would have a larger footprint under this alternative, and longer construction duration, but impacts would remain short term and similar to those described for Alternative 1. The South Carlsbad South receiver site is addressed below.

South Carlsbad South

Beach replenishment at the South Carlsbad South receiver site would have visual impacts identical to South Carlsbad North. Nearby viewers would be campers in the state park. During implementation, views would temporarily degraded but on any given day only 200 LF would be affected by direct closure. Construction is anticipated to occur over a 14-day time period. Fill for this site would come from either SO-5 or SO-6, which would be similar in color to the existing receiver site beach. Natural processes would eliminate any noticeable differences over time and the impact would not be significant. As with Alternative 1, there would be no significant, long-term impact associated with the pipeline. Because of the short-term nature of the project and long-term enhancement benefit, visual impacts would not be considered significant.

Borrow Sites

Visual impacts associated with borrow sites would be similar to Alternative 1. Dredge activity at sites SO-5 and MB-1 would be increased in duration. The overall time of borrow activity would be an estimated 7 weeks more under Alternative 2 than Alternative 1. There would not be long-term, significant visual impacts.

Mitigation Measures for Alternative 2

No mitigation would be required as no significant impacts have been identified.

4.7.4 No Project/No Federal Action Alternative

With the No Project Alternative, the beaches would not be enhanced. Where there are visible cobbles they would remain, and narrow beaches would not be widened. Adjacent residents and beach users would not experience the disturbance of construction or views of the pipeline; however, they would not experience the benefits of more scenic beaches.

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4.8 SOCIOECONOMICS

As stated in Section 3.8, NEPA requires consideration of "economic" and "social" effects (40 C.F.R. § 1508.8) but CEQA only requires evaluation of population and housing such that increased population or housing results in physical impacts. There would be no housing constructed with this project and no increase in population so there is no applicable CEQA analysis.

The social and economic effects of the action would be beneficial. The nourished beaches would have wider and larger sand areas, or would replace beaches with exposed cobblestones with sand-covered beaches. 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 receiver locations.

4.8.1 Significance Criteria

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 long-term health. Potential impacts are considered over time with no particular start date. NEPA does not require explicit definition of significance criteria. Potential impacts specific to environmental justice concerns are addressed in Sections 6.6 and 6.7.

4.8.2 Alternative 1

Impacts of Alternative 1

Commercial Fisheries

Previous interactions with commercial fishermen and their representatives during RBSP I, and in preparation for RBSP II, identified four main areas of concern regarding beach replenishment projects. These concerns all focus on the potential for loss of resources and income and can be summarized as follows:

- Sand placed on the beaches would move from the beaches onto sensitive habitat areas causing immediate loss of commercial resources associated with these habitats (e.g., lobster, crab, urchin), effectively causing area preclusion for some period of time.
- Turbidity plumes from the project would cause commercial resources to move from the area for some period of time, effectively causing area preclusion for some period of time.
- Movement of the sand from the beaches onto sensitive subtidal habitat areas would adversely affect nursery habitat, causing significant long-term damage (through population reduction) to the fishery.
- Dredging operations would 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.

It is appropriate to note that commercial trawl and gill netting operations would not be directly affected by this project because these activities are not permitted within 3 miles of the coast. California halibut (ranked sixth in value among local nearshore species) are commercially fished using nets and trawls and these methods are generally restricted to waters at least 3 miles from shore. Since the borrow sites are all located approximately 1 mile or less from shore, no impacts are predicted for this component of the fishery.

Area Preclusion Issues

Socioeconomic impacts to the commercial fishery can be examined in terms of the regional fishery and individual fishing (local level) operations.

<u>Preclusion in the Regional Perspective</u>. In terms of the regional fishery, there would be no significant impact to the overall San Diego region fishery from the proposed project. This conclusion is based on the distribution of the commercial catch among fish blocks along the coast, and the relatively low contribution of the North County area, where most dredging and sand placement would occur, to the overall fishery. Looking at the three North County fish blocks in terms of aggregate value over the years 1999 to 2008, for the four most valuable nearshore species currently fished, the North County accounted for 27.5% of the area lobster value, 2.6% of the area urchin value, 47.4% of the area squid value, and 24.2% of rock crab value. To result in even a 10% reduction of the overall San Diego County fishery for any of these

species, the project would have to degrade the North County lobster catch by 35.5%; more than eliminate the North County urchin catch; degrade squid catch by 27.9%; and degrade rock crab catch by 40.5%.

There is a slight chance that the MLPA Initiative may change regional commercial fishery patterns by precluding some nearshore areas to commercial fishing. As stated in the MLPA FEIR (URS 2010), approximately 7.3% of the spiny lobster fishing grounds from the Port of Oceanside may be affected, while 5.9% of the area from the Port of San Diego may be affected. Other fisheries, such as rock crab and urchin, may also be affected. With some nearby nearshore areas closed by the MLPA Initiative, regional patterns may shift and fishermen may move to waters affected by the project; therefore, a loss in value cannot be accurately estimated, but it is not anticipated to be substantial.[6]

Setting aside halibut and sheephead fisheries as having relatively low levels of effort in the North County, it is possible that there would be localized impacts on the lobster, rock crab, and urchin fisheries. That is, if fishermen are displaced from certain areas, effort would be directed toward other areas. This shift in effort could result in a marked increase in fishing pressure on the areas to which the effort was redirected and cause localized overfishing of these resources. This type of impact, except for small areas, is not considered likely for several reasons. First, the model-predicted sand movement shows a concentration of longer term sand deposits in relatively few, small areas. These areas are typically near the mouths of lagoons (there are several in North County) and/or where the coast contains a feature that is irregular enough to disrupt the smooth flow of sand in the nearshore area (North Carlsbad areas). Second, fishermen would attempt to avoid reducing their catch per unit by not placing too much gear in any one area. Third, fishermen move traps that are not productive, so that effort is redistributed based on relative level of success.

<u>Preclusion in the Local Level Perspective</u>. Using available quantitative data to examine small, localized impacts within the North County area is difficult. In general, there is an inherent difficulty in using available quantitative data to assess localized impact to the fishery. CDFG data are collected by two separate geographies: fish block data for catch and port data for landings. Landings data are useful for a look at fisheries in a general area, but (particularly in the case of larger ports) may include data from resources caught considerable distances away from the port. Fish block data, while more closely tied to the actual distribution of resources, are less

[6] The MLPA FEIR suggests that proposed closures may actually provide a benefit, as "the restrictions on commercial harvest in certain areas will likely increase the productivity of these areas and potentially 'seed' other areas open to commercial harvest via increased larval output" (URS 2010:5-11).

useful in understanding localized impacts. Fish blocks encompass an area that is 10 minutes longitude by 10 minutes latitude, except as reduced in size where a particular block intersects the coastline (Figure 3.8-1). In general, these areas are too large to capture localized project impacts. While the CDFG data have inaccuracies, they are the best available data and are supplied by local fishermen (and fish buyers) themselves. Potential inaccuracies are somewhat minimized, however, by using data from more than one block, and checking San Diego port data against Oceanside port data.

Another problem in quantifying potential impacts attributable to the project is the inherent variability of the fishery from year to year. The relatively large (normal) fluctuations seen from year to year could serve to either dampen or accentuate project-related impacts. For example, the urchin fishery has experienced a wide range of variability by year and by port from 1999 to 2008, with some annual landings near zero pounds and others in excess of 50,000 pounds. Additionally, rockfish landings have experienced wide fluctuations since 1999, with the Ports of Oceanside and San Diego demonstrating almost opposite landing trends over the decade presented.

One way to examine the potential impacts of preclusion to the local commercial fishery is to assess the impact of previous similar projects in the same area, such as RBSP I, at least on a general level. Local commercial fishermen have expressed concerns that previous beach replenishment operations have caused the loss of commercial resources and created a “dead zone” off the beach, which has taken several years to return to normal. The concern is that the proposed project would create similar impacts.

To understand the relationship to RBSP I and the performance of the local fishery, an evaluation was performed of landings reported for 2002, which is the year after implementation of RBSP I. In 2001, approximately 2.1 mcy of sand was placed at 12 receiver sites from Oceanside to Imperial Beach. Commercial lobster landings reported for the Port of Oceanside for the following year (2002) slightly decreased from the previous year (which was the second-highest year on record between 1999 and 2008), from 57,292 pounds in 2001 to 39,551 pounds. In 2003, however, the number of pounds landed for the Port of Oceanside exceeded the catch in 2002 by 12,128 pounds and was similar in pounds and value to the 2000 lobster catch. The same trend is present for urchin for the Port of Oceanside, which experienced a relatively small drop in pounds landed in 2002 compared to 2001 (7,363 fewer pounds), but quickly rebounded in 2003 to levels exceeding those in 2000 and 2001, with 23,902 total urchin pounds landed. Rock crab experienced a relatively steady drop in pounds landed after 2001 to 2004 with a 71.0% decrease over those years. However, the same overall trend is seen in the Port of San Diego, suggesting impacts at an areawide level, as opposed to a local level individual to the Port of Oceanside. Thus, based on the CDFG data for Oceanside landings, there is no evidence of long-term local impacts to the lobster, urchin, or crab fisheries as a result of RBSP I.

In addition to RBSP I, which provides a relative analog to the proposed project's level of effort and geographic distribution, other beach replenishment activities have occurred for decades and there still appears to be an abundance of sensitive habitats, while the commercial catch reported for Oceanside remains high for most commercial species. Indeed, the most recent fishery statistics for Oceanside suggest that the commercial catch is exceeding that of the Port of San Diego (Figures 3.8-2a to 3.8-2d), suggesting either that local factors may be gaining in importance over area factors in determining catch, or commercial species are shifting northward because of larger environmental factors. Regardless, the distribution suggests that the beach replenishment projects in the North County have had minimal effect on commercial resources. If beach replenishment impacts commercial catch, these impacts must be localized and fishermen make up deficits by fishing in other areas, which can include the still-bountiful areas near the Port of San Diego. This would imply that resources are well distributed within each fish block so that localized impacts have little effect overall.

It appears that declines in local fisheries may be more strongly linked to variables other than beach sand replenishment. It is known that El Niño events and winter storms have substantial impacts on commercial fisheries. The 1997 to 1998 El Niño was followed by a precipitous drop in commercial catch for almost every species for all of San Diego County. The medium-ranged El Niño event in 2002 to 2003 did not create the same level of impact as the 1997 to 1998 event but may have slightly affected individual fisheries. It is anticipated that the strong 2009 to 2010 El Niño event that has recently passed will affect catch rates in the county over 2010, but data are not yet available. Other factors include winter storms that cause loss of equipment and hinder fishermen from working their traps, as well as larger economic forces such as higher fuel prices and the nationwide recession that started in December 2007.

Based on the available baseline fisheries data, there is likely to be no significant regional or localized impact 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.

Alternative 1 would require approximately 173 days of dredging, pipeline activity, and beach replenishment. Even though the dredging duration would extend for months, only a small area of the 60-mile coastline would be affected at any one time. That is, with only one or (possibly) two dredges 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 2.4.3, SANDAG is committed to coordinating dredge operations with the U.S. Coast Guard and commercial fishermen so that, via timely notification, areas can be fished the maximum amount of time and only the area of active dredging would be restricted. Thus, there would be no significant long-term preclusion impacts as a result of the dredging operations.

Loss of Nursery Habitat

The nearshore trap fisheries most likely to be affected include lobster, crab, and fish (mainly sheephead). While direct impacts of the proposed project can be evaluated relative to the commercial resources, indirect effects cannot easily be predicted. There is essentially no available information upon which to objectively evaluate the effects of turbidity and sand transport upon the recruitment, growth, and maturation of juvenile lobster on the North County coast. NEPA regulations promulgated by the CEQ address the required approach where incomplete or unavailable information is an issue (40 C.F.R. 1502.22). Generally, the fact that information is unavailable must be indicated and existing, credible scientific evidence that is relevant must be summarized so that methods generally accepted by the scientific community can be utilized. Section 3.8 summarizes the limited studies in New Zealand and Florida on sediment/turbidity and juvenile lobsters. This impact analysis uses that data as well as a focus on the effects of the project on habitats that support lobster populations, specifically surfgrass for nursery and hard-bottom for shelter/foraging. Fish block data for Port of Oceanside landings indicate that 53.1% of the catch came from the Encinitas/Solana Beach fish block area, 30.5% from the Del Mar/Torrey Pines fish block, and 16.4% from the Oceanside fish block. These landings data tend to correlate with the amount of hard-bottom and surfgrass resources reported from within each of these areas. This general correlation supports the approach of evaluating effects to lobster with effects to surfgrass or substrate.

Lobsters are creatures of the nearshore zone and are adapted to wave surge, turbidity, siltation and sand burial of habitat. Juvenile lobsters spend 1 or 2 years in the nearshore area and are dependent upon surfgrass and hard-bottom reef habitats as a nursery area and a refuge from predators. The effects of the beach replenishment and subsequent redistribution of the sands upon these habitats has the potential to cause loss of commercial resources. The project has been designed to avoid indirect impacts to intertidal surfgrass, which would minimize potential impacts to lobster nursery areas (Section 4.4). However, some nearshore low-lying reefs, including a few with nearshore surfgrass, may be affected temporarily by sand redistribution and this could cause a short-term loss of habitat for juvenile lobsters. The significance of this effect upon juvenile lobsters is difficult to determine, but it is judged to be less than significant based upon the sand transport modeling predictions that suggest only limited sedimentation of reef heights that support surfgrass. While increases in turbidity and sand burial would occur from the proposed project, these effects are similar to those of beach replenishment projects that have been ongoing for over four decades with no apparent effect on resources. Therefore, the proposed project may have an adverse impact on the area's ability to function as a juvenile lobster habitat, but this effect is judged to be short term and less than significant. Localized impacts are predicted to occur over small areas of reef supporting surfgrass, kelp, and feather boa that may experience partial sedimentation under worst-case assumptions, but are not expected to result in a significant impact to lobsters at the local population level.

Natural turbidity and silting of reefs from coastal lagoons and river discharges following winter storms does not seem to produce the same effect as sedimentation from sand replenishment activities. Catch rates generally remained high in these areas (Guth 1999). This suggests that it may not be strictly turbidity or siltation effects causing perceived resource loss off of replenished beach sites, and other unmeasured or unknown factors may be responsible. It has been previously suggested that these factors could include sediment contaminants and pathogens that are exposed during dredging and redistributed during beach replenishment. However, testing of borrow site sediments found no evidence of chemical contamination (Section 3.3 [Water Resources]). The closest wastewater outfall to any proposed borrow site is at SO-6, which is approximately 0.8 mile from the discharge area. The other borrow sites are also a substantial distance from wastewater outfalls. Thus, there is little potential for the borrow site sediments to be a reservoir of pathogens.

Direct impacts from dredging would not cause significant impacts to the lobster fishery. The area that would be affected by dredging the borrow sites represents a very low percentage of the available nearshore habitat and the dredge activity at any one location would be limited. Turbidity and siltation from dredging would also be localized and short term (Sections 4.3 and 4.4). After dredging, borrow sites would be deeper than surrounding areas but these areas are not expected to affect lobster movement or distribution. Therefore, while increases in turbidity and siltation from dredging the borrow sites would be considered adverse in the short term, no long-term significant impacts are expected to commercial species.

The second most important commercial fishing resource, on the San Diego County level, is red urchins. This fishery, however, is highly concentrated outside the North County area, with the La Jolla/Point Loma fish block alone accounting for 97.3% of the catch from 1999 to 2008. This part of the fishery would not be affected by the proposed project. However, for a few fishermen in the North County, red urchins are an important resource. Red urchins inhabit kelp beds and nearby hard-bottom reefs. These habitats would not be affected by dredging at the borrow sites. Sand redistribution from the beaches to nearshore low-lying reefs could temporarily cover some potential urchin habitat; however, these low-lying reefs are not prime habitat for red urchins, which prefer higher reefs offering shelter from predation and increased potential to trap drift kelp—the preferred food source for this species.

Localized decreases in visibility due to turbidity from borrow site dredging or from the beaches could affect diving conditions. This effect would be localized and of limited duration, and would not be significant.

The squid fishery is another locally important commercial fishery. Squid was the third most valuable resource in San Diego County from 1999 to 2008. Landings for squid were highest for La Jolla/Point Loma area (48.0%), followed by the North County areas of Oceanside (27.7%) and Del Mar/Torrey Pines (19.7%). The area near Imperial Beach accounts for 4.7%. Within the North County area, squid is second in importance only to lobster. Squid eggs can be found in sandy areas at depths between 60 and 180 feet, which includes some of the depths identified for proposed borrow sites. Squid can be found within 200 miles of shore and at depths of 2,300 feet, but they are typically caught at night when the squid move to within the upper 295 feet of the water column to feed (CDFG n.d.). The breeding habitats and fishing grounds for squid may be affected by the proposed project, but the area affected would represent a very low percentage of the available nearshore habitat. The dredge activity at any one location would be limited since the primary squid fishing spots in Southern California include those areas near the Channel Islands and coastal areas from Point Conception to La Jolla, with primary landing ports at Ventura, Port Hueneme, San Pedro, and Terminal Island (CDFG 2005). Turbidity and siltation from dredging may affect 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.

Sheephead is an important emerging fishery. Sheephead are inhabitants of kelp and rocky habitats. These habitats would not be affected by the borrow site dredging and therefore no significant effects are predicted. Redistribution of sand from the beaches would 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, while some temporary impacts to low-lying reefs may occur, this effect to sheephead would be considered less than significant.

California halibut utilize the nearshore area and lagoons as feeding and nursery areas. As discussed in Section 4.4, the proposed project could potentially affect this species. The project has been designed to avoid significant long-term impacts to the coastal lagoons so no impacts to the lagoon nursery areas are expected. Some areas of the nearshore may temporarily be 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.

Gear Loss

Vessel traffic and dredge 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 sand replenishment and fishing activities, a 300-foot buffer would be designated around the discharge pipe connection buoys during dredging operations. GPS tracking would be employed to track dredging activity. In the event that gear is damaged or destroyed outside of the identified 300-foot buffer, compensation would be the responsibility of the contractor. Additionally, coordination with fishermen would be conducted to notify them of planned dredging, transit, and sand placement locations and times. As described in Section 2.4.3, SANDAG has committed to coordination with commercial fishermen and the dredge operator to minimize, to the extent possible, gear conflict and disruption of fishing locations. Significant potential impacts would be avoided by these processes.

<u>Kelp Harvesting</u>

The project has been designed to minimize effects on kelp and kelp habitat. Dredging of the borrow sites would cause localized turbidity and siltation. However, the borrow sites have been designed to provide a minimum 500-foot buffer zone from kelp beds and potential kelp habitat (Section 4.4). This buffer zone is judged to be sufficient as the distances from the dredging would generally be much greater than 500 feet from these resources; the duration of turbidity would be intermittent and reach potential resources for only 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 are anticipated to be less than significant.

Recreational Fishing and Diving

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 receiver sites. Turbidity from the beaches and presence of pipelines would preclude usage of small areas for short periods. In the longer term, access for shore diving and surf fishing may improve with the placement of sand on the beaches.

Because the borrow sites are located offshore of the beaches, surf fishing and beach diving most likely would not be affected by dredging and therefore no impacts are predicted. However, as discussed in Section 4.6 (Land and Water Use), dredge area MB-1 is within the MBAR (which includes Wreck Alley) and is adjacent to the SDURA. Wreck Alley contains the most popular local wrecks for dive charter businesses as well as recreational divers, but turbidity plumes are not projected to reach the dive sites. Divers may experience increased underwater noise at nearby wrecks, and dive boats and fishing vessels transiting between features may have to maneuver to avoid the dredge operations, but these inconveniences would be of short duration as dredging operations are only anticipated to last 14 days, at this location, under Alternative 1. Risk to the safety of divers from straying underwater into the dredge area is not expected to be an issue, as the closest wreck/sunken structure artificial reef is approximately 500 feet from the dredge area. Further, divers typically descend to and ascent from these offshore sites using permanently attached buoy/mooring lines, and normally do not stray from the structures farther than the limit of visibility. Therefore, these effects are considered less than significant.

Sport fishing boats could be affected by dredging operations and turbidity plumes from the beaches. Some loss of sport fishing area would occur during actual dredge operations but this area would be substantially less than the available nearshore areas for sport fishing and short-term in nature at individual dredge locations. The impact would be less than significant.

Mitigation Measures for Alternative 1

There would be no long-term significant impacts to commercial fisheries. As described in Section 2.4.3, a coordinated protocol would be implemented to notice commercial fishermen of dredge areas and transit locations. This would provide fishermen the knowledge to schedule their activities around the short-term dredge and construction activities associated with project.

4.8.3 Alternative 2

Impacts of Alternative 2

The impacts of Alternative 2 would be similar to those identified for Alternative 1, but somewhat larger in area and different in specific location. Under worst-case assumptions, partial sedimentation of small areas that support giant kelp is predicted. While temporary adverse impacts to commercial fisheries target species may occur on a localized basis or at the individual fishing operation level due to temporary displacement from favored fishing sites, no significant commercial fisheries impacts are identified for Alternative 2.

Mitigation Measures for Alternative 2

No significant impacts were identified; therefore, no mitigation measures are required. The protocol would apply for coordination with commercial fishermen as described in Section 2.4.3.

4.8.4 No Project/No Federal Action Alternative

No adverse impacts would occur to commercial fisheries or local socioeconomics as a result of the No Project Alternative. However, the No Project Alternative would not provide a social or economic benefit and the erosion of the region's beaches would continue without intervention. Recreational opportunities and tourism value would not experience a beneficial impact.

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4.9 PUBLIC HEALTH AND SAFETY

Public health and safety concerns are those that could have an impact on the welfare of the public affected by the proposed action. The following specific safety issues are addressed: public access and safety during project construction, lifeguard services, recreational safety, vessel traffic and safety, and potential public health and safety impacts resulting from the formation of beach scarps (i.e., the cut in the beach berm face caused by wave action). Potential impacts to the lifeguard towers (structures) on individual receiver sites are addressed in Section 4.10 (Structures and Utilities). While there would be more people present at each receiver site during the summer period when sand is proposed for placement on many of the receiver beaches, the overall impact conclusions would not change given the short-term nature of the activity at any individual beach.

4.9.1 Significance Criteria

For this analysis, determination of significance of potential public health and safety impacts is based on the level of safety precautions that would be implemented during replenishment activities. An impact to public health and safety would be significant if it would:

- create a health hazard or potential health hazard,
- expose people to potential health hazards, or
- create navigation hazards or result in unsafe conditions for vessel traffic.

4.9.2 Alternative 1

Impacts of Alternative 1

Receiver Sites

The following analysis is applicable to all 11 possible receiver sites.

Public Access and Safety

During implementation of Alternative 1, active construction zones at each receiver site would be closed to public access to prevent an unsafe condition. This is due primarily to heavy equipment used to grade beaches at these sites. Accordingly, during discharge and spreading operations, a portion of the beach would be closed at each site. This closure would affect both the existing beach and offshore areas between the dredge (and its pipeline) and the receiver site. For more information on the closure at each receiver site, refer to Tables 2-5 and 2-6.

During beach replenishment operations, the contractor selected to perform beach building operations would provide all necessary safety measures in the vicinity of the receiver beaches, including fencing, barricades, and flag personnel, as necessary. The portion of the beach receiving sand would be closed to the public during actual replenishment construction activities (Table 2-6). When all sand has been discharged and spread out on the closed section of the receiver site, the operation would shift along the receiver site to a new section of beach to be replenished. This would continue until the entire receiver site has been replenished. During replenishment operations, any pipeline extending along the beach, but outside of active replenishment areas, would be covered with sand at key access points. The sand-covered parts of the pump line would create pedestrian bridges, at approximately 300-foot intervals, to ensure sufficient public access. Because active replenishment areas would be closed to public access and pedestrian bridges would be created to provide access along beaches with temporary pipelines, no significant impacts to public health or safety would result. This alternative would result in public health and safety benefits by adding sand to eroded areas adjacent to fragile bluffs.

Lifeguard Services

During construction of Alternative 1, the pipeline would be buried in front of accessways and launches for lifeguard boats and vehicles. A sand, cobble, or earthen ramp would allow for access from lifeguard stations, over the pipeline, and to the ocean. Similar ramps would provide north-south access over the discharge line for lifeguard vehicles and pedestrians. Lifeguard services would not be impeded with implementation of Alternative 1.

The following receiver sites have temporary lifeguard towers in place during the summer months: South Carlsbad South, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, and Imperial Beach. If sand replenishment occurs during the summer season when the temporary lifeguard towers are on-site, SANDAG would coordinate with the respective jurisdiction to temporarily relocate towers during construction. Temporary relocation would not impair the ability of lifeguards to ensure public safety since this portion of the beach would be closed to the public during construction activities. The towers would be replaced after sand placement, before the beach is reopened for recreational uses. Near permanent lifeguard towers, sand would be dug out where necessary to preserve the line-of-sight from tower-viewing platforms. As long-term beach safety would not be affected by implementation of the proposed action, no significant impacts to lifeguard stations would occur.

Recreational Safety

As described in Section 3.9, sediment samples were collected in fall 2005 and analyzed for the proposed receiver sites (Moffatt & Nichol 2010a). Samples were analyzed by or under the direction of Calscience Environmental Laboratories in accordance with the approved Sampling and Analysis Plan (SAP) and compared to the NOAA SQUIRT Guidelines. As discussed in Section 4.6 (Land and Water Use), the physical and chemical properties of the borrow site materials are acceptable, and the materials are appropriate for beach nourishment. No impacts would occur with implementation of this alternative.

Although not anticipated, the possibility exists that unforeseen wastes and materials could be dredged from the offshore borrow sites. Borrow sites have been tested for the suitability of the dredge materials to be placed on the receiver beaches; nonetheless, illegal dumping activities may occur in offshore waters and the proposed borrow sites might contain hazardous or dangerous materials. In the event that hazardous or dangerous materials are found in dredge spoils, dredging and disposal activities would immediately stop. An evaluation would be made to determine the extent of the contamination and most appropriate treatment of the site.

Scarps

Scarp height is a function of the breaking wave height and the elevation of the existing beach berm. Scarps develop naturally along the beach profile and vary in height due to substantial changes in the beach profile (i.e., a drastic drop in elevation).

Large scarps may result in safety hazards due to substantial changes in the beach profile (i.e., a drastic drop in elevation). Because scarps are a function of beach berm height, placement of fill on the receiver sites would not increase scarp height, provided fill is placed to the height of the existing beach berm (U.S. Navy 1997b). The proposed project would not place beach fill above the height of the existing beach berm. Therefore, safety impacts due to increased scarp heights would not occur.

Borrow Sites (Vessel Safety)

The potential for a vessel to collide with a dredge or support vessel would be extremely remote. The dredge would be equipped with markings and lights in accordance with U.S. Coast Guard regulations. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. Thus, local boaters should be aware of the location of the dredge. A hopper dredge would travel at relatively slow speeds (approximately 1.7 knots) during actual dredging operations. The travel speed would also be slow (approximately 5 knots) during the transport of sand from borrow sites to the receiver sites.

To maintain vessel safety, an approximate 300-foot-radius buffer area would be established around the mono buoy in offshore waters, to allow proper anchoring and pump line operation. To completely ensure that no vessels would enter the offshore restricted zone, the anchoring area would be included in the Notice to Mariners, which is overseen by the U.S. Coast Guard. Also, any pump lines used during beach replenishment efforts, whether floating or submerged, would be clearly marked as navigational hazards. This short-term increase in vessel traffic would be negligible compared to the total areal vessel traffic, and the limited distance of travel to set and remove the pump line. Accordingly, significant impacts to public health and safety would not result with implementation of this alternative.

Mitigation Measures for Alternative 1

No significant impacts have been identified; therefore, no mitigation measures would be necessary.

4.9.3 Alternative 2

Impacts of Alternative 2

Public health and safety impacts under this alternative would be similar to those described for Alternative 1. Accordingly, impacts would be less than significant.

Mitigation Measures for Alternative 2

No mitigation measures would be necessary because no significant impacts have been identified.

4.9.4 No Project/No Federal Action Alternative

Under the No Project Alternative, no dredging or replenishment activities would occur. At some receiver beaches, waves would continue to erode fragile bluffs that support property and structures, including housing. The erosion would continue unabated. Public health and safety would potentially deteriorate without sand replenishment activities.

4.10 STRUCTURES AND PUBLIC UTILITIES

This section addresses structures and public utilities that could be affected by implementation of the proposed project. The season of construction would not affect the impact analysis.

4.10.1 Significance Criteria

Impacts to structures and public utilities would be significant if they would:

- result in the need for new systems, or
- result in substantial alterations to existing systems.

Because an increase in service demand would not occur with the proposed action, this analysis focuses on displacement or disruption of structures and public utilities.

4.10.2 Alternative 1

Impacts of Alternative 1

Receiver Sites

Oceanside

The sewer outfall pipe buried just north of Loma Alta Creek would not be displaced and interruption in service would not occur. The proposed beach nourishment would be beneficial for this outfall structure because the sand would serve as additional cover to protect the pipeline. Therefore, the outfall would not be impacted by Alternative 1. The existing outlets for the storm drains at the end of Marron Street and Tyson Street, and the pipe at Forster Street would be within the proposed sand placement area. As described in Section 2.4, sand placement around storm drain outlets would be designed to allow proper drainage. Accordingly, impacts to storm drains would be less than significant.

The bottom of the public stairs at the end of Tyson Street, Pine Street, Ash Street, Haynes Street, Cassidy Street, one block south of the Loma Alta Creek outlet, and Vista Way may be covered by sand, which would tend to stabilize the stairways. Public access to the beach via these stairways would not be affected, and significant impacts would not occur upon implementation of Alternative 1. The public access ramps at Wisconsin Avenue, Forster Street, and just north of Loma Alta Creek would not be affected. The access road at Oceanside Boulevard would also not be impacted because sand placement would cover only the lower end of the road. A private stairway with access to the beach is located north of the creek. No adverse impacts to this structure would occur as a result of Alternative 1. Existing private stairways to the beach may be partially covered. However, no impacts would occur as the sand would provide additional protection to the stairway and would not restrict access to the beach.

Sand placement around stationary lifeguard towers within the replenishment footprint would be conducted by placing sand around the towers without removing them. Proposed sand placements at Towers No. 7 and 9 would not be higher than the lifeguard's line-of-sight since the towers are raised over the concrete/riprap structure. As Tower No. 11 is located on top of a concrete and riprap structure, the sand would not be necessary. As described in Section 2.4, the portion of the proposed fill that is higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. The sand would provide additional protection against storm surge damage and would temporarily benefit the lifeguard towers; no adverse impacts would occur.

North Carlsbad

The Buena Vista Lagoon Weir north of the receiver site would not be impacted by sand placed within the site boundaries. Generally, the site would be constructed to elevations up to 12 feet above MLLW. As described in Section 2.4, sand placement around storm drain outlets would be designed to allow proper drainage. Accordingly, impacts to storm drains would be less than significant.

As discussed in Section 3.10, public access stairs are located off Ocean Street, Beech Avenue, Pacific Avenue, Grand Avenue, and Carlsbad Village Drive. In addition, several residential properties have private stairways for beach access, a few of which reach the beach surface. All of the properties in the reach have constructed sea walls and riprap to protect against erosion.

Although implementation of Alternative 1 would raise the beach surface and cover the bottom portion of some of these stairways with sand, beach access would not be restricted. Some stairs currently ending above the beach surface may reach the sand surface and result in enhanced access, which would be a beneficial effect. Adverse impacts to access stairs would not occur upon implementation of Alternative 1. Beach access via the access road at Pine Avenue would not be impacted, since sand placement would not extend past the base of the road and access would not be restricted.

Several properties along the receiver site have sea walls. Although weep holes (i.e., small holes designed to drain accumulated water) would be covered upon implementation of the proposed project, the majority of sea wall tops would not be covered. Several properties have terraced sea walls and landscaping, the lower terraces of which would be covered by sand. As additional sand would help to stabilize the shoreline and protect against erosion, no significant impact to sea walls would occur at the North Carlsbad receiver site.

Lifeguard Tower No. 38 is located on the sand at the southern end of the receiver site on Pine Avenue and is not moved during the winter season. The tower is surrounded by riprap and its platform is approximately 15 feet above the sand. Sand would be placed as close to the tower as possible to provide additional protection against damage. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. As such, no viewing interference would occur at this lifeguard tower and no negative impacts would occur with implementation of Alternative 1.

South Carlsbad North

The only structure located within the sand receiver site is Lifeguard Tower No. 29, which is located high on the bluff above the sand. No impacts would occur to the tower with sand placement.

Batiquitos

The proposed beach berm at the Batiquitos receiver site would be approximately 12 feet above MLLW. As described in Section 2.4, sand placement around storm drain outlets would be designed to allow proper drainage. Accordingly, impacts to storm drains would be less than significant. In addition, measures to ensure continued flow through the storm drain would be implemented to maintain proper drainage and prevent impacts to the storm drain.

The lower portions of both the public access points, located at the Ponto State Beach entrance and the Grandview staircase, and private access stairs may be covered with sand. This would have the beneficial effect of stabilizing stairway structures. Sand placement would not extend past the sea wall, although some weep holes may be covered during sand placement. Although portions of the vegetated groundcover may be covered by sand, the vegetation is primarily maintained for erosion control and is not sensitive. Therefore, no impacts would occur because the sand would also provide erosion protection, similar to the groundcover.

If placement occurs during the summer season, when the lifeguard towers are located on the beach, SANDAG would coordinate with the State to temporarily relocate the towers from the site during construction. Therefore, no impacts would occur to these temporary structures. For public health and safety issues related to lifeguard towers, refer to Section 4.9 (Public Health and Safety).

Leucadia

Lower portions of the public access stairways, ramp, and seasonal lifeguard tower located at this beach would not be covered during sand placement, as the specific receiver site does not encompass these structures. Beneficial impacts would occur to the numerous private stairways that extend to the beach within the receiver site footprint, as the proposed sand placement would provide additional support.

Moonlight Beach

Storm drain pipes are located at the end of B Street at Moonlight State Beach and include one 36-inch, one 60-inch, and three 48-inch pipes. The receiver site would be constructed to elevations up to 12 feet above MLLW. As described in Section 2.4, sand placement around storm drain outlets would be designed to allow proper drainage. Accordingly, impacts to storm drains would be less than significant.

Public access stairways are located within the vicinity of the proposed receiver site. Alternative 1 would cover the bottom portion of the stairways with sand, which would tend to stabilize the stairway structures. Beach access would not be affected by implementation of Alternative 1.

Lifeguard towers located at B and C streets are not moved during the winter season. Sand would be placed as close to the base of the towers as possible and would provide beneficial impacts to the towers through stabilization and reduced erosion. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. As such, no viewing interference would occur to this lifeguard tower, and no impacts would occur.

Cardiff

The proposed sand placement would provide additional protective covering for the sewer outfall pipe, which would be a beneficial effect.

Sand placement would not extend to the riprap protection surrounding the parking lot or restaurants; therefore, no impacts would occur. Lower portions of the lifeguard access ramp may be covered with sand, but this would not impact access to the beach. If placement occurs during the summer months when Lifeguard Tower No. 6 is located on the beach, SANDAG would coordinate with the State to temporarily relocate it from the beach until after construction is completed (see also Section 4.9 [Public Health and Safety]). Sand would be placed as close as possible to Lifeguard Tower No. 5 to provide additional protection against erosion and storm surge. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards and no viewing interference would occur. No impacts would therefore occur to this lifeguard tower.

Solana Beach

The proposed sand replenishment project would provide additional protective covering for the buried sewer outfall pipe, which would be a beneficial effect. Drainage through the storm drain to the ocean would be maintained by excavating a channel in placed sand as described in Section 2.4. Therefore, no significant impacts are anticipated to storm drains.

The public and private access ramp and stairs at Fletcher Cove, Seascape Shores, Seascape Surf, and Del Mar Shores Beach Park are located at higher elevations than the proposed fill area; therefore, access to the beach would not be impacted. If sand placement occurs during the summer months when the four temporary lifeguard towers at Fletcher Cove, at 350 S. Sierra Avenue, at Seascape Surf, and at 825 S. Sierra Avenue are located on the beach, SANDAG would coordinate with the City of Solana Beach to temporarily relocate them until construction is completed. Therefore, no adverse impact to lifeguard towers would occur. Refer to Section 4.9 (Public Health and Safety) for an evaluation of public health and safety.

Torrey Pines

There are three permanent State lifeguard towers on the receiver site. Tower No. 1 is the southernmost tower located about 100 yards south of the beach access road and Towers No. 2 and No. 3 are in order moving northward. Riprap has been placed on the beach to protect the road. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. No additional access points or structures exist within the vicinity of the proposed receiver site, and no adverse impacts would occur upon implementation of Alternative 1.

Imperial Beach

The public access ramp at Elder Avenue and Descanso Avenue, and the gated access road at the south end of Seacoast Drive are located at higher elevations than the proposed fill area and would not be impacted by sand replenishment. In addition, there is a vehicle beach access point at the Elm Avenue street end that is located above the proposed fill area. If sand replenishment occurs during the summer season when the lifeguard tower is located within the receiver site, SANDAG would coordinate with the City of Imperial Beach to temporarily relocate it during construction. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. Therefore, no viewing interference would occur to the lifeguard towers. Section 4.9 (Public Health and Safety) addresses the effects of lifeguard tower relocation and beach usage.

Borrow Sites

Impacts to structures and utilities located within the proposed borrow sites are discussed in Section 4.6 (Land Use).

Mitigation Measures for Alternative 1

No significant impacts to utilities or structures were identified; no mitigation measures are required.

4.10.3 Alternative 2

Impacts of Alternative 2

Receiver Sites

Implementation of this alternative would result in similar effects to structures and utilities as analyzed for Alternative 1. Sand placement is beneficial for structures such as stairways, buried outfall pipes, and permanent lifeguard towers, since it provides additional support and protection against erosion and storm damage during winter months.

The South Carlsbad South receiver site would not be replenished as part of Alternative 1. The bottom portion of the public access stairway located at the State Beach may be covered during sand placement with implementation of Alternative 2. However, this action would tend to stabilize stairway structures. The EWA Landfill line is located outside of the receiver site. In the event of equipment movement over the line, protections would be put in place to prevent impacts. In addition, two lifeguard towers are located on-site. These towers are removed in late October and replaced on the beach in March. If sand placement occurs during the summer season when the towers are within the site, SANDAG would coordinate with the City of Carlsbad to temporarily relocate the towers during construction. As described in Section 2.4, any portion of proposed fill higher than the viewing platform would be removed to preserve line-of-sight views for lifeguards. Therefore, no viewing interference would occur to the lifeguard towers. For public health and safety issues related to lifeguard towers, refer to Section 4.9 (Public Health and Safety).

Borrow Sites

Impacts to structures and utilities located within the proposed borrow sites are discussed in Section 4.6 (Land Use).

Mitigation Measures for Alternative 2

No significant impacts to utilities or structures were identified under this alternative. Therefore, no mitigation measures are required with project implementation.

4.10.4 No Project/No Federal Action Alternative

No dredging or beach replenishment activities would occur under the No Project Alternative. There would be no impacts to structures and utilities under this alternative, and no mitigation measures would be necessary. The beneficial effect of stabilizing structures such as stairways and outfalls would not occur under this alternative.

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4.11 TRAFFIC

This traffic impact section addresses the potential for the various alternatives to impact existing vehicular traffic and parking conditions in the vicinity of the receiver sites. It acknowledges the attractiveness of beaches during summer and potential parking conflicts. The analysis would not change given a spring construction start (spring 2012) instead of late summer. Sea vessel traffic and safety concerns are discussed in Section 4.9 (Public Health and Safety).

4.11.1 Significance Criterion

Traffic and parking impacts would be significant if beach replenishment activities resulted in a long-term impact to access routes, local streets, or parking areas in the vicinity of the receiver sites.

4.11.2 Alternative 1

Impacts of Alternative 1

Implementation of Alternative 1 would require delivery of construction equipment and commuting of work crews to the receiver sites. Construction vehicles would be driven to and kept on-site for the duration of beach replenishment activities. At a maximum, 12 crew persons would be working at a receiver site at any one time. Beach replenishment activities associated with Alternative 1 would not significantly affect traffic, as Alternative 1 would generate very few trips. The small increases in traffic volumes during replenishment would be localized and temporary; no long-term impacts to existing traffic and circulation patterns would occur. Construction personnel would park in public parking areas and would not create significant parking impacts given the small number of spaces required at each site.

Subsequent to the completion of sand replenishment, some changes in traffic could occur. The replenishment of receiver 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, there would be some decrease in traffic at the adjacent beaches.

The replenishment of beaches with the most existing sand would also increase the attractiveness of the beach. However, the increase in use is likely to be less pronounced than at the currently rocky beaches, and increases in traffic and parking congestion would also be less.

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 replenishment may induce additional use that would marginally increase the congestion. 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 receiver sites is predicted to remain noticeable at the each beach for an average of 5 years as the sand is distributed throughout the littoral cell (Table 4.1-1). This would reduce the long-term attractiveness of a site relative to other nearby locations, or to its condition prior to project implementation. The long-term impact of the proposed beach sand replenishment on traffic and parking would not be significant.

Mitigation Measures for Alternative 1

No mitigation would be required.

4.11.3 Alternative 2

Impacts of Alternative 2

Alternative 2 would result in similar impacts to those described for Alternative 1, with larger fill volumes at South Carlsbad North, Solana Beach, and Imperial Beach, and an additional site at South Carlsbad South. However, the impacts would remain temporary, localized, and less than significant.

Mitigation Measures for Alternative 2

No mitigation would be required.

4.11.4 No Project/No Federal Action Alternative

As no beach replenishment activities would occur, no traffic impact would result.

4.12 AIR QUALITY

Generally, air quality is a regional issue, and potential impacts to air quality are evaluated on a regional basis. Localized impacts may be considered in cases of potential severe traffic congestion or the release of toxic air pollutants. Neither of these cases is applicable to the proposed action. Therefore, the air quality impact analysis considers the project alternatives as a whole, and not by individual receiver and borrow sites. Air quality impacts are also not dependent upon the season of construction, but rather the total annual project emissions within a calendar year compared to annual emission thresholds.

Impact Analysis Methodology

All of the proposed action alternatives would generate air pollutant emissions from project construction activities only; there are no operational activities associated with the proposed action alternatives. Construction activities would generate temporary (short-term) emissions primarily as exhaust emissions (NO_X, SO_X, CO, ROG, $PM_{2.5}$, and PM_{10}) from the operation of construction equipment and vehicles, and to a lesser degree as fugitive dust emissions (PM_{10} and $PM_{2.5}$) from sand-moving activities, as the sand would be wet or damp. The sediment to be dredged would be underwater, pumped to and deposited on the receiver sites as slurry, and spread as drained but wet sand at the receiver sites.

The principal sources of pollutant emissions for the proposed action alternatives include the following:

- combustion emissions from diesel engine vessels used in dredging operations;
- combustion emissions from diesel engine-driven booster pumps used for sand conveyance;
- combustion emissions from construction equipment at receiver sites used to install, position, and remove conveyance piping and pumps; construct training berms; and distribute sand; and
- fugitive dust emissions from earthmoving (wet sand) operations.

The potential air pollutant emissions that would be generated by the proposed action alternatives were estimated using the Urban Emissions Model (URBEMIS) 2007 model, version 9.2.4 (Rimpo Associates 2007), and/or USEPA AP-42 emission factors. URBEMIS is a computer model designed to estimate air emissions from land use development projects based on development type and size. The emission factors and calculation methodologies contained in the URBEMIS model have been approved for use by ARB. The URBEMIS model contains emission factors and vehicle data specific to many California counties and air basins. While San Diego County data are not included in the URBEMIS model, testing has indicated that Riverside County and Orange County data are representative of San Diego County. For this analysis, Orange County data are used due to its proximity to coastal San Diego County.

The URBEMIS model was used to calculate project construction emissions from dredging and placement of sand as grading activities in URBEMIS. Construction inputs to the URBEMIS model were from project-specific information, as well as standard construction procedures or industry standard defaults included in the URBEMIS model. Project-specific information includes project construction schedules, including start dates and durations; the area and volume of sediment to be excavated and graded; the type, number, and size of construction equipment and vehicles to be used; and the number of construction workers.

The project construction scenario would be similar for both alternatives, except that each alternative would dredge and place different quantities of sand at the same rate, but over different durations, at 10 to 11 receiver sites, on a 24-hour/7-day per week basis, as provided in Table 2-5. The dredging equipment required would be the same for each alternative and include one dredge, as well as four support vessels including one anchor scow, one survey boat, one small boat to shuttle the dredge crews to shore and back, and a tug boat for initial placement and removal of the dredge at each source site. Dredging operations would serve one receiver site from one borrow site at a time. The transport of dredged sediment would be facilitated by booster pumps, where pipelines would convey sand, as slurry, to the receiver sites. Booster pumps would be necessary along the length from the Oceanside to North Carlsbad receiver sites, and to convey material to South Carlsbad North, Moonlight Beach, and Torrey Pines. The construction equipment required at each receiver site to install and remove equipment over 6 days would require one large forklift (or small crane) (at 6 hours per day) and a wheeled bulldozer or loader (at 4 hours per day). To place the sand received from the dredge at each site would require two dozers (at 18 hours per day), one heavy forklift (at 2 hours per day), and one small generator (at 7 hours per day) to provide light for night operations.

Since the CAA General Conformity thresholds are annual thresholds in tons per calendar year, project emissions were quantified for each of the proposed alternatives in URBEMIS as total emissions per calendar year. The proposed project options were assumed to all begin construction in the spring of 2012. The construction duration of each alternative was based on the degree of sand deposition required on each receiver site for each alternative. Based on the volumes provided, all alternatives would be accomplished in calendar year 2012. The annual emissions of each criteria pollutant for each alternative were quantified and identified for calendar year 2012, and against CAA General Conformity and CEQA/NEPA thresholds (provided in Tables 3.12-2 and 3.12-3) to determine the impact significance of each alternative.

In addition to regional impacts, localized air quality impacts of CO and TACs were also considered. The project would not generate traffic, which would result in congestion at signalized intersections, and thus would not create potential CO impacts in proximity to sensitive receptors. The principal TAC of concern is primarily diesel PM from the operation of diesel construction equipment and vehicles in proximity to sensitive receptors. The project construction would occur in the ocean and on beaches closed to people for sand placement. The intensity of operations, one or two pieces of equipment moving back and forth on the beach, would be small compared with uses such as heavy traffic or industrial warehouse operations, and it may be assumed that the impact of diesel emissions on local residents would be less than significant.

A discussion of project impacts from GHG emissions and climate change is provided in Section 4.14 (Climate Change).

4.12.1 <u>Significance Criteria</u>

Air quality impacts would be considered significant if the action would:

- violate any federal or state ambient air quality standard,
- contribute to an existing or projected air quality violation, or
- expose sensitive receptors to criteria or toxic pollutant concentration in violation of applicable health-based legal limit.

As noted in Section 3.12, the APCD does not have quantitative emissions limits for construction activities. It may be reasonably assumed for nonattainment pollutants, that if the project conforms to the SIP, then emissions would not violate any ambient air quality standard nor contribute to an existing or projected air quality violation. It may also be assumed that if the standards for nonattainment pollutants are applied to attainment pollutants, then conformance to these standards would result in emissions that would be less than significant.

Conformance to the SIP is demonstrated by obtaining appropriate permits from the APCD, or by demonstrating that emissions would be less than *de minimis* thresholds established by the USEPA.

Project impact significance was determined by comparing the total annual emissions of applicable pollutants of each project alternative against CAA General Conformity and CEQA/NEPA thresholds. If the annual emissions of the applicable pollutants of each alternative would not exceed the respective thresholds, each project alternative would conform to the SIP, would be exempt from preparing a formal CAA General Conformity analysis, and would not result in a significant impact under CEQA/NEPA. To document the General Conformity exemption, a draft RONA is included in Appendix H. If determined not to be exempt, a formal conformity analysis would be required to determine conformity.

To demonstrate General Conformity for the project in the SDAB, the total annual direct and indirect project emissions of nonattainment/maintenance pollutants in the SDAB (CO, ROG, NO_X,) were compared against the specified *de minimis* level thresholds for these pollutants, and 10% of the applicable area's annual emission budget for the subject pollutants (Table 3.12-2).

To determine air quality CEQA/NEPA significance for the project in the SDAB, the total annual direct and indirect project emissions of attainment pollutants (SO_X, PM_{10}, and $PM_{2.5}$) and nonattainment/maintenance pollutants (CO, ROG, NO_X) were compared against the specified emission rate thresholds (i.e., *de minimis* levels) for these pollutants (Table 3.12-3).

4.12.2 <u>Alternative 1</u>

Alternative 1 would dredge, transport, and place approximately 1.8 mcy of sand on 10 receiver sites over 173 days beginning spring of 2012, as shown in Table 2-5.

Impacts of Alternative 1

Alternative 1 would generate air pollutant emissions from offshore dredging operations and sediment transport to beach receiver sites, and from the sediment placement and distribution operations at the receiver sites.

Dredge Operation Emissions

The principal source of emissions from dredging would be diesel engines used for dredge propulsion, driving dredge pumps, and driving electric generators. Dredges are either registered through the state or permitted at the district level to operate annually, not on a project-specific basis. Dredges can be registered under the ARB's Portable Registration Program, or can apply for a permit from APCD. When applying for a permit, APCD conducts an analysis based on the projected activity of the dredge annually, including an Air Quality Impact Analysis (APCD 2010). Because an air quality evaluation is conducted separately by the ARB or APCD and any emissions are already accounted for in agency projections, project-specific dredge emissions are not taken into account in this analysis and are not discussed further.

Pump Operation Emissions

As described in Section 2.4, booster pumps would be necessary where pipelines would convey sand to the receiver sites and the conveyance distance would be approximately 10,000 feet or greater. Under Alternative 1, booster pumps would be necessary along the length from the Oceanside to North Carlsbad receiver sites, and to convey material to South Carlsbad North, Moonlight Beach, and Torrey Pines. The exact locations of pumps are not known at this time. At some onshore locations, electric power may be available to drive the pumps, and pollutant emissions would not be of concern. Offshore pumps would be addressed under the permitting mechanisms addressed above and are not discussed separately.

Construction Equipment Emissions

Under Alternative 1, construction equipment would be used at each receiver site to install the sand placement equipment, distribute the sand received from the dredge, and remove the sand placement equipment. It was assumed that a large forklift (or small crane) and a wheeled bulldozer or loader would be used for equipment installation and removal. For sand placement, two wheeled loaders would be used, with occasional support from the forklift. There might also be a small-engine generator to provide light for night operations. For the duration of construction operations, the data from Table 2-5 were used, with the assumption that mobilization and demobilization would take 3 days at each receiver site.

Major earthmoving activities usually generate substantial PM emissions (fugitive dust). Alternative 1 includes substantial sand conveyance and distribution activities; however, the sand being disturbed would be either underwater, as slurry in a pipeline and deposited on a receiver site, or quite moist as it is being spread on the beach. Therefore, the potential for dust generation would be very low. Activities on dry sand would be limited to mobilization at each site (1 to 2 days) and crew access; both would be of relatively short duration. Therefore, impacts from dust generation resulting from earthmoving, and from the movement of vehicles on the beaches would be less than significant.

The estimated construction emissions of Alternative 1 are shown in Table 4.12-1. Construction data inputs and assumptions used in the URBEMIS model are included in the model output in Appendix H.

Table 4.12-1
Alternative 1 – Estimated Construction Emissions

Emission Source	**Air Pollutant Emissions (tons/year)**					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Construction Equipment	3.72	34.05	11.73	0	3.39	1.57
De minimis Thresholds(1)	*100*	*100*	*100*	*100*	*100*	*100*
Exceed *de minimis* Thresholds?	No	No	No	No	No	No
Area annual emission budget(2)	*56,977*	*61,612*	*322,003*	*NA*	*NA*	*NA*
Exceed 10% of budget?	No	No	No	NA	NA	NA

Emission totals rounded to the nearest whole number.
(1) *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA and CEQA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_X, PM_{10}, and $PM_{2.5}$.
(2) Forecast emissions budget for 2010 (ARB 2008a).
(3) *De minimis* thresholds for SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO are used.

Applicability Analysis for General Conformity

To assess whether the proposed action is exempt from a General Conformity analysis, the total construction equipment emissions are compared with the General Conformity *de minimis* thresholds in Table 4.12-1. As seen in Table 4.12-1, the estimated emissions of ROG, NO_X, and CO would be less than the General Conformity de minimis thresholds, and less than 10% of the area's annual emissions forecast. Therefore, Alternative 1 is presumed to conform to the SIP, and a formal conformity determination is not required. A draft RONA has been prepared that reflects the determination that a formal conformity analysis is not required, and is included in Appendix H.

Emissions from dredging and pumping operations that would be allowed by a Permit to Operate (or ARB Registration) are not included in the project emission comparison with *de minimis* thresholds for General Conformity. These emissions are accounted for under the dredge permit or registration as discussed above. This determination is in accordance with 40 C.F.R. §51.853(d)(1) and §93.153(d)(1), which state that a conformity determination is not required for the portions of the action that would be permitted by the San Diego APCD under the New Source Review program.

NEPA and CEQA Significance

The NEPA and CEQA significant impact analysis differ from the General Conformity applicability analysis in that emissions of SO_2 and PM_{10}, attainment pollutants are considered as well as the nonattainment pollutant emissions.[7] Therefore, SO, PM_{10}, and $PM_{2.5}$ are included in estimated emissions calculations of Table 4.12-1, as well as their *de minimis* threshold values. As shown in Table 4.12-1, Alternative 1 emissions do not exceed CEQA/NEPA thresholds; therefore, no significant impact would occur.

Local Impacts

In addition to regional impacts, localized air quality impacts of CO and TACs were also considered. Alternative 1 construction would occur in the ocean and on beaches closed to people for sand placement; therefore, there would be no significant impact from TACs, particularly diesel PM from the operation of diesel construction equipment and vehicles.

Alternative 1 Impacts Summary

The emissions of Alternative 1 would not result in a significant impact if they would not exceed General Conformity significance thresholds and would be less than 10% of the area's annual emissions forecast, and thus conform to the SIP; would not exceed CEQA/NEPA significance thresholds; would not expose sensitive receptors to localized toxic pollutant concentrations; and major emissions sources would be permitted or registered with the appropriate air quality agency. The comparison of estimated project emissions with threshold values for other sources, as shown in Table 4.12-1, demonstrate General Conformity, conformance with the SIP, and less than CEQA/NEPA thresholds. Alternative 1 would not result in localized CO or TAC (e.g., diesel PM) impacts, or extraordinary quantities of fugitive dust in proximity to sensitive receptors. There would be no extraordinary quantities of fugitive dust due to the high moisture

[7] This evaluation does not address lead, hydrogen sulfide, or vinyl chloride. Although these pollutants are regulated by the state or federal government, through ambient air quality standards, little to no emission of these substances would result from implementation of the proposed action.

content of the sand being placed. Thus, no sensitive receptors would be exposed to localized pollutant concentrations and air quality impacts would be less than significant.

Mitigation Measures for Alternative 1

No mitigation measures are required since there would be no significant impacts.

4.12.3 Alternative 2

Alternative 2 would dredge, transport, and place approximately 2.7 mcy of sand on 11 receiver sites over 271 days beginning spring 2012, as shown in Table 2-5.

Impacts of Alternative 2

The operations of Alternative 2 would be similar in nature to Alternative 1, although the amount of sand dredged from each borrow site, transported, and placed on individual receiver sites may be greater. Estimated construction emissions for equipment used to place sand at each receiver site and locate the pipelines are provided in Table 4.12-2 and the supporting calculations are provided in the URBEMIS output data in Appendix H.

Table 4.12-2
Alternative 2 – Estimated Construction Emissions

Emission Source	Air Pollutant Emissions (tons/year)					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Construction Equipment	4.95	45.33	15.62	0	4.52	2.09
De minimis Thresholds[(1)]	*100*	*100*	*100*	*100*	*100*	*100*
Exceed *de minimis* Thresholds?	No	No	No	No	No	No
Area annual emission budget[(2)]	*56,977*	*61,612*	*322,003*	*NA*	*NA*	*NA*
Exceed 10% of budget?	No	No	No	NA	NA	NA

Emission totals rounded to the nearest whole number.

(1) *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA and CEQA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_X, PM_{10}, and $PM_{2.5}$.

(2) Forecast emissions budget for 2010 (ARB 2008a).

(3) *De minimis* thresholds for SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO are used.

As shown in Table 4.12-2, the estimated emissions of Alternative 2 are less than the General Conformity threshold values and Alternative 2 is presumed to conform with the SIP.

In addition, Alternative 2 emissions would be less than CEQA/NEPA threshold values. There is a very low potential for dust generation because the sand being moved would have a high moisture content. Therefore, there would be no air quality impacts.

Mitigation Measures for Alternative 2

No mitigation measures are required since there would be no significant impacts.

4.12.4 No Project/No Federal Action Alternative

Under the No Project Alternative, no construction would occur. Therefore, no air quality impacts would occur, and no mitigation measures would be necessary.

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4.13 NOISE

The principal noise sources associated with the proposed project would include diesel-powered engines on the dredge offshore and heavy construction equipment and vehicles at the receiver sites and booster pumps, which are anticipated to be similar from site to site. Sand would be placed at one site at a time. Noise impacts are evaluated at noise-sensitive receptors nearest the receiver sites. Some of the receiver sites are similar to each other in relation to proximity of receptors to the sites. Thus, similar sites are grouped together. This analysis is not dependent upon the season in which project construction occurs as it focuses on permanent receptors (residents) that would be present year-round.

4.13.1 Significance Criteria

Noise impacts would be considered significant if the action would:

- result in daytime noise levels at any sensitive receptor in excess of the applicable construction noise limits, as listed in Table 3.13-2, if no variance has been issued by the local jurisdiction (as required);
- conduct noise-generating activities during the hours prohibited by the applicable local construction noise ordinance, as specified in Table 3.13-2, if no variance has been issued by the local jurisdiction (as required);
- result in average hourly nighttime noise levels greater than 45 dBA L_{eq}, or 5 dBA above the ambient noise level, whichever is greater, at any residence for more than 3 consecutive nights;
- result in average hourly nighttime noise levels greater than 45 dBA L_{eq}, or 5 dBA above the ambient noise level, whichever is greater, at any residence if there has been no notification to the resident; or
- result in noise above ambient levels that would adversely affect sensitive threatened or endangered species or in excess of standards set by the resource agency with jurisdiction over the species.

4.13.2 Alternative 1

Noise Sources

Noise impacts from construction are a function of the noise generated by equipment, the distance to and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Noise levels from construction activities are typically considered as point sources and would drop off at a rate of -6 dBA per doubling of distance from the source over hard site surfaces, such as parking lots and water. The drop-off rate would be approximately -7.5 dBA per doubling of distance for soft site surfaces, such as grass fields and open terrain with vegetation (FTA 2006). For purposes of this analysis all surfaces are considered acoustically hard.

The magnitude of construction noise impacts depends on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the activity, and distance between the activity and receptor. Maximum noise levels from construction equipment range from approximately 70 to 90 dBA at 50 feet from the source (FTA 2006). However, as shown in Table 4.13-1, maximum noise levels from construction equipment anticipated to be used for the proposed actions range from approximately 70 to 85 dBA at 50 feet from the source. The noise levels vary for each type of equipment, as equipment may come in different sizes and with engines of varying horsepower. Construction equipment noise levels also vary as a function of the 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. The Federal Highway Administration Road Construction Noise Model includes usage factors for converting maximum noise levels to hourly noise levels. 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.

The dominant noise generated during dredging and placement of sand would result from diesel engines used to drive various pieces of equipment. On the dredge, the engines would be used for propulsion, to power dredge equipment, and to provide electric power. At the receiver sites, diesel engines would be used in bulldozers, loaders, forklifts, and cranes, as required. Diesel engines may be used in booster pumps to convey the sand slurry over distances greater than 10,000 feet.

Table 4.13-1
Noise Ranges 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
Pumps	77
Soil Mix Drill Rig	80
Tractor	84

HP = horsepower
KVA = kilovolt ampere
Source: FTA 2006

Beach maintenance was in progress when site visits were made to the Mission Beach and Imperial Beach receiver sites in July 1999. In both cases, the equipment in use was Case 621B wheeled loaders. Two of the machines were equipped with buckets, one with a rake. Working noise levels for this machine 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 are estimated at 65 to 68 dBA at 50 feet. These may be considered typical noise levels for all beach equipment that may be used for the project and the referenced 80-dBA L_{eq} at 50 feet used in this analysis for impact determination would be considered conservative.

It is also noted that construction equipment are 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 the backup alarm noise.

Diesel engines used on the dredge would likely be larger than those used in construction equipment, and the noise generated would be greater. However, the engines would be housed in structures, which would reduce noise levels, and the resulting noise levels are not anticipated to exceed 90 dBA at 50 feet. In addition, the dredge would be located a distance off of the beach.

Diesel engines of the slurry pumps would also be larger than those used in the construction equipment. These engines are normally housed in an enclosure that provides noise reduction. A noise level of 77 dBA at 50 feet is assumed for purposes of this noise analysis (FTA 2006).

Impacts of Alternative 1

Alternative 1 specifies that project construction would occur 24 hours per day, 7 days per week (24/7 schedule). However, nighttime and weekend work is prohibited by local noise ordinance at the Oceanside, North Carlsbad, Solana Beach, and Imperial Beach receiver sites. Night and weekend work at the Torrey Pines site might also be limited if the Del Mar Noise Ordinance prevented the night and weekend operation of a booster pump conveying sand to Torrey Pines. To avoid a significant impact, SANDAG would obtain a noise variance, or equivalent, from each local jurisdiction prior to the commencement of work at each site. The noise variance may place conditions on construction activities, such as notification requirements, noise control plan, or scheduling restrictions, to minimize impacts to residents. Noise variances were obtained for RBSP I and that project was compliant under a 24/7 schedule. No significant noise impacts would occur under Alternative 1.

<u>Receiver Sites</u>

Oceanside, North Carlsbad, Moonlight Beach, Cardiff, and Imperial Beach—Beach Front Receptors (and Del Mar, beach front receptor relative to borrow site SO-5)

Receiver sites Oceanside, North Carlsbad, Moonlight Beach, and Imperial Beach have beachfront residences at or near the same elevation as the receiver sites, and within 50 feet of the nearest points of planned sand placement. At Cardiff, adjacent sensitive receptors include restaurants. The dominant existing noise at each of these sites is the surf activity, and ambient surf noise levels range from 63 to 71 dBA L_{eq} at the sensitive receptors, as described in Section 3.13.

During sand placement, the principal project noise at beachfront residences and restaurants would be from construction equipment. A peak construction noise event scenario would include a diesel engine under load while sounding a backup alarm in proximity to a residence or restaurant. When at a point nearest to local residences, construction equipment noise levels would be anticipated to occasionally exceed 85 dBA L_{max} for a few minutes in a given hour. While these would be noticeable, they would not be considered significant due to the short duration. Hourly noise levels, with equipment moving about the site and breaks for measurement and surveying, are anticipated to be approximately 70 dBA L_{eq}. This noise level would exceed the upper range of the ambient surf noise levels (70 dBA L_{eq}) and would be audible to local residents. In addition, the average noise level change would exceed a 3- to 6-dBA increase and would be noticeable due to the difference in character from the ambient surf noise.

As the work moves away from any individual receptor, the construction noise level at the receptor would decrease with distance. At 200 feet, a decrease of 12 dBA would be anticipated. Thus, at distances greater than 200 feet, maximum construction noise levels would attenuate to 73 dBA L_{max} or less, and average noise levels 68 dBA L_{eq} or less. Impacts would be less than significant.

When nighttime work would occur within 200 feet of a residence, the change in noise environment would likely disturb the sleep of residents. While closing the windows would reduce the noise level, the change in the volume and character of the noise may disturb sleep as much as the increase in noise level would. The nighttime construction noise would be an adverse impact. Residents would be notified at least 1 week in advance of planned work near their residences, and work would last no longer than 3 consecutive days within a distance where the noise might cause a sleep disturbance. Therefore, impacts would be less than significant.

The dredge area at SO-5 is located approximately 2,500 feet from the nearest beachfront residents at the closest point. These residents are located in Del Mar, which does not contain a receiver site, and would only be exposed to potential noise from dredge activities at the dredge site. Beachfront residents located adjacent to receiver sites would be located a minimum of approximately 3,350 feet from the nearest dredge activities in Cardiff for SO-6. These residents would also potentially be exposed to sand placement noise as described above. Noise due to dredge activities at the borrow site would attenuate at these distances. Noise attenuation from a point source, at that distance, due to the spreading of energy and atmospheric effects, would be approximately 37 dBA. With a 90-dBA source noise at the dredge, the resulting noise level at the nearest beach front residence would be approximately 54 dBA. With the normal prevailing onshore wind, noise levels may seem slightly greater. However, a noise level of 54 dBA would be much less than the normal ambient noise level from wave activity on the beach, and noise from the dredge would not be expected to be audible. No significant noise impacts would occur due to dredging activities.

Booster pumps are anticipated to be required for replenishment at the Oceanside and North Carlsbad receiver sites. If pump noise is 70 dBA L_{eq} at 50 feet, and the pump is located at least 250 feet from a sensitive receptor, then the noise level at the receptor would be 56 dBA L_{eq}. This noise would be at least 5 dBA below the ambient noise levels of 63 to 71 dBA L_{eq} and would not be a significant impact. If a suitable location cannot be found at a distance of 250 feet or greater, there is a choice of noise abatement measures to maintain noise levels below ambient levels. Such measures would include (1) a sand berm or temporary barrier can be constructed between the pump and receptor to reduce noise; and (2) it may be possible to use an electric motor to drive the pump, rather than a diesel engine.

South Carlsbad North

The nearest residences to this receiver site are 300 to 400 feet from the beach sand replenishment areas. Most of the beach area where sand would be distributed is not directly visible due to the topography. Construction noise would attenuate 16 dBA or more at the nearest residences and would not likely be discernable above the traffic noise from Carlsbad Boulevard. The noise impact would not be significant. There is no potential impact at this site from dredge or booster pump noise.

Torrey Pines Beach

The nearest residential receptors to this receiver site front Carmel Valley Road and are approximately 2,000 feet away. There are two major roadways and a rail line separating these receptors from the beach area. Under favorable atmospheric conditions, project-related construction noise may be faintly heard at these receptors. There would be no significant noise impact at this receptor.

Batiquitos, Leucadia, and Solana Beach – Bluff Receptors

Sensitive noise receptors at these three sites are residences located on bluffs above the receiver 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}. The topography and slightly greater distance from these residences to the sand replenishment areas, when compared with the beach front residences at Oceanside, Moonlight Beach, etc., would reduce maximum noise levels to approximately 71 dBA L_{max}, and hourly noise levels to 65 dBA L_{eq}.

Impacts would be similar to those described at sites with beach front residences, e.g., Oceanside, North Carlsbad, Moonlight Beach, Cardiff, and Imperial Beach. The peak construction noise event would occur with a diesel engine under load, sounding a backup alarm, while close to a residence. This event would be heard by residents. The average noise change would be noticed because of a difference in character from the ambient surf noise, and because the overall average noise level would be anticipated to increase 3 to 5 dBA. When nighttime construction occurs within 200 feet of a residence, the change in noise environment is anticipated to disturb the sleep of some residents. While closing the windows would reduce the noise level, the change in the volume and character of the noise may disturb sleep as much as an increase in noise would. The nighttime construction noise would be an adverse impact. Residents would be notified at least 1 week in advance of planned work near their residences, and work would last no longer than 3 consecutive days within a distance where the noise might cause a sleep disturbance. No significant noise impacts would occur.

The approximate minimum distance from the dredge to bluff top sensitive receivers is 2,500 feet, which would occur at the Solana Beach receiver site. At that distance, noise attenuation from a point source would be approximately 34 dBA. With a 90-dBA source noise at the dredge, the resulting noise level at bluff top residences would be approximately 56 dBA. With the normal prevailing onshore wind, noise levels may seem slightly greater. However, a noise level of 56 dBA would be much less than the normal ambient noise level from wave activity on the beach, and noise from the dredge would not be expected to be audible. Therefore, impacts would be less than significant.

Booster pumps are anticipated to be required for replenishment at the Leucadia and Moonlight Beach receiver sites. The pump would likely be located in the Batiquitos/Leucadia area. If pump noise is 70 dBA L_{eq}, and 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 the ambient noise levels and would not be a significant impact. If a suitable location cannot be found at a distance of 250 feet or greater, there is a choice of noise abatement measures to maintain noise levels below ambient levels. Such measures would include (1) A sand berm can be constructed around the pump to reduce noise; and (2) it may be possible to use an electric motor to drive the pump, rather than a diesel engine.

Vibration and Groundborne Noise Impact Regulations

CEQA states that the potential for excessive groundborne noise and vibration levels must be analyzed; however, CEQA does not define the term “excessive” vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration; however, federal, state, and local governments have yet to establish specific groundborne noise and vibration requirements. Additionally, there are no federal, state, or local vibration regulations or guidelines directly applicable to the proposed project.

Although it is possible for vibrations from construction projects to cause building damage, the vibrations from construction activities are almost never of sufficient amplitude to cause more than minor cosmetic damage to buildings (FTA 2006). Groundborne vibration generated by construction projects is usually highest during pile driving, soil compacting, jackhammering, and demolition-related activities.

Based on standard vibration propagation equations, construction equipment vibration levels would potentially be felt at residences within 50 feet of sand placement activities but would be well below the threshold for damage to residential structures. Therefore, the proposed project may result in short-term vibrations felt by residents but would not expose local sensitive receptors to significant impacts resulting from groundborne vibrations.

Sensitive Bird Species

There are no specific noise standards set by the USFWS for the California least tern or the western snowy plover (Hays 2000). The noise standard set for nesting sites of other Southern California threatened or endangered species (i.e., California gnatcatcher and least Bell's vireo) is 60 dBA L_{eq} (City of San Diego 2007). This criterion also is considered generally applicable to light-footed clapper rail (County of San Diego 2009).

Noise levels at 350 feet from the receiver beaches are projected to reach approximately 64 dBA L_{max} with an average level of approximately 60 dBA L_{eq}. The distance from the receiver sites to the closest nesting locations are summarized in Table 3.4-4. Some nesting sites are shown to be in proximity to the receiver beaches (i.e., Batiquitos and Imperial Beach); however, they are all greater than 350 feet from the construction areas. Therefore, due to the distance between the existing colonies and the proposed project sites (greater than 350 feet) construction noise would not be expected to have a significant impact on the California least tern or western snowy plover colonies. Similarly, construction of the Imperial Beach receiver site would be more than 350 feet away from marsh areas in the Tijuana Slough NWR that may be used as nesting sites by endangered Belding's savannah sparrow or light-footed clapper rail. Potential impacts to sensitive bird species are discussed in greater detail in Section 4.4 (Biological Resources).

Mitigation Measures for Alternative 1

No significant impacts have been identified; therefore, no mitigation measures are necessary.

4.13.3 Alternative 2

Impacts of Alternative 2

Alternative 2, like Alternative 1, specifies that project construction would occur on a 24/7 schedule. Nighttime and weekend work is prohibited by local noise ordinance at the Oceanside, Solana Beach, Torrey Pines, and Imperial Beach receiver sites. To avoid a significant impact, SANDAG would obtain a variance, or equivalent, from each applicable local jurisdiction prior to the commencement of work at each site. Therefore, no significant noise impact would occur under Alternative 2.

Impacts at the sites with beach front or bluff top residences or businesses would be the same as those described for Alternative 1, with less than significant nighttime noise impacts. Residents near these sites would be notified at least 1 week prior to the start of the work and the period of impact would not exceed 3 consecutive days.

Alternative 2 would increase volumes at South Carlsbad North, Solana Beach, and Imperial Breach. While the increased volumes would expand the potentially impacted area, noise levels associated with delivery and spreading of the sand are anticipated to be similar to those described under Alternative 1 for these sites. Thus, there would likely be some short-term, less than significant noise impacts, at these receiver sites under Alternative 2.

The South Carlsbad South receiver site would be included in Alternative 2. The sensitive receptor area at this site is the South Carlsbad State Beach Campground, located on the bluff above the beach. Construction equipment noise levels at this receptor area would be similar to those described for bluff top sites in Alternative 1, approximately 71 dBA L_{max} for short peak noises, and 65 dBA L_{eq} for an hourly average. There would likely be some short-term but less than significant noise impacts. The character of impact would be slightly different from that at the bluff top residences, as the background ambient noise at the camp sites would have more traffic noise, and the camping tents and recreational vehicles would provide less noise insulation than a normal residence. Visitors to the campground would be notified at least 1 week prior to the start of the work, or as soon as feasible, given the transient nature of campground occupancy. The period of nearby impact would not exceed 3 consecutive days.

Similar to Alternative 1, construction noise levels would not be expected to exceed 60 dBA at nesting sites of sensitive bird species.

Mitigation Measures for Alternative 2

No significant impacts have been identified; therefore, no mitigation measures are necessary.

4.13.4 No Project/No Federal Action Alternative

Under this alternative, there would be no dredge activity, construction at receiver sites, or pipeline pumps, and there would be no noise levels above ambient conditions at any locations. There would be no noise impacts.

4.14 CLIMATE CHANGE

This section includes an analysis of GHG emissions for the alternative scenarios, including analysis methodology, significance criteria, and proposed mitigation measures applicable to climate change. Impacts to climate change occur on a cumulative basis; therefore, the cumulative impact from each alternative is considered, rather than by individual borrow/receiver site. This section also provides a qualitative discussion of sea level change due to climate change as it pertains to the proposed project.

Analysis Methodology

GHG Emissions

Neither the ARB nor San Diego APCD have formally adopted a recommended methodology for evaluating GHG emissions associated with new projects at the time of writing. Pursuant to full disclosure and according to the OPR's CEQA Guidelines that state, "A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project," the construction and operational emissions associated with the proposed action have been quantified using methods described below.

GHG emissions due to the proposed action would be associated with construction. Construction emissions would be associated with engine exhaust from dredging equipment, construction vehicles, and employee commute trips. Construction emissions would be temporary and would subside after completion of the proposed action. Construction activities contribute GHG emissions to a much lesser extent than operation of land use development projects, for which emissions occur annually over the lifetime of the project.

Construction-related emissions were estimated using the URBEMIS 2007 Version 9.2.4 model described in Section 4.12, Air Quality. URBEMIS does not currently include emission estimates for GHGs other than carbon dioxide (CO_2), and although emissions of GHGs other than CO_2, including methane and nitrous oxide, would result from project-related activities, the emission levels are small in comparison to emission levels in the form of CO_2.

Sea Level Rise

There are currently no federal, state, or local guidelines that establish a level of significance or a methodology for evaluating sea level rise associated with new projects in CEQA or NEPA documents. The impacts associated with sea level rise are discussed qualitatively, based on the Coastal Conservancy estimates of sea level rise.

4.14.1 Significance Criteria

There are no adopted quantitative federal, state, or local significance criteria for global climate change impacts or GHG emissions that pertain to this proposed action. At the federal level, as described in Section 3.14.2, the CEQ issued an “indicator” level of emissions that would lead to NEPA analysis. The indicator level proposed by the CEQ is 25,000 metric tons of carbon dioxide equivalents (CO_2e) per year, but is not intended to be used as a threshold.

At the state level, in the absence of significance thresholds proposed by the ARB, two air quality management districts have adopted significance thresholds for projects and plans under their jurisdiction that are consistent with the goals of AB 32. The Bay Area Air Quality Management District and the South Coast Air Quality Management District (SCAQMD) have adopted thresholds for stationary sources, but neither has established thresholds for construction-related emissions. The San Diego APCD has not adopted any thresholds at this time; however, as described above, climate change must be addressed in CEQA documents according to Appendix G of the CEQA Guidelines, including whether the project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and whether the project conflicts with the goals and strategies of the California Global Warming Solutions Act of 2006, known as AB 32, to reduce GHGs to 1990 levels by 2020.

In addition, Section 15064.7 of the CEQA Guidelines states that “a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies”. In the absence of significance guidelines from the San Diego APCD, this analysis will use the adopted thresholds from the SCAQMD, which is the air district with adopted thresholds in closest proximity to the project location. The SCAQMD has adopted a stationary source threshold of 10,000 metric tons of CO_2e per year.

While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

4.14.2 Alternative 1

Heavy-duty off-road equipment, materials transport, and worker commutes during construction of the proposed action would result in exhaust emissions of GHGs. The types of construction equipment that would be used in the proposed action are described in Section 4.12 and are provided in Appendix H. Construction would occur over an 173-day period beginning in spring 2012, as shown in Table 2-5.

Impacts of Alternative 1

GHG Emissions

Construction-related emissions that would occur as a result of implementation of the proposed action total 4,282 metric tons of CO_2e. Model details are provided in Appendix H. Construction emissions would be finite and would subside upon completion of the project. Standard emissions control measures would be implemented during construction, including limiting idling of construction vehicles to 5 minutes. Generally, emissions related to construction activities are small in comparison to operational emissions, which occur over the lifetime of a project.

At the federal level, CEQ has provided guidance for determining when agencies should evaluate climate change impacts. Specifically, the guidance states that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO^2e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. The CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the environmental analysis for projects involving direct emissions of GHGs. Emissions from the proposed action are well below the metric provided by CEQ and would not require additional analysis.

Although no numeric thresholds have been established by ARB or San Diego APCD, the emissions from the proposed action are well below the thresholds adopted by SCAQMD. In addition, the emissions would be finite, since there are no operational emissions associated with the proposed action. Thus, the project's GHG emissions fall well below all adopted levels above which the emissions could be considered substantial. The project's GHG emissions would not have a significant impact, either directly or indirectly, on the environment and would not conflict with California's GHG-reduction goals and strategies of AB 32.

Sea Level Rise

The California State Coastal Conservancy Climate Change Policy is the most applicable guidance adopted at the state level to date, and states that projects should consider project vulnerability to sea level rise of 15 inches by 2050 and 55 inches by 2100. Using an average rate of increase, under the 2050 scenario, this would be an average of 0.375 inches per year, while under the 2100 scenario, this would be an average of 0.611 inches per year increase in sea level. The proposed action would transport 1.8 mcy of sand on 10 receiver sites. The effect would be negligible in 4 to 5 years, depending on the site (Table 4.1-1). The replenishment would act as a buffer against increasing sea level rise, which would increase the receiver sites' resiliency to sea level rise. The extent to which sea level rise will be perceptible under both the project and no project scenarios is likely to be imperceptible within the next 5 to 10 years; however, any additional sand placed at the receiver sites would act as an additional barrier to the predicted rate of sea level rise over the next 5 to 10 years, depending on the extent of sea level rise and the local dynamics at each receiver site.

Mitigation Measures for Alternative 1

No significant impacts were identified; therefore, no mitigation measures would be required.

4.14.3 Alternative 2

Similar equipment would be utilized under Alternative 2 as in Alternative 1. Larger fill volumes would occur at South Carlsbad North, Solana Beach, and Imperial Beach, and an additional receiver site at South Carlsbad South would be added. The resulting construction period would be 98 days longer than in Alternative 1, resulting in 271 days of construction, beginning in spring 2012, as shown in Table 2-5.

Impacts of Alternative 2

Implementation of this alternative would result in greater GHG emissions than Alternative 1. Construction-related emissions that would occur as a result of implementation of the proposed action total 5,702 metric tons of CO_2e. Model details provided in Appendix H. Construction emissions would be finite and would subside upon completion of the project. Standard emissions control measures would be implemented during construction, including limiting idling of construction vehicles to 5 minutes.

Similar to the discussion in Alternative 1, total emissions from the proposed action would be well under the guidance level provided by the CEQ (25,000 metric tons of CO_2e per year) and the SCAQMD (10,000 metric tons of CO_2e per year) and no further analysis would be required.

Sea Level Rise

Impacts to sea level rise under Alternative 2 would be similar to the impacts discussed under Alternative 1. The proposed action would transport up to 2.7 mcy of sand on 11 receiver sites in 2012, which would have the effect of elevating the shoreline to the receiver sites. The replenishment would act as a buffer against increasing sea level rise, which would increase the receiver sites' resiliency to sea-level rise, but only in the near-term (Table 4.1-1).

Mitigation Measures for Alternative 2

As with Alternative 1, no significant impacts were identified; therefore, no mitigation measures would be required.

4.14.4 No Project/No Federal Action Alternative

A No Project Alternative would result in no dredging or replenishment activities, and no additional GHG emissions. The No Project Alternative would constitute no impact.

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CHAPTER 5.0
CUMULATIVE PROJECTS AND IMPACTS

CEQA Guidelines require a discussion of significant environmental impacts that would result from project-related actions in combination with "closely related past, present, and probable future projects" located in the immediate vicinity (CEQA Guidelines, § 15130 [b][1][A]). 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 § 15355).

Federal regulations implementing NEPA (40 C.F.R. §§ 1500–1508) 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 C.F.R. § 1508.7).

The discussion of cumulative impacts is further guided by the CEQA Guidelines in §§ 15130(a) and (b), which state:

- 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 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 cumulatively considerable and 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.

In general, effects of a particular action or group of actions would be considered cumulative impacts under the following conditions:

- effects of several actions occur 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 PROJECTS

There is a long history of beach replenishment projects in the San Diego region, primarily involving projects placing sand from large- and small-scale maintenance dredging of harbors and lagoons onto nearby beaches. There was also the large-scale offshore dredging effort (RBSP I) which placed sand along 12 locations. Two other substantial beach nourishment efforts were associated with lagoon restoration at Batiquitos between 1994 and 1997 (over 1.8 mcy) and lagoon functional improvements for infrastructure facilities at Agua Hedionda Lagoon in 1998 (560,000 cy). Much smaller replenishment actions have resulted from opportunistic projects from upland coastal development, like the Pacific Station and Scripps Memorial Hospital projects in Encinitas. Sand placed at specific locations as a result of these activities disperses throughout the littoral system over time, eventually becoming too dispersed to be measurable in any single location.

Prior to implementation of RBSP I in 2001, sand nourishment projects placed 3.3 mcy of sand along the San Diego coastline between 1994 and 2000 (Coastal Frontiers 2010). Including the 2 mcy of sand associated with RBSP I, a total of 2.5 mcy of sand was placed on regional beaches between 2001 and 2009 (Coastal Frontiers 2010). These numbers do not include the routine “bypass” placement volumes where sand is removed from North County lagoons and placed on nearby beaches. Since 2001, that bypass volume has averaged over 197,000 cy/year from Agua Hedionda, 251,000 cy/year from Oceanside Harbor, and 22,000 cy/year from San Elijo Lagoon. The littoral system has, therefore, been subject to sand inputs on a relatively frequent basis. Generally, projected amounts of sand inputs up to 2017 (including RBSP II) would not substantially exceed these historic amounts. Data collected before and after RBSP I have shown that the nearshore environment of the regional coast line continues to function.

Sand bypassing operations, in the form of lagoon and harbor dredging, return sand that becomes trapped in these features to the littoral zone, particularly in the Oceanside Littoral Cell. Sand bypassing plays an important role in maintaining the distribution of sediment within the littoral system and does not increase the quantity of sand in the overall system.

Potential cumulative projects along the San Diego region coast are listed in Table 5-1. The table identifies the project name, the jurisdiction within which the action will occur, a brief description, and the anticipated schedule for implementation. Cumulative projects considered in this analysis consist of ongoing or proposed beach nourishment projects adjacent to the receiver sites and development projects proposed adjacent to receiver sites. There are no proposed actions adjacent to the borrow sites. This list primarily includes planned projects that are on file with local jurisdictions and/or the Office of Planning and Research (OPR). Relevant, projects that have not yet been filed with the OPR may also be included in this list for the purposes of full disclosure, although there may not be adequate information at this time to determine their potential cumulative contribution. Approved opportunistic sand nourishment programs under SCOUP have also been identified in the list, although the total authorized volumes have not yet been placed at each approved receiver site, nor are they likely. Programmatic policy documents (i.e., Coastal Regional Sediment Management Plan, Shoreline Preservation Strategy) 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. An environmental document was not prepared for the Preservation Strategy and an environmental document for the Sediment Management Plan has not yet been initiated.

Based on shoreline monitoring, some of the sand placed as part of RBSP I is still present in the system, although measurable quantities vary substantially by location (Coastal Frontiers 2010). Long-term (5 years) beach-width gains persisted at North Carlsbad, Cardiff, and Solana Beach; transient gains (2 to 4 years) were observed at Oceanside, Encinitas (Batiquitos, Leucadia, Moonlight), and La Jolla; and negligible gains (1 year or less) occurred at South Carlsbad, Imperial Beach, Del Mar, and Mission Beach. As such, cumulatively considerable projects included within Table 5-1 are generally those initiated concurrent with or after RBSP I (2001) or possibly planned up to 2017 (5 years after RBSP II implementation). It is assumed that projects occurring before implementation of RBSP I have become too dispersed to provide reliable information on potential impacts; therefore, they are not included in this analysis. This is not intended to be an exhaustive list of all past beach nourishment and related maintenance projects.

Numerous coastal projects are identified in this list for purposes of disclosure, including several projects that are known in concept but are still very much in the planning stages or are not funded. Coastal projects are often high profile so this list provides information about the current status of projects even if they are not likely to occur in the 2012 time period of RBSP II, or

Table 5-1
RBSP II List of Cumulative Projects

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
REGIONAL/MULTIPLE JURISDICTIONS				
RBSP I	Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, San Diego, Imperial Beach	Sand Nourishment	This project involved the dredging of over 2 million cubic yards (cy) of beach-quality material from offshore borrow sites located outside of the depth of closure (i.e., outside of the respective littoral cells) and the placement of this material on 12 receiver sites in the San Diego region: Oceanside, North Carlsbad, South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, Del Mar, Torrey Pines, Mission Beach, and Imperial Beach. This project also included implementation of a 5-year monitoring program, including intertidal habitat monitoring, subtidal monitoring, kelp monitoring, and lagoon monitoring. The proposed project addressed in this EA/EIR would be based on RBSP I.	Sand placement completed summer 2001; monitoring through 2005.
Opportunistic Beach Fill Program (SCOUP)	Oceanside, Carlsbad, Encinitas, Solana Beach, Coronado, and Imperial Beach	Opportunistic Sand Nourishment Program	Implementation of a sand replenishment program to allow for the processing of multiple beach replenishment projects over a 5-year period. For each listed 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 included under each jurisdiction below. The exception is Coronado, which has no other listed projects. For this jurisdiction, this program authorizes sand deposition between Naval Air Station North Island and the Naval Amphibious Base at an annual maximum of 100,000 cy. No materials have been placed and the program is not detailed below.	Plans approved by local jurisdictions. Generally, the authorizations allow for a certain quantity of material to be placed during certain seasons if fines are 10% or less. The allowed quantity is substantially less for material with greater fines. Initial placement volumes in Years 1 and 2 are also lower for some jurisdictions. To date, actual sand placement has only occurred in Encinitas. See specific jurisdictions below.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
OCEANSIDE				
Oceanside Harbor Maintenance Dredging	Oceanside	Maintenance Dredging/Sand Placement	Oceanside Harbor is dredged annually by the USACE to maintain sufficient depth for boat traffic. Dredged material is typically disposed of by placing it on Oceanside beaches south of Tyson Street. The average amount of material placed on the beach is 175,000 cy. The most recent activity (spring 2010) placed an estimated 268,000 cy of sand between the San Luis Rey River and the Oceanside Pier.	Ongoing; annually in spring.
Sand Compatibility & Opportunistic Use Program (SCOUP)	Oceanside	Opportunistic Sand Nourishment	Implementation of a sand replenishment program to allow for the processing of multiple beach replenishment projects over a 5-year period. The project allows the annual placement of up to 150,000 cy of opportunistic sand along the beach at the 5,000-foot receiver site, located south of Forster Street.	Approved for period 2008–2013. To date, no material has been placed at this site under this program. No material has been identified in the near term due to economic conditions. Under the current authorization, only 20,000 cy could be placed annually in the first 2 years. Given permit expiration date in 2013, it is unlikely that more than 20,000 cy total may be placed under this program.
Buena Vista Lagoon Weir Replacement Project	Oceanside	Maintenance	The City of Oceanside has proposed to replace the existing weir at the mouth of Buena Vista Lagoon, located at the border of Oceanside and Carlsbad. The project would replace the existing 50-foot-long weir with an 80- by 10-foot weir. The new weir design would decrease beach erosion downstream and increase flows through the mouth of the lagoon during storm events while maintaining the freshwater characteristic of the lagoon.	Design and plans completed; construction not started. No construction date known.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
CARLSBAD				
Carlsbad Energy Center Project	Carlsbad	Development	Carlsbad Energy Center LLC proposes to develop a natural-gas-fired generating facility on a 23-acre site in the City of Carlsbad adjacent to Agua Hedionda Lagoon. The project will be a 558-megawatt (MW) gross combined-cycle generating facility with two units (one natural-gas-fired combustion turbine and one steam turbine unit) on the approximately 23-acre Carlsbad project site. As part of the project, existing steam boiler Units 1, 2, and 3 at the Encina Power Station will be retired.	Awaiting final agency approval.
Carlsbad Desalination Plant	Carlsbad	Development	Poseidon Resources (Channelside) LLC (Poseidon) will construct and operate an approximately 50-million-gallon-per-day seawater desalination plant to produce potable water from sea water.	Anticipated operational in 2013.
Agua Hedionda Lagoon Maintenance Dredging	Carlsbad	Maintenance Dredging/Sand Placement	This lagoon has undergone maintenance dredging since 1955; in that period, over 5.9 million cubic yards (mcy) may have been removed. This dredged material has been placed on adjacent beaches in Carlsbad. The last maintenance dredging of the outer lagoon was completed in April 2009 and resulted in the removal of 299,000 cy of sand. This sand was placed on adjacent beaches (ref. CDP #6-06-61). Typical dredge volumes anticipated in 2011 are approximately 500,000 cy. Of that total, approximately 100,000 cy would be placed north of the north jetty. The remainder would be placed south of the north jetty.	Early 2011.
Batiquitos Lagoon Maintenance Dredging	Carlsbad	Maintenance Dredging/Sand Placement	As a result of the Batiquitos Lagoon Enhancement Project completed in 1997, continued dredging and sand placement occur approximately every 2 years to maintain the lagoon (last performed in 2006). Maintenance dredging is designed to remove sand from flood shoals drawn into the lagoon by tidal action and redistribute it to nearshore areas of adjacent beaches. Whether sand placement will occur nearshore or on the	Ongoing; fall/winter 2011/2012 for 165,000 cy.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
			beach is yet to be determined. Dredging and sand placement have occurred periodically over the last 10 years, yielding approximately 110,000 cy of dredged materials, which have historically been placed on local beaches north and south of the inlet channel. Future dredging is anticipated to provide approximately 165,000 cy, anticipated to be placed on City of Carlsbad and Encinitas beaches in fall 2011.	
Opportunistic Beach Fill Program (SCOUP)	Carlsbad	Opportunistic Sand Nourishment Program	Implementation of a sand replenishment program to allow for the processing of multiple beach replenishment projects over a 5-year period. This project would allow for the placement of up to 150,000 cy per year of opportunistic beach fill along the Encinas Beach portion of South Carlsbad State Beach, with an initial maximum fill of 50,000 cy. To date, no material has been placed on this site under this program. Permits for the program expire in 2011; however, Carlsbad is pursuing an extension to the program. If extended, approximately 30,000 cy may be placed.	Approved for period 2006–2011. For purposes of this analysis, assume up to 30,000 cy of sand placement between 2012 and 2017.
ENCINITAS				
Opportunistic Beach Fill Program (SCOUP)	Encinitas	Opportunistic Sand Nourishment Program	For Encinitas, this program authorizes the deposition of sand adjacent to Batiquitos Beach and Moonlight Beach at an annual maximum of 120,000 cy and 150,000 cy, respectively. To date, limited material has been placed.	Approved for period 2010–2015.
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. This project has been occurring annually in May since 2000.	Approved; occurs annually in May.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
Scripps Memorial Hospital – Parking Lot Removal	Encinitas	Development/ Opportunistic Sand Nourishment Project	Approximately 5,000 cy of sand was dispersed at inter-tidal portions of Moonlight Beach from this upland development project, which consisted of the construction of a multistory parking garage at Scripps Memorial Hospital. This sand placement project was authorized under the City's SCOUP program.	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 the San Elijo Lagoon to maintain the opening and places the cobble and sand material south of the mouth on Cardiff Beach. Opening occurs twice annually on an as-needed basis. An average of 20,000 cy is bypassed from the lagoon to the beach to the south per event.	Occurs at least once annually.
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 Lagoon Restoration Project	Encinitas	Lagoon Restoration	The proposed project would restore the lagoon via major infrastructure changes (e.g., railroad tracks, Coast Highway 101, and I-5 bridge) and include dredging and vegetation restoration. The proposed project may also include relocation of the existing lagoon inlet to enhance tidal influence under some of the alternatives. If excess dredged material is available and suitable, then it could be placed on the beach and/or in the nearshore zone.	Planning process ongoing, no environmental document released for public review.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
Encinitas/Solana Beach Shoreline Protection Project	Encinitas/Solana Beach	Shoreline Protection/Sand Nourishment	The Solana Beach–Encinitas shoreline protection project examines two critical segments: Segment 1 is within the City of Encinitas and extends from the 700 block of Neptune Avenue to Swami's reef (approximately 2.0 miles in length); Segment 2 is within the City of Solana Beach and stretches from Table Tops reefs to the southern limit of Solana Beach (approximately 1.4 miles in length). Various methods of shoreline protection along these segments are proposed, including beach replenishment and construction of sand retention structures (i.e., groins, seawalls, sand berms). The various alternatives included a beach nourishment only alternative with up to 1.5 mcy of material (initial placement) and approximately 600,800 cy added periodically over the 50-year project life. Alternatives with other retention elements proposed less sand volumes for nourishment.	Draft EIR/EIS distributed in 2005 but not finalized; project currently undergoing Plan Reformulation process with USACE. That plan assumes implementation no earlier than 2015. Likely to be variation of the project described in the 2005 document.
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. To date, no materials have been placed. No placement is currently planned for the near term.	Approved for period 2008–2013.
Fletcher Cove Reef Project	Solana Beach	Shoreline Protection	The USACE 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. The Fletcher Cove Submerged reef is based on the multipurpose conceptual reef planned for Ventura County known as "Oil Piers." Preliminary concepts propose a feature that is 295 feet long by 66 feet wide constructed of geotubes, concrete, or stone, located approximately 300 feet from shore.	Conceptual engineering and design completed; Phase II engineering design and environmental review anticipated to begin in 2011.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
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 began in summer 2010.
DEL MAR				
San Dieguito Wetland Restoration	Del Mar	Restoration	The San Dieguito Wetland Restoration Project involved the development, design, and ultimate implementation of a comprehensive restoration plan for approximately 440 acres in the western San Dieguito River Valley.	Construction completed fall 2005.
San Dieguito Wetland Restoration Maintenance Dredging	Del Mar	Maintenance Dredging/Sand Placement	The San Dieguito Wetland Restoration includes the alteration of the streambed of the San Dieguito River, tributary to the San Dieguito Lagoon, by opening the mouth of the river to allow for tidal flow. Project activity includes initial dredging and subsequent monitoring and maintenance dredging (SAA #1600-2006-0347-R5). It is anticipated that approximately 80,000 cy of sand being dredged from the lagoon and river mouth will be placed on the beach areas immediately to the north and south of the inlet.	Currently anticipated in spring 2011 (Elwany 2011).
SAN DIEGO				
San Diego Harbor Dredging	San Diego/ USACE	Maintenance Dredging/Sand Placement	This project is a continuing program of regular maintenance dredging conducted by USACE to dredge the shoaled areas of the San Diego Harbor. This project would involve dredging of approximately 300,000 cy of material with a maximum dredging duration of 100 days. No material has been placed onshore under this program this calendar year; however, nearshore placement of dredged materials is not likely at Imperial Beach until after 2012.	Dredging occurred in 2005 when approximately 300,000 cy were placed in the nearshore off Imperial Beach. Possible nearshore placement off Imperial Beach after 2012.
Silver Gate Yacht Club Dredging	Coronado along San Diego Bay	Maintenance Dredging/Sand Placement	This project removed 2,000 cy of material near the yacht club and placed it in the nearshore off Imperial Beach.	Completed 2008.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
San Diego River/Mission Bay Dredging	San Diego	Maintenance Dredging/Sand Placement	Maintenance dredging of Mission Bay entrance and navigation channels and disposal of 745,000 cy of dredged material on Mission Beach. The purpose of the proposed project is to maintain authorized channel depths in federal channels to allow for safe navigation for recreational and commercial vessels in Mission Bay. The clean, sandy material was disposed of primarily on Mission Beach (489,000 cy), with a smaller volume of fine-grained sands (256,000 cy) disposed into the surf zone immediately offshore of Mission Beach. The approach channel was dredged to its authorized depth of -25 feet MLLW, the entrance and main channels to -20 feet MLLW, and Mariners Cove to -15 feet MLLW.	Completed fall 2010.
San Diego River Mission Bay Jetty and Revetment Repair Project	San Diego/ USACE	Maintenance Dredging/Sand Placement	The purpose of the proposed project is to perform repairs to the Middle Jetty at the entrance channel to Mission Bay. Repair of a small section of the revetment near Mariners Basin was not included as part of this project, as funds were not available. In addition, the bottom of the Entrance Channel has slowly shoaled in a number of areas. Removal of sediments from the shoaled areas by dredging is included as part of the San Diego River/Mission Bay Dredging project mentioned above.	Approved 2009; repair work completed spring 2010; no additional work will be done.
IMPERIAL BEACH				
Opportunistic Beach Fill Program (SCOUP)	Imperial Beach	Opportunistic Sand Nourishment Program	For Imperial Beach, this program authorizes sand deposition from Imperial Beach Boulevard to the southern end of Seacoast Drive south of Admiralty Way at an annual maximum of 75,000 cy. To date, no material has been placed, and no placement is currently planned.	Approved for period 2008–2013.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
Imperial Beach Pollutant Transport and Dispersion Experiment (IB09) Scripps Institution Oceanography	Imperial Beach/ UCSD	Sediment Study	The experiment was performed to improve understanding and modeling capabilities of breaking-wave-driven mixing and transport of pollutants in the nearshore at distances of up to 5–10 kilometers from a surf zone source. The mixing and transport of pollutants by the breaking-wave-driven process was studied through a series of dye tracer experiments. The focus was on dry-weather conditions, when the Tijuana River flow is very small and beach usage is at a maximum. This experiment did not involve sediment placement.	Completed fall 2009.
Imperial Beach Silver Strand Shoreline Protection Project	Imperial Beach/ USACE	Shoreline Protection/ Sand Nourishment	The proposed plan to provide shoreline protection to the City of Imperial Beach would involve an initial beach fill project consisting of approximately 1,588,000 cy, resulting in a total beach width of approximately 100 feet beyond the existing beach line. The extent of the fill project would range from Carnation Avenue to the southern extent of the city's development, an approximate length of 7,100 feet. The proposed plan would include nourishment cycles estimated once every 10 years over the 50-year project life. It is approximated that 1 mcy of sand would be placed on the beach during each nourishment cycle.	Planning and permitting stages; no federal funds identified or authorized.
Palm and Carnation Avenue Street End Improvement Project (MF 573)	Imperial Beach	Street Revitalization/ Beach Access	The project created landscape design, public art, and roadway improvements to the street ends of Palm Avenue and Carnation Avenue; provided visual and physical beach access; and established year-round lateral beach access, including disabled, lifeguard, and emergency vehicle access, by constructing a permanent transition from the groin/street end to the beach. The project involved placement of approximately 8,000 cy of sand at the end of Palm Avenue and placement of approximately 1,000 cy of sand at the end of Carnation Avenue; EIR (SCH#2002031106).	Completed in 2009.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
Tijuana River mouth Dredging and Beach Nourishment with USFWS Refuge Office for TJ Rivermouth Closures	Imperial Beach/USFWS	Maintenance Dredging/Sand Placement	Typically annual dredging completed to reopen the Tijuana River mouth and restore tidal exchange to the estuary. Removal of 2,500 cy occurred in 2010. Material was placed to reinforce an eroded dune face.	Spring-summer 2011, but may not be required in 2011 (Winter 2011).
United States Coast Guard Mooring Ballast Point Dredge	Imperial Beach/ USCG	Maintenance Dredging/Sand Placement	Dredged approximately 33,000 cy and placed in the nearshore just south of the Imperial Beach Pier.	Completed March 2011.
USACE San Diego Harbor Entrance Channel Maintenance Dredge	Imperial Beach/ USACE	Maintenance Dredging/Sand Placement	Up to 350,000 cy of sand is available for dredging from the entrance and approach channel to San Diego Bay; placement in the nearshore just south of Imperial Beach Pier.	May occur in Fall 2011 or Winter 2011-2012.
Tijuana River National Estuarine Research Reserve – Sediment Fate and Transport Study	Imperial Beach	Sediment Study	The project consisted of the implementation of a Sediment Fate and Transport Study within Border Field State Park at the Tijuana River National Estuarine Research Reserve. Sorted sediment from the Goat Canyon sediment basin was conveyed via track to designated areas along the beach south of the Tijuana River mouth. The project placed sediment in three phases: Phases 1 and 2 involved transport and deposition of approximately 10,000 cy of sediment over a maximum of 10 days; Phase 3 involved transport and deposition of approximately 40,000 cy of sediment over a maximum of 60 days. Extensive physical monitoring was conducted to determine potential impacts on marine habitats as a result of sediment movement.	Study completed fall 2009.
Johnson (MF 701)	Imperial Beach	Development	Construction of a two-dwelling-unit residential structure with vertical seawall at 684–686 Ocean Lane; MND (SCH #2006101119).	Planning and design stages; summer 2010.

Project	Jurisdiction	Project Type	Description	Project Status/ Schedule
Seacoast Inn (MF 661)	Imperial Beach	Development	Demolition of existing 38-room hotel; construction of new 78-room hotel with restaurant, conference room, underground parking garage, and vertical seawall at 800 Seacoast Drive; EIR (SCH #2005101113).	Planning and design; no date projected for implementation.
Harmon Nelson (MF 924)	Imperial Beach	Development	Demolition of existing three-dwelling-unit residential structure; construction of new three-dwelling-unit residential structure with vertical seawall at 1008 Ocean Lane; MND (SCH #2008041143).	Permits expire June 18, 2011.
Bikeway Village MF 1034	Imperial Beach/California Coastal Commission	Development	Redevelop existing warehouse buildings to tourism commercial uses (café, bicycle shop, hostel, etc.). Application filed in February 2010 and an EIR is anticipated.	Planning and design.
McCann (MF 1045)	Imperial Beach	Residential Demolition	Demolition of five-unit apartment at 1174 Seacoast Drive; NOE Class I(l).	Approved.

Note: Does not include repair or minor improvements to private revetments within individual jurisdictions.

within the up to 5 years when sand volumes may be measurable. In particular, the total sand volumes authorized in the various SCOUP projects are not likely to be placed in the next 1 to 2 years. All programs will expire between 2011 and 2013, and given current and foreseeable economic conditions with much reduced development, there will be far fewer, if any, projects with opportunistic material. The City of Carlsbad is pursuing an extension of their SCOUP through 2016. The total authorized amount is not anticipated for placement in the next few years, although up to 30,000 cy have been identified for potential reuse as part of the Agua Hedionda Channel Improvements Project.

5.2 ANALYSIS OF CUMULATIVE IMPACTS

5.2.1 Geology and Soils

The three littoral cells along the coast of the San Diego region have been experiencing a reduction of natural sand sources for beach replenishment, and the beaches fed by this process have been eroding over time. Implementation of the proposed replenishment action would be a short-term beneficial impact and would cumulatively contribute in that time frame to the reduction of erosion at the identified beach sites. Over the long-term, only relatively minor increases in the thickness of sand on the beaches and offshore bars are anticipated, similar to changes in thickness that should naturally occur seasonally. Cumulative projects would not affect the transport of sediment off the coast. Bypass projects would merely relocate sand up and down the littoral cell, and nourishment projects from other sources could provide additional sand to sustain the littoral cells. This could be beneficial overall.

5.2.2 Coastal Wetlands

Implementation of RBSP II, in combination with other projects that place sand on beaches of the region, has the potential to affect sedimentation to local wetlands, particularly the lagoons in North County that currently are maintained by periodic dredging. Monitoring after RBSP I confirmed the project had no substantial effect on routine maintenance activities. Similarly, while some sedimentation is anticipated due to project sand, RBSP II is not anticipated to contribute considerably to maintenance requirements at regional lagoons. SANDAG has committed to providing funds to offset project-related sedimentation at individual lagoons upon completion of construction. RBSP II would not result in cumulatively considerable impacts.

5.2.3 Water Resources

Both dredging and sand placement operations associated with the proposed project would generate turbidity plumes that would disperse due to particle settling, and natural mixing and dilution processes. The spatial extent of the plumes would be limited in size due to the sandy nature of the sediment and would not persist once construction operations were completed. The project also incorporates the use of training dikes, as much as possible, during sand placement at the receiver sites to promote settlement of sediment on the beach and to lower the amount of suspended sediment within return waters subject to wave action. Because the turbidity plumes would be localized at both the borrow and receiver sites, the combined actions of dredging and sand placement operations would not result in overlapping turbidity plumes. Turbidity is not anticipated to span from one receiver site to another since adjacent receiver sites served by the same borrow site would be constructed at different times and turbidity would dissipate quickly when hydraulic pumping of sand to a receiver site concludes.

Potential cumulative impacts may occur if more than one project involving placement of sand occurs simultaneously or immediately before or after the proposed action in the same vicinity. Such potential projects include harbor or lagoon maintenance, lagoon restoration, or shoreline protection projects. Implementation of RBSP II at the same time as sand bypassing projects associated with maintenance of lagoons and harbors has a low potential for cumulative impacts to water quality. If Oceanside Harbor maintenance were to occur at the same time as RBSP II, the sites are far enough apart that turbidity plumes would not be expected to overlap. Dredge activities for lagoon maintenance are not planned concurrent with RBSP II; therefore, a potentially adverse cumulative effect would not be expected to occur.

The proposed project, similar to other projects identified in Table 5-1 involving discharges to waters of the United States, would be implemented in accordance with RWQCB water quality certifications, which require compliance with all applicable water quality standards, limitations, and restrictions as specified in the California Ocean Plan and San Diego's Basin Plan. Because the project would result in short-term localized turbidity that has a low potential for overlapping with turbidity resulting from other projects, and any overlap that would occur would also be short term, no significant long-term cumulative impacts to water resources are anticipated when the proposed action is considered in conjunction with other applicable past, present, and reasonably foreseeable future projects.

5.2.4 Biological Resources

The proposed project, in combination with other beach nourishment and bypass projects listed in Table 5-1, would be expected to result in cumulative changes to biological resources. Beaches naturally undergo seasonal accretion and erosion associated with changes in wave climate. Generally, sand is transported to offshore bars during the winter and to the beach in summer. Sandy beaches within the region have undergone retreat over many years associated with reduced sediment delivery to the coastline from a variety of factors, including watershed development, flood control projects, dams, and construction of harbors. Where projects would increase sandy beach habitat there would be short-term gains for species that utilize that habitat. If sediment moves offshore in substantial excess quantities and for a substantial duration as compared to typical conditions, then sensitive reef habitat could experience adverse impacts. Of the listed cumulative projects, only those involving beach nourishment or associated with the ocean environment have the potential to contribute to cumulative impacts to nearshore and offshore biological resources. Projects involving land-based capital improvements or development or demolition would not directly affect those biological resources and are not discussed further.

Cumulative Impacts in Combination with Future Maintenance and Opportunistic Beach Fill Projects

Future project types may involve placement of sand in the shorezone, including sand from lagoon restoration projects, opportunistic beach fill programs (e.g., SCOUP projects), shoreline protection projects, harbor dredging projects, and bypassed sand from lagoon and harbor maintenance dredging projects. SCOUP quantities are considered relatively minor for this cumulative analysis due to the low volumes likely to be placed and the restriction on placing sand within recently nourished sites. As tabulated by Coastal Frontiers in 2010, new sand placed in the shorezone since 2001 added nearly 2.5 mcy of sand to the beaches (including RBSP I). Additional volumes of sand are relocated from lagoons to beaches by maintenance dredging. While new sand to the system is the primary concern for determining cumulative impacts, SANDAG is considering all sand placement in the shorezone as a conservative approach. Potential cumulative effects are described in greater detail by habitat and sensitive species below.

<u>Sandy Beach Habitat</u>

Generally, sandy beach habitat was enhanced by RBSP I by providing wider beaches that maintained a persistent sand depth across seasons. Such conditions were beneficial to invertebrates that live within the sandy sediment, shorebirds that feed on the invertebrates and rest on beaches, and grunion that spawn in sandy beach habitat. Results of surveys conducted at certain receiver sites and nearby beaches within 4 years of RBSP I and in 2009 at proposed RBSP II receiver sites indicate that no long-term significant impacts to sandy beach habitat or resources occurred after RBSP I. Habitat was available regionally subsequent to decades of routine nourishment.

RBSP II, in combination with past projects, and future maintenance and opportunistic beach nourishment projects, has the potential to extend the duration of beach width and shorezone volume performance benefits. However, recovery of sandy beach invertebrates after disturbance could be delayed if additional beach nourishment from another project occurred in the same location and same year as RBSP II. There is the potential for cumulative impact from repetitive disturbance at Batiquitos if RBSP II and routine lagoon maintenance were to be scheduled close in time because they share the same receiver site. The Batiquitos maintenance project is scheduled for fall 2011. The potential for adverse cumulative effects would be minimized by scheduling the RBSP II project after August 1, 2012, and cessation of nesting at the W-2 site to avoid and minimize impacts to sensitive least terns and snowy plovers that nest at the lagoon. Because the peak recruitment period for invertebrates is spring/early summer, this schedule would also minimize the potential for adverse effects to the invertebrate forage base in 2012.

RBSP II has been designed to minimize the potential for cumulative impacts by placing the Oceanside receiver site downcoast and the North Carlsbad receiver site away from areas used for placing bypassing sands dredged from Oceanside Harbor and Aqua Hedionda Lagoon, respectively. Cumulative impacts are expected to be less than significant. RBSP II includes protective measures, as described in Section 2.5, to ensure no significant impacts to grunion occur. Overall, RBSP II, in combination with past and future maintenance and opportunistic programs, likely would contribute to beneficial cumulative effects by enhancing beach width and increasing sandy beach habitat persistence.

Soft-Bottom Subtidal Habitat

None of the proposed future maintenance or opportunistic beach fill programs involve offshore borrow site dredging. RBSP II avoids the potential for long-term cumulative impacts by not occupying the exact same footprint as the RBSP I borrow sites. Further, the 10+ year duration between dredging events allows natural recolonization to occur. Therefore, the cumulative effects of RBSP II in combination with future maintenance and opportunistic programs would not be cumulatively significant over the long term.

Nearshore Sensitive Hard-Bottom and Vegetated Habitats

Sand placement on beaches has the potential to result in impacts to sensitive nearshore habitats, including hard-bottom and vegetated habitats, from turbidity during construction and sedimentation after construction. Monitoring conducted for 4 years after implementation of RBSP I found no significant effects to nearshore reefs or kelp beds attributed to the project. Sand cover increase was noted at several nearshore reefs and kelp bed stations, but was mainly attributed to natural variability or potential contributions from other sources (e.g., maintenance, restoration projects). Of the 33 stations that were monitored, only three were identified as possible areas where increased sedimentation may have resulted from RBSP I in combination with other projects, and only at one of these stations (NC-SS3) was a decline reported in surfgrass at the end of the monitoring period. The overall conclusion of the monitoring was that no long-term impacts were observed from RBSP I. However, the potential for significant cumulative impacts was acknowledged as a possibility with the placement of large volumes of sand (similar to or exceeding the sand volumes of RBSP I) in proximity to sensitive resources.

Kelp bed mapping conducted over the past two decades indicates that canopies have responded similarly on regional and larger Bight-wide scales in response to temperature and nutrient conditions associated with broader scale oceanographic characteristics of El Niño and La Niña periods. All kelp beds in San Diego County, including those located in the vicinity of RBSP I receiver sites, displayed substantial growth in 2007–2008, reaching bed canopy sizes in 2008 that were the largest recorded in the past decade. Therefore, no significant cumulative effects occurred to kelp bed habitat with implementation of RBSP I in combination with harbor and lagoon maintenance or opportunistic beach nourishment projects. Similarly, no significant cumulative impacts to kelp would be anticipated with implementation of RBSP II.

Sand movement from receiver sites has the potential for significant cumulative impacts to sensitive nearshore habitat areas where multiple projects, in combination, place large volumes of sand on the beaches or directly in the nearshore. There is tremendous uncertainty associated with predicting long-term indirect impacts from the cumulative addition of sand volumes from multiple sources to the dynamic ocean system, which displays a high degree of natural variability in wave climate and other oceanographic conditions, all of which have the potential to affect nearshore habitats and resources.

Locations along the San Diego coast with a relatively higher risk for project cumulative impacts to reefs include areas in proximity to lagoons and harbors that remove sediment during maintenance projects and bypass the sand to adjacent beaches. As noted above, RBSP II was designed to minimize the potential for cumulative impacts by locating the Oceanside and North Carlsbad receiver sites away from locations where maintenance sands are bypassed from Oceanside Harbor and Aqua Hedionda Lagoon. Because hard-bottom is limited offshore of the southern end of Oceanside and the bypass and receiver site locations are located 1,600 feet or more upcoast from the hard-bottom area, the risk for cumulative impacts is relatively low.

The potential for cumulative impacts is anticipated to be less than significant off North Carlsbad. The receiver site is located upcoast of the beach location where sand is actually backpassed (or replaced upcoast of the lagoon) during maintenance of Aqua Hedionda Lagoon. Localized sand influence and some reduction of surfgrass were observed at the end of the RBSP I monitoring period at a monitoring station near the jetty. While the overall impacts of RBSP I were considered not significant, the potential for cumulative effects or influence of the jetties blocking sand movement downcoast was uncertain. Modeling predictions of sand level increases in the vicinity of reefs offshore and downcoast of the North Carlsbad receiver site suggest there would be less-than-significant effects on reef habitat. The modeling predictions take into account sand-level changes measured on profiles near the lagoon before and after RBSP I, which reflect past placements of maintenance volumes of similar magnitude as planned for placement in January 2011. RBSP II is scheduled to occur more than 1 year after maintenance dredging at Agua Hedionda Lagoon, further minimizing potential cumulative effects. Therefore, RBSP II is not anticipated to contribute considerably to sand accumulation at reefs in proximity to the receiver site and cumulative effects associated with the project would be less than significant.

Modeling indicates that sand placement at the Batiquitos receiver site would not result in significant cumulative effects in the event that Batiquitos maintenance dredging occurs in fall 2011 as currently scheduled (6 months to 1 year before the proposed implementation of RBSP II).

The Cardiff receiver site is located between two substantial reef features (Cardiff and Table Tops) that influence sand movement. Reef heights are variable along the inshore portion of Cardiff Reef upcoast of the receiver site, and shoaling naturally occurs in the vicinity of the lagoon mouth upcoast of the site. These physical factors create a complex system that introduces relatively greater uncertainty into the cumulative impacts assessment. However, model predictions at beach profiles offshore of the receiver site suggest that sand level increases would have relatively small effects on reef habitat upcoast or downcoast of the profile locations. Therefore, RBSP II is not anticipated to contribute considerably to any sand accumulation at either reef.

Maintenance of the newly restored San Dieguito Lagoon is proposed to place approximately 80,000 cy on beaches north and south of the lagoon entrance in spring 2011; the north site would be adjacent to the RBSP II receiver site. There is a low potential for concurrent implementation of both projects; however, even with similar implementation schedules, the project impacts associated with RBSP II are predicted to be less than significant. Placement of sand in the nearshore at Imperial Beach would not occur near persistent sensitive marine resources. Therefore, RBSP II is not anticipated to contribute considerably to sedimentation along sensitive marine habitats and cumulative effects associated with the project would be less than significant.

Threatened and Endangered Species

Endangered least tern and threatened snowy plover have the potential to be affected by beach nourishment projects. The primary concern to least tern is the potential for effects of turbidity on nearshore foraging habitat and time away from nest sites. Critical habitat for snowy plover occurs on beaches in the project area; the species forages on certain local beaches and nests at many of the same locations as least terns in the county. The prior restoration of Batiquitos Lagoon created new nesting habitat that resulted in beneficial effects for both least terns and snowy plovers. Monitoring of turbidity plumes and bird foraging in the vicinity of the borrow and receiver site offshore of the Batiquitos Lagoon nest sites during implementation of RBSP I found no evidence of effects on least tern foraging behavior. Construction of the Batiquitos receiver site was scheduled after nesting had ended for the season at the lagoon nesting sites; therefore, no impacts occurred at that receiver site.

Nest sites at Batiquitos Lagoon and Tijuana NERR (near Imperial Beach) have continued to substantially contribute to the reproductive success of least terns and snowy plovers in the county since implementation of RBSP I. Therefore, there is no indication of significant cumulative effects of RBSP I in combination with other past projects on either species. The project resulted in enhanced sandy beach habitat in several coastal segments, including Encinitas/Leucadia in the vicinity of the Batiquitos nest sites and critical habitat. Beach nourishment has had, and would continue to have, some beneficial effects for that species. Protective measures would be used to avoid and minimize effects to least terns and snowy plovers during construction of RBSP II. Therefore, construction impacts of RBSP II would be localized and less than significant on a cumulative basis.

Cumulative Impacts in Combination with Shoreline Protection Projects

Two large federal shoreline protection projects are in the planning stages, one at Encinitas/Solana Beach and one at Imperial Beach. Both have the potential to place large sand volumes on beaches in the project area, including overlapping footprints with some of the proposed RBSP II receiver sites. The implementation dates of these projects are highly uncertain; however, it is clear that they would only occur after RBSP II due to their relatively long planning processes. There is uncertainty whether there would be the potential for cumulative effects for RBSP II in combination with either or both of those projects over the 5-year period subject to this cumulative assessment. RBSP II likely would contribute to an overall benefit associated with maintaining or increasing shorezone volume gains in the near term to help counteract shoreline protection concerns.

Because RBSP II would not be implemented in the same year as these two projects, no significant cumulative construction effects would result to sandy beach habitat, grunion, least terns, snowy plovers, etc. However, there could be the potential for cumulative disturbance levels to the soft-bottom subtidal habitat from offshore dredging to produce the sand supply for RBSP II and shoreline protection projects. The location of the dredge sites for these two projects is not confirmed; however, they would likely be near the RBSP sites because that is where suitable material has been identified to date. RBSP II minimized the potential for significant cumulative effects by shifting borrow site locations relative to RBSP I. Further, in the 10+ years since RBSP I dredging, the borrow site seems to be similar in fish and benthic usage as before dredging. Although the dredging amount would be substantially greater, dredging would occur periodically over a 50-year project life span, which would allow some time for natural recovery. The overall cumulative effect may be significant, but given the intervening timing the project would not result in incrementally considerable impacts.

The second concern is the potential for cumulative effects on sensitive nearshore resources (reefs, kelp beds) associated with large volumes of sand input in proximity to sensitive habitats. RBSP II would minimize the potential for significant cumulative effects through the use of multiple, relatively small receiver sites to nourish beaches in the region. Monitoring results from RBSP I and modeling predictions for RBSP II suggest that sand-level increases from RBSP II would have less-than-significant effects on sensitive habitats and resources. This, plus the amount of time between implementation of RBSP II and shoreline protection projects that are in the planning stages, suggests that the potential for cumulative effects would be less than significant.

Cumulative Impacts in Combination with Other Ocean-Related Projects (Retention Reef and Revetments)

The proposed project does not involve construction of any hardscape, either reefs or sea walls, so it would not contribute to any cumulatively significant effect associated with those features to offshore soft-bottom habitat or onshore beaches.

Conclusion

Overall, the proposed project plus other beach nourishment projects would cumulatively enhance sandy beach habitat to the benefit of numerous species. The potential for cumulative impacts to sensitive nearshore habitat areas is anticipated to be less than significant based on project model predictions. There would be no cumulatively considerable impacts associated with RBSP II.

5.2.5 Cultural Resources

The proposed action is the only project that would have a potential effect to underwater archaeological sites, as none of the other projects involve offshore dredging at this depth. The project itself would have no significant impacts following implementation of measures to monitor for and avoid resources, and there would be no cumulative impact.

5.2.6 Land and Water Use

As discussed in Section 4.6, beach replenishment activities would generally be compatible with existing land and water uses. No inconsistencies with federal, state, or local land use plans have been identified, and most land use plans encourage beach replenishment. The reasonably foreseeable projects would start at various times. The proposed project does not include any hardscape elements so it would not contribute to cumulative impacts associated with offshore reefs or shoreline protection. Given the various planned start dates for the reasonably foreseeable projects and the highly uncertain start date of others listed for disclosure, combined with the beneficial impacts to land use that would occur with implementation of the proposed action, no significant cumulative land and water use impacts would occur with this project.

Recreational activities at a specific receiver site would be temporarily relocated to other local beaches and dive sites during dredging, sand placement, and construction activities. It is unlikely that other replenishment activities or other reasonably foreseeable projects in the same vicinity would occur concurrently, which would enable surrounding beaches to accommodate additional recreational users. Because beach closure would only occur on a short-term basis, and nearby recreational opportunities would be continued, no cumulative recreation impacts would occur.

Beach replenishment activities are designed to increase and enhance recreational opportunities at beaches for both residents and tourists. Implementation of this action would increase the width and quality of the proposed receiver beaches, increasing the value of beach recreational activities for both the local and regional tourist industry. Implementation of this project would, therefore, cumulatively benefit the recreational value of San Diego regional beaches.

5.2.7 Aesthetics

Cumulative visual impacts are dependent on the scenic quality of the region and the type of proposed project. The coastal region of San Diego County is considered highly scenic. Sand placement activities and other reasonably foreseeable nourishment projects along the proposed receiver beach sites and adjacent areas would result in short-term visual impacts that would cease at the end of construction activities. The proposed action and other replenishment/bypass projects would be considered to have generally longer-term beneficial visual impacts, as they would widen San Diego beaches currently affected by erosion and improve coastal views, generally for 5 years or less at a given site. The list also identifies very few possible future projects that could result in permanent structures at or very near the shore: the energy/desalination facilities at Agua Hedionda Lagoon and the Shoreline Protection Project in Solana Beach/Encinitas, which identifies sea walls as a possible alternative. The energy/water elements would be constructed in an area with other similar facilities, including an existing power plant. And the coasts of both Encinitas and Solana Beach are characterized by numerous types of protective structures along the cliffs with various colors, heights, and styles. The proposed beach nourishment project does not have any hardscape element and would not contribute to the change in visual quality associated with these permanent projects. Implementation of the proposed project and other nourishment actions would have cumulatively beneficial visual impacts along the coast.

5.2.8 Socioeconomics

Sand replenishment activities would occur in uninhabited areas reserved for recreational uses. There would be no direct cumulative impacts to population or housing from this proposed action in conjunction with other reasonably foreseeable projects. There are proposed demolition projects in Imperial Beach, but these structures would be replaced. One element of the purpose and need of the project, and other similar nourishment projects, is enhancement of the beach for recreation. This valuable resource draws tourists and strengthens the economy. Additionally, beach nourishment would protect public infrastructure. The proposed action and others like it would result in beneficial impacts to the local and regional population and the economy.

As discussed in Section 4.8, although temporary impacts to fishermen may occur due to restricted fishing areas during construction, no cumulative impacts are expected to occur because this impact would be short term. Localized impacts may displace fishermen from favored locations as the sand moves off the beaches and deposits on low-relief hard substrate and scattered reefs. However, in terms of the regional fishery, there would be no significant cumulative impact to the overall San Diego region fishery from the proposed project based on the distribution of the commercial catch among fish blocks along the coast and the relatively low contribution of the North County area, where most dredging and sand placement would occur. Less-than-significant impacts are expected to occur with RBSP II to sensitive habitats (reefs and kelp habitat); therefore, no cumulative impacts to the commercially important species dependent on those habitats, including lobster, crab, and fish (mainly sheephead), are anticipated. Impacts to recreational fishing and diving, sport diving, and decreased visibility for divers due to turbidity plumes from dredging operations would be considered short term and would not be considered cumulatively significant. Therefore, no cumulative impacts associated with socioeconomics are expected to occur.

5.2.9 Public Health and Safety

Safety measures associated with the proposed action include onshore and offshore closure to public access, onshore barricades, and safety personnel as necessary. Other beach nourishment projects would institute the same type of buffer zones and barricades. These safety measures would only be used on a short-term basis for the length of individual beach replenishment activities. Although seasonal lifeguard towers may need to be temporarily relocated during replenishment activities, impacts would not be significant because no beach usage would occur in areas of active construction. No cumulative impacts are expected to occur along the length of the pipeline since the pipe would be buried or spanned by access ramps at critical public and lifeguard access points. The location and schedule of the dredge would be published in the U.S. Coast Guard Local Notice to Mariners. To maintain vessel safety, an approximate 300-foot-radius buffer area would be established around the mono buoy in offshore waters to allow proper anchoring and pump line operation. To ensure that no vessels would enter the offshore restricted zone, the anchoring area would be included in the Local Notice to Mariners. No cumulative impacts to public health and safety are expected to occur.

5.2.10 Public Utilities and Structures

Regional demand for existing utility services such as water, sewer, gas and electric, solid waste, and wastewater would not be incrementally increased by implementation of the proposed action. Short-term cumulative interruption of services would be avoided by project-by-project monitoring efforts. It is not anticipated that any long-term disruption impacts would occur. Generally, the proposed projects listed would not result in new construction with substantial increase in demand for utilities. The desalination project and energy project would generate a potable water and energy. Therefore, the project would not contribute to any cumulative impacts to utilities or structures.

5.2.11 Traffic

As discussed in Section 4.11, no long-term traffic impacts would occur because only a minor increase in vehicular activity to the receiver sites is anticipated and because construction would be temporary. Cumulative impacts would not be significant when considering the other reasonably foreseeable projects, since few (if any) projects would require the use of the same routes for construction vehicles at the same time of the RBSP II construction activities and very few would generate traffic.

5.2.12 Air Quality

The analysis of air pollutant emissions to determine conformance to ambient air quality standards is a regional analysis that, by its nature, is cumulative. The SIP and 2010 emissions inventory consider foreseeable projects and cumulative growth. Section 4.12.1 demonstrates conformance with the SIP. There would be no significant cumulative air quality impacts.

5.2.13 Noise

Construction activities associated with the proposed action would generate changes in noise levels in the vicinity of the receiver beaches for the duration of the project. However, these noise changes would not contribute to cumulative noise impacts due to the distance between the proposed receiver beaches. In addition, beach replenishment activities would not likely occur concurrently with other similar projects. Increases in noise levels would only be short term and noise levels would return to existing values upon completion of beach replenishment activities. Other foreseeable projects would be similar; that is, they would have relatively short but intense construction noise, but not result in noise generating permanent features. The exceptions might be the energy/water infrastructure at Agua Hedionda Lagoon, but these structures are generally located near other similar facilities. No long-term, permanent cumulative noise impacts would occur.

5.2.14 Climate Change

While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. Section 4.14 provides a complete analysis of GHG emissions for the alternative scenarios for the proposed project. As stated in Section 4.14, no operations are associated with this project and only construction emissions were considered. Generally, emissions related to construction activities are small in comparison to operational emissions, which occur over the lifetime of the project. The GHG emissions projected from construction of the proposed project are considered small and are well below the adopted levels that are considered substantial at both the federal and state levels (refer to Section 4.14.2). The project's GHG emissions would not have a significant impact on the environment, either directly or indirectly, or on a cumulative level.

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CHAPTER 6.0
OTHER CONSIDERATIONS REQUIRED BY CEQA/NEPA

This section addresses other topics required by CEQA and NEPA in an EA/EIR. These include an analysis of significant unavoidable adverse impacts to the environment (NEPA, 42 U.S.C. § 4321 et seq.; and CEQA, Cal. Pub. Res. Code, § 21000 et seq., as amended); the relationship between local short-term uses of the environment and long-term productivity (NEPA); the identification of any irreversible and irretrievable commitments of resources (NEPA and CEQA); an analysis of growth-inducing impacts (CEQA); a discussion of effects found not to be significant (CEQA); a discussion of Executive Order 13045 (Environmental Health and Safety Risk to Children, 62 Fed. Reg. 19885 (1997)); and a discussion of issues related to Executive Order 12898 (Environmental Justice, 59 Fed. Reg. 7629 (1994)).

6.1 SIGNIFICANT UNAVOIDABLE ADVERSE EFFECTS

The EA/EIR evaluated the proposed alternatives with respect to numerous issues, including Geology and Soils, Coastal Wetlands, Water Resources, Biological Resources, Cultural Resources, Land and Water Use, Aesthetics, Socioeconomics, Public Health and Safety, Structures and Utilities, Traffic, Air Quality, Noise, and Climate Change. All of the potential impacts associated with the proposed project will be less than significant and are not considered significant or unavoidable.

6.2 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The objective of the proposed project is to provide a second regional beach sand replenishment project in the San Diego region's eroding beaches by dredging material from offshore borrow sites and placing sand directly onshore. This action would widen existing beaches in order to reduce erosion potential and increase protection of existing structures, as well as increase recreation opportunities for long-term use. Disposal of beach-compatible dredged material on identified receiver sites would support SANDAG's SPS and RSM Plan; policies contained in the Oceanside, Carlsbad, Encinitas, Solana Beach, Imperial Beach, and San Diego Coastal State Park System General Plans; and the project objectives. Implementation of the proposed project would not result in any environmental impacts that would significantly narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or the general welfare of the public within communities surrounding the receiver sites. Rather, the project would provide for future beneficial beach resources (e.g., recreational activities and tourism).

6.3 IRREVERSIBLE/IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are 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 beach replenishment activities in the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach would result in the placement of between 1.8 and 2.7 mcy of dredged beach-compatible fill material. The project is necessary to increase protection of existing beaches, which not only provide recreational opportunities for residents, but also contribute to the regional tourist industry. The proposed action would result in the consumptive use of nonrenewable energy sources and labor required to operate dredges, trucks, pumping equipment, and grading equipment. These commitments of resources could have otherwise been applied to projects other than the proposed action. However, the proposed action would not result in the use of a substantial amount of resources and would be short term in nature. Additionally, no natural resources would be permanently destroyed and beach replenishment would be considered beneficial to the region.

6.4 GROWTH INDUCEMENT

Under CEQA, an EIR must discuss the ways in which the proposed project and alternatives could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the area of population growth or the construction of additional housing, either directly or indirectly, in the area surrounding the proposed action. Analysis of growth-inducing effects includes those characteristics of the action that may encourage and facilitate activities that, either individually or cumulatively, would affect the environment. Population increases, for example, may impose new burdens on existing community service facilities. Similarly, improvement of access routes may encourage growth in previously undeveloped areas. Growth may be considered beneficial, adverse, or of no significance environmentally, depending on its actual impacts to the environmental resources present.

The proposed project would result in a temporary increase in beach area and sand cover at each of the receiver sites. A benefit of the project would be enhancement or continuation of the recreational usage of each of the receiver sites. It must be emphasized, however, that such localized recreational benefits would be temporary (the maximum lifespan of the project is approximately 5 years), although the dispersed sand may continue to cycle in the littoral system past that time. For use in evaluating the growth-inducing impact of the proposed project, it is assumed that the level of beach use at each site would remain near current levels or increase slightly. 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.

6.5 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 prepared for the RBSP I project and identified five issues that were determined not to be significant. Similarly, this EA/EIR discusses all of the environmental topic areas included in CEQA Guidelines Appendix G (Environmental Checklist Form) with the exception of the following environmental topics: hazards and hazardous materials, mineral resources, public services, agricultural resources, and population and housing. A brief description of these issues is included below.

Agricultural Resources (item II in CEQA Appendix G): 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 will occur.

Hazards and Hazardous Materials (item VIII in CEQA Appendix G): No hazards would be created and no hazardous materials would be emitted or used for the proposed project. Previous environmental documentation for several identical receiver beaches (U.S. Navy 1997a, 1997b) found no public safety impacts to result from beach replenishment activities. The proposed project would not contribute to the formation of scarps, and sand would not be placed above the height of any existing beach berm. No replenishment sites are included on a list of hazardous materials sites pursuant to Government Code Section 65962.5.

Mineral Resources (item XI in CEQA Appendix G): No mineral resource that would be valuable to the region and the residents of California would be lost as a result of this project. Nor would this project 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 (Item XIII in CEQA Appendix G): This project would not result in substantial population growth in an area. This project would also not displace substantial numbers of existing housing, nor would the project displace substantial numbers of people.

Public Services (item XIV in CEQA Appendix G): No public services, facilities, or infrastructure would be affected by the proposed dredging and beach replenishment operations.

The remainder of the issue areas included in Appendix G of the CEQA Guidelines was evaluated in detail in this document in Chapter 4. Environmental effects are defined as either significant or not significant. Impacts identified as significant are determined to exceed some or all threshold values expressed in this document as "Significance Criteria." Effects found not to be significant do not exceed thresholds stated as "Significance Criteria."

This analysis determined that the proposed San Diego Regional Beach Sand Project II would not have a significant effect on any of the evaluated issue areas. Although no long-term significant impacts are expected, a monitoring plan would be implemented during construction and for 4 years following completion to verify no significant impacts occur.

In other instances, consequences of the replenishment were found to be beneficial, such as the positive effect of enhanced local recreational opportunities for both residents and tourists, as well as increase protection of public property and infrastructure.

6.6 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 Fed. Reg. 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 proposed project sites (i.e., receiver 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 0.25 mile and 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 proposed project, would occur within these buffer zones. The list below presents the child-focused land uses near the proposed receiver sites for all alternatives combined. 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 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.

Oceanside

- Three elementary schools are located within 0.5 mile of the project site (Ditmar Elementary, South Oceanside Elementary, and St. Mary Star – The Sea School).
- Two parks (Tyson Street Park and Buccaneer Park) are located within 0.25 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

North Carlsbad

- One junior high and high school (Army and Navy Academy) is located within 0.25 mile of the project site, and one summer school (Camp Pacific) is located within 0.25 mile of the project site.
- Three parks (Maxton Brown Park, Magee Park, and Rotary Park) are located within approximately 0.25 mile of the project site. One park (Pine Avenue Park) is located within approximately 0.5 mile of the project site.
- One children's activity center, the Boys & Girls Club, is located within 0.5 mile of the project site.

South Carlsbad North

- One preschool (Discovery Isle Child Development Center) is located within 0.5 mile of the project site.
- No parks are located within 0.5 mile of the project site.
- One childcare center, a YMCA, is located within 0.25 mile of the project site.

South Carlsbad South

- One preschool (Discovery Isle Child Development Center) is located within 0.5 mile of the project site.
- No parks are located within 0.5 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Batiquitos

- No schools are located within 0.5 mile of the project site.
- No parks are located within 0.5 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Leucadia

- Four schools (The Intelligent Choice Education Center, Montessori Children's House, Head Start, and Leucadia Children's School) are located within 0.5 mile of the project site, and one volleyball club (Encinitas Volleyball Club) is located within 0.25 mile of the project site.
- One Park (Leucadia Roadside Park) is located within 0.25 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Moonlight Beach

- One elementary school (Pacific View Elementary) is located within 0.25 mile of the project site, and two schools (Julian Charter School and Oasis Community School) are located within 0.5 mile of the project site.
- One park (Moonlight Beach Park) is located within 0.25 mile of the project site, and one park (Encinitas Viewpoint Park) is located within 0.5 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Cardiff

- No schools are located within 0.5 mile of the project site.
- One park (Glen Park) is located within 0.5 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Solana Beach

- Two preschools and daycare centers (Solana Beach Child Development Center and Hanna Fenichel Center) are located within 0.25 mile of the project site. One elementary, junior, and high school (Fusion Learning Academy) is located within 0.25 mile of the project site.
- Two parks (Fletcher Cove Beach Park and North Bluff Preserve) are located within 0.25 mile of the project site.

Torrey Pines

- No schools are located within 0.5 mile of the project site.
- No parks are located within 0.5 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Imperial Beach

- One elementary school (West View Elementary) is located within 0.5 mile of the project site. One camp (YMCA) is located within 0.5 mile of the project site.
- Two parks (Dunes Park and Reama Park) are located within 0.25 mile of the project site.
- No daycare centers are located within 0.5 mile of the project site.

Despite the number of child-focused land uses within 0.25 and 0.5 mile of the proposed project sites, there would be no disproportionate impacts to children during implementation of the proposed sand replenishment project. No significant impacts would occur and there is no indication that any impacts would disproportionately accrue to children.

Areas of replenishment would be restricted during project implementation for safety reasons and no long-term health and safety effects would occur after the beach areas were reopened for public use. Short term, less than significant noise impacts during construction are likely to extend into neighborhoods off-site (as discussed in Section 4.13), but 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, no disproportionate impacts to environmental health risks and/or safety risks to children are likely to occur with project implementation.

6.7 ENVIRONMENTAL JUSTICE

This section summarizes potential 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 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 the USEPA.

To comply with the executive order, this EA/EIR process included gathering demographic and income information from SANDAG to identify areas of low-income and/or high minority populations in the areas contiguous with the receiver sites that would potentially be exposed to impacts. These receiver sites were then assessed for disproportionate impacts to low-income and minority populations.

As discussed in Section 3.8, none of the areas adjacent to the project site(s) have minority populations in greater proportion than the San Diego region as a whole. There are two project census tracts that have percentages of minority populations higher than their jurisdictional city average, but that percentage remains lower than the County as a whole. Thus, in comparison to the adjacent cities and the County, the census tracts contiguous with the sand replenishment project area cannot be considered a high minority population area.

As discussed in Section 3.8, the majority of project-specific census tracts have household median incomes that are close to or greater than the County median income ($72,963). Three project specific census tracts (CT 181 and 183 in Oceanside and CT 102 in Imperial Beach) have median incomes substantially lower than the County. The median income for the Imperial Beach census tract is slightly lower than for the region and for city as a whole, indicating that this tract likely does not contain a disproportionate number of low-income individuals. The census tracts in the City of Oceanside have, according to the most recent SANDAG projections, have higher per capita income levels than the city as a whole and have a greater proportion of small single-family and multi-family homes, indicating that those census tracts have households with fewer people but higher incomes.

The proposed sand replenishment project would not have a disproportionate impact on minority populations or low-income populations because the areas encompassed by the replenishment sites do not include disproportionately high minority populations or low-income populations compared to the contiguous cities or the County.

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CHAPTER 7.0
CORPS DECISION DOCUMENT REQUIREMENTS

This chapter constitutes the most current version of the Corps of Engineer's Decision Document (EA) which includes the Environmental Assessment, 404(b)(1) Guidelines Evaluation, Public Interest Review, and Statement of Findings for U.S. Army Corps of Engineer District Corps of Engineers Los Angeles District (USACE-LA) for RBSP II (Alternative 2-R). Chapter 7 does not represent the Final Corps Decision Document as the Corps and SANDAG have not completed the Corps permit process under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Corps permit processes that remain to be completed include the Section 401 Water Quality certification process with the CRWQCB, the Federal Consistency Determination process under the Coastal Zone Management Act with the California Coastal Commission, and compliance with Section 106 of the National Historic Preservation Act with the tribal governments and the SHPO. Information found within this chapter addresses specific considerations required by USACE in its decision-making process as the lead agency under NEPA and includes our initial preliminary determinations. Information to address specific questions are either included in the chapter or relevant sections of the EA/EIR as referenced. One major change that occurred after the Corps went out on public notice in 2011 was the removal of the South Carlsbad South receiver site from RBSP II.

1. Application as described in the public notice.

   APPLICANT: *San Diego Association of Governments (SANDAG)*

   WATERWAYS & LOCATIONS: *Implementation of the proposed project (Alternative 2-Reduced [2-R]) would occur on the following 10 receiver beaches in the San Diego region: Oceanside, North Carlsbad, South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, Cardiff, Solana Beach, Torrey Pines, and Imperial Beach.*

   The Oceanside receiver site, under the maximum length alternative, extends from Wisconsin Avenue south to Morse Street. The fill would extend up to 4,100 linear feet (LF) and include up to 420,000 cubic yards (cy) of sand. The proposed site is similar to RBSP I but has been shifted 1,800 feet north.

   The North Carlsbad receiver site is located south of Buena Vista Lagoon and extends for up to 3,100 LF to Oak Street. Up to 225,000 cy of sand would be placed at this site. The proposed site is similar to RBSP I.

The <u>*South Carlsbad North*</u> *receiver site is adjacent to the Carlsbad State Beach campground facilities located north of Encinas Creek. This beach fill would extend up to 3,100 LF and would include a maximum of 158,000 cy of sand placement. The South Carlsbad North site would be similar to RBSP I. No sand placement would occur at the South Carlsbad South receiver site.*

The <u>*Batiquitos*</u> *receiver site is located approximately 1,000 feet south of Batiquitos Lagoon (the area is also known as "Ponto"), stretching for approximately 1,490 feet into the community of Leucadia and Leucadia State Beach. Up to 118,000 cy of sand would be placed on this site. The Batiquitos receiver site would be similar to RBSP I.*

The proposed receiver site at <u>*Leucadia*</u> *extends approximately 2,700 LF from just south of the Grandview access stairs to Jasper Street. The proposed receiver site is similar to RBSP I. Up to 117,000 cy of sand would be used to replenish this beach.*

The proposed <u>*Moonlight Beach*</u> *receiver site is located at the foot of B and C streets at Moonlight State Beach. The proposed receiver site is similar to RBSP I and extends approximately 770 LF. Up to 105,000 cy would be used for beach replenishment at this site.*

The <u>*Cardiff*</u> *receiver site is located south of the San Elijo Lagoon mouth and Restaurant Row along Coast Highway 101. The receiver site extends approximately 780 feet and would receive up to 101,000 cy of sand. The receiver site is similar to RBSP I.*

The <u>*Solana Beach*</u> *receiver site's northern boundary begins north of Fletcher Cove Beach Park and extends approximately 4,750 feet south under the maximum length alternative. The receiver site is similar to RBSP I but would be extended 1,000 feet to the north and 1,800 feet to the south under the maximum length alternative (Alternative 2)11. Up to 360,000 cy of sand would be placed on this site.*

The <u>*Torrey Pines*</u> *receiver site is bordered by Los Peñasquitos Lagoon and Torrey Pines State Reserve. The receiver site stretches for approximately 1,620 feet and is located on Torrey Pines State Beach. The receiver site is similar to RBSP I and a total of up to 245,000 cy would be placed on this site.*

The <u>*Imperial Beach*</u> *receiver site is north of the Tijuana Slough National Wildlife Park and has been extended north compared to RBSP I. The receiver site would receive up to 650,000 cy of sand and would extend for approximately 5,750 feet from Imperial Beach Boulevard north of the pier to approximately 1,000 feet south of Encanto Avenue.*

The three proposed borrow sites are located within or adjacent to borrow sites defined during the RBSP I project; SO-6, SO-5, and MB-1. Investigations for RBSP II focused on the previous borrow sites, then expanded those to determine whether additional deposits of beach quality sand were present. These additional investigations resulted in the expansion of some of the previous borrow site boundaries to encompass areas with the highest quality sand. Proposed dredge areas for RBSP II would be located within these expanded borrow sites.

LATITUDE & LONGITUDE: *Coordinate System WGS 1984. Please see Table 7-1 for a complete listing of center points for the receiver and borrow sites.*

Table 7-1
Center Points for Receiver and Borrow Sites
(Latitude and Longitude)

Receiver Site	**Alternative 2-R**
Oceanside	Latitude: 33.180799 Longitude: -117.373143
North Carlsbad	Latitude: 33.160217 Longitude: -117.35578
South Carlsbad North	Latitude: 33.119589 Longitude: -117.327363
Batiquitos	Latitude: 33.082233 Longitude: -117.311996
Leucadia	Latitude: 33.069478 Longitude: -117.307564
Moonlight	Latitude: 33.047544 Longitude: -117.298528
Cardiff	Latitude: 33.011073 Longitude: -117.279877
Solana Beach	Latitude: 32.987433 Longitude: -117.274021
Torrey Pines	Latitude: 32.927853 Longitude: -117.260054
Imperial Beach	Latitude: 32.575418 Longitude: -117.132966
Borrow Site	
SO-6	Latitude: 33.004782 Longitude: -117.290572
SO-5	Latitude: 32.970761 Longitude: -117.280331
MB-1	Latitude: 32.772115 Longitude: -117.273201

PROJECT PURPOSE: *The purpose of the proposed beach replenishment project is to replenish beaches in accordance with the SPS and the RSM Plan. These documents identified regional coastal areas with critical shoreline problems and the need for large regional replenishment projects to place up to 30 mcy of sand. Each of the receiver sites is identified as an initial Beach Erosion Concern Area (BECA) in the RSM Plan. The proposed action would serve 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. Section 1.2 provides additional discussion regarding the project purpose and need.*

Basic: *The Corps has determined that the basic purpose of the proposed project is beach replenishment, which is considered water dependent.*

Overall: *The Corps has determined that the overall project purpose is to provide adequate beach replenishment at 10 San Diego County regional beaches.*

Water Dependency Determination: *The basic project purpose of the proposed project is beach replenishment, which is water dependent and must be conducted within waters of the United States (U.S.) to accomplish the basic project purpose.*

PROPOSED WORK: *The proposed project, Alternative 2-R, would place approximately 2.5 mcy of sand on 10 receiver beach sites at San Diego regional beaches. The proposed activity that would require a standard permit is discharge of fill into tidal waters of the U.S. The proposed project would place approximately 2.5 mcy of beach-compatible fill on beaches in the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach. Approximately 181 acres of dredged mostly sandy material would be placed as permanent fill under Alternative 2-R on 10 different receiver beach sites from three different offshore borrow sites.*

Avoidance and Minimization Information: *Section 2.4 identifies construction methods and design features to avoid impacts to nearshore aquatic resources and hard reef habitats, dredge operations, the use of training dikes, equipment management, scheduling, public safety/beach closures, and coordination with commercial fishermen. The permittee has committed to providing funds to offset potential predicted sedimentation accumulation at individual lagoons due to project sand, as described in Table 7-2. In addition, a monitoring plan would be implemented as described in Section 2.5. Criteria for evaluating other borrow and receiver sites included proper grain size compatibility, compliance with Inland Testing Manual (ITM) water quality criteria,* *avoidance of sensitive marine habitats, placement techniques of the dredged material, and evaluating receiver sites that avoid lagoon inlet closures.*

Table 7-2
Predicted Lagoon Sedimentation and Corresponding Funding Commitments

Lagoon	Anticipated Sedimentation Volumes (cy)	Responsible Management Entity	Committed Funding ($)
Agua Hedionda Lagoon	none	NRG Cabrillo Power	0
Batiquitos Lagoon	25,700	CDFG	245,800
San Elijo Lagoon	10,000	San Elijo Lagoon Conservancy	32,600
San Dieguito Lagoon	10,300	Southern California Edison	49,234
Los Penasquitos Lagoon	10,200	Los Penasquitos Lagoon Foundation	24,650

Compensatory Mitigation: *The environmental restoration of the 10 receiver beaches will create sandy beach habitats throughout San Diego County that currently function as wave eroded areas adjacent to bluffs, roadways, rock armored areas, bulkheads, seawalls, parking lots, and existing sandy beach areas. The Corps is currently proposing that no compensatory aquatic resource mitigation is necessary as a result of implementation of the proposed project. The Corps' determination is based on the monitoring results of the RBSP I project where extensive monitoring was done after the beaches were constructed and no adverse long term impacts to aquatic resources were discovered. Specific long-term monitoring is again proposed after construction to confirm no adverse impacts occur, as identified in Section 2.5.3. If adverse long-term impacts do occur, then the permittee would implement actions to mitigate those impacts. Mitigation for any significant impacts to sensitive marine habitats would be restoration of like habitat at a minimum 2:1 ratio, unless the Corps receives and approves a functional assessment model and mitigation plan that restores the functions impacted.*

EXISTING CONDITIONS: *The 10 receiver beaches are previously sandy beach habitats throughout San Diego County that currently function as wave eroded areas adjacent to bluffs, roadways, rock armored areas, bulkheads, seawalls, parking lots, and existing sandy beach areas. The three borrow sites are submerged subtidal sandy environments* *where native formation sands currently exist and no sensitive marine aquatic resources exist. The proposed Oceanside receiver site consists of a predominately flat, sandy beach with cobbles that extends approximately 60 to 80 feet from the high tide line to The Strand. (The Strand is a narrow public road between the beach and abutting residence.) South of Wisconsin Avenue, the receiver site narrows into an eroded beach with riprap (large boulders) slopes from the back of existing residences to the approximate high tide mark. The receiver site gently slopes from the high tide mark into the surf zone. Since the September 2009 site visit, it appears some sand loss along the site has occurred and more rocks (riprap) are visible throughout the site. South of Oceanside Boulevard, there is a sandy pocket beach approximately 150 feet wide and 125 feet from the road to the line of riprap. This pocket beach protects homes north and south of Buccaneer Beach to just north of Kelly Street.*

The North Carlsbad beach segment consists of a predominantly flat sandy beach, extending approximately 50 feet from the surf line to riprap slopes and seawalls that protect existing beach front residences and fragile bluffs. Similar to the Oceanside receiver site, less sand was present in June 2010 as compared to September 2009.

The existing beach at the South Carlsbad North site is completely washed over during high tide and vegetated bluffs approximately 40 to 50 feet in height abut the beach. Portions of the South Carlsbad receiver sites are located on Carlsbad State Beach.

At the northern part of the Batiquitos receiver site, a relatively flat, sandy and cobbly beach exists. Steep vegetated cliffs abut the southern portion of the proposed receiver site, where a gently sloping sand beach with scattered rocks, cobbles, and riprap exists. Along this southern portion, the beach is completely washed over by incoming surf during high tide. Several residences are located on the bluff above.

The Leucadia receiver site is similar to the southern end of the Batiquitos receiver site in that steep vegetated cliffs abut the beach. The beach consists of a gently sloping sand beach with scattered rocks, cobbles, and riprap. At high tide waves reach the bluffs. Several residences are located on the bluff above.

The Moonlight Beach receiver site consists of a gently sloping sandy beach extending approximately 100 feet from the high tide line to the adjacent residential uses and existing recreational area. Riprap is located at the northern extent of the receiver site to protect residences.

The beach along the Cardiff receiver site extends approximately 30 to 40 feet from the high tide line to cobble and riprap. The riprap provides an approximately 10- to 15-foot *buffer for Coast Highway 101, a key north-south arterial. Riprap exists along the northern portion of the site to protect several existing restaurants. The beach and surfing area is also known as George's.*

Steep cliffs (approximately 80 feet tall) abut the Solana Beach receiver site and the beach consists of a gently sloping sand beach with scattered rocks and cobbles. Riprap, notch fills, and seawalls line the cliffs in an ongoing effort to slow wave-induced erosion. At high tide, no dry beach exists along the majority of the receiver site as waves reach the cliffs and existing sea walls. Similar to the Oceanside and North Carlsbad receiver sites, less sand was present along the cliffs and sea walls in June 2010 compared to September 2009. Several pocket beaches exist along the receiver site, with a small sandy beach at Fletcher Cove, which sits above the high tide mark.

The Torrey Pines beach is a gently sloping, thin-sand beach with scattered cobbles and high bluffs along Torrey Pines State Reserve. During high tide, waves reach the bluffs along the southern portion of the receiver site. There is also riprap to protect North Torrey Pines Road from storm wave action.

The north and south ends of the Imperial Beach receiver site are predominantly residential, with a commercial node located at the base of the pier. In addition, a park and open space are adjacent to the pier, which is located at a relatively wide sandy beach area that stretches from Palm Avenue to Beach Avenue. Riprap is in place along the north and south ends of the site to protect adjacent residential development from wave action. The southern end of the receiver site is mostly cobbles with some sand.

The three borrow sites, SO-6, SO-5 and MB-1, are located offshore along the coast from Encinitas to Mission Beach.

The SO-6 borrow area is located in the Swami's State Marine Conservation Area (SMCA) west of San Elijo Lagoon and south of both the RBSP I SO-6 borrow area and the San Elijo wastewater outfall pipeline. This borrow area has been estimated to have a surface area of 44 acres and contains approximately 700,000 cy of sand.

The RBSP II SO-5 borrow area is located offshore of the San Dieguito River. For RBSP II, SO-5 has been shifted closer to shore and to the north to intersect the offshore paleochannel of the San Dieguito River. This borrow area is estimated to have a surface area of 124 acres and contain almost 2,000,000 cy of sand.

The MB-1 borrow area is located offshore of Mission Beach, north of the Mission Bay jetties. The area has been identified immediately adjacent to the south and east *boundaries of the RBSP I borrow area. This borrow area has been estimated to have a surface area of 107 acres and contains approximately 1,600,000 cy of sand.*

2. Authority.

☒ Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403).
☒ Section 404 of the Clean Water Act (33 U.S.C. §1344).
☐ Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. 1413). Note that no ocean disposal and only ocean dredging is proposed in the nearshore so Section 103 of the MPRSA does not apply.

3. Scope of Analysis.

a. NEPA.

(1) Factors.

(i) Whether or not the regulated activity comprises "merely a link" in a corridor type project.

The proposed project is a regional beach sand nourishment project that provides sand placement at several receiver beaches from Oceanside to Imperial Beach. The beaches are not joined into one linear shoreline and are disconnected replenishment shoreline areas within each City. Therefore, the proposed project does not serve as a link to another corridor-type project.

(ii) Whether there are aspects of the upland facility in the immediate vicinity of the regulated activity which affect the location and configuration of the regulated activity.

The proposed project is a regional beach sand nourishment project that provides sand placement at several receiver beaches from Oceanside to Imperial Beach. There are upland elements such as bluffs and roadways that define the back beach, which is the eastern project extent.

(iii) The extent to which the entire project will be within the Corps jurisdiction.

The proposed beach nourishment would occur from the back beach down to the water. The configuration of some of the beach replenishment sites where the dredged material is to be placed by pipeline may require a series of berms near or within the intertidal zone *to comply with environmental constraints such as washing the material, controlling turbidity, and proper distribution of the material to construct the design beach fills. The project is water dependent and must be conducted within waters of the U.S. to be effectively implemented.*

(iv) The extent of cumulative Federal control and responsibility.

A federal permit is required for all work within waters of the U.S. and navigable waters under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Additionally some of the receiver sites may have listed shorebird species that are regulated in the lower and upper beach areas that are regulated under the Endangered Species Act. Also the inter-tidal, near shore, and borrow site areas require coordination with NMFS for Essential Fish Habitat resources under the Magnuson Stevens Act.

(2) Determined scope.

☐ Only within the footprint of the regulated activity within the delineated water.

☒ Over entire property: *The proposed beach nourishment project must be implemented at the upper and lower beach areas and in waters of the U.S. All work is water dependent and most of the work is within USACE jurisdiction. The NEPA scope of this proposed project includes the adjacent upland receiver site coastal beach zones (staging areas, pipeline construction zones, training dikes, pipeline discharge points) and offshore environment (three offshore borrow site dredging zones, pipeline and pump-out zones, barge transit and anchorage areas, vessel transit zones) within the boundaries of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach in San Diego County, and includes State Lands and State Park property.*

b. NHPA "Permit Area".

(1) Tests. Activities outside the waters of the United States ☒are/☐are not included because all of the following tests ☒are/☐are not satisfied: Such activity ☐would/☒would not occur but for the authorization of the work or structures within the waters of the United States; Such

activity ☒is/☐is not integrally related to the work or structures to be authorized within waters of the United States (or, conversely, the work or structures to be authorized must be essential to the completeness of the overall project or program); and Such activity ☒is/☐is not directly associated(first order impact) with the work or structures to be authorized. *Expansion of the NHPA Permit Area beyond the area where waters of the U.S. exist into the lower and upper beach areas is appropriate since all of the NHPA permit area tests above are met. The NHPA scope of this proposed project includes the adjacent upland receiver site coastal beach zones (staging areas, pipeline construction zones, training dikes, pipeline discharge points) and offshore environment (three offshore borrow site dredging zones, pipeline and pump-out zones, barge transit and anchorage areas, vessel transit zones) within the boundaries of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach in San Diego County, and includes State Lands and State Park property.*

(2) Determined scope.

The scope of the NHPA permit area includes the coastal beach zones and offshore environment within the boundaries of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach in San Diego County, and includes State Lands and State Park property.

c. ESA "Action Area."

(1) Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

(2) Determined scope.

The ESA Action Area for this proposed project includes the coastal beach zones and offshore environment within the boundaries of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach in San Diego County, and includes State Lands and State Park property. The ESA action area of this proposed project includes the adjacent upland receiver site coastal beach zones (staging areas, pipeline construction zones, training dikes, pipeline discharge points) and offshore environment (three offshore borrow site dredging zones, pipeline and pump-out zones, barge transit and anchorage areas, vessel *transit zones) within the boundaries of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Diego, and Imperial Beach in San Diego County, and includes State Lands and State Park property. The ESA Action Area shall also include the downstream and upstream areas from the 10 receiver sites and three borrow sites where turbidity plumes may develop.*

d. Public notice comments. ☐ NA

(1) The public also provided comments at ☐public hearing, ☐public meeting, and/or ☒ *Because the document is a joint EA/EIR, a Corps public notice may be required concurrent with the release of the draft document under NEPA. The NOP was released on May 21, 2010, in compliance with CEQA requirements, as described in Section 1.4. Three public scoping meetings were held between June 3, 2010, and June 8, 2010. The release of the EA/Draft EIR constituted part of the public noticing under NEPA for the proposed project. The Corps public notice, attached as Appendix J to this EA/Final EIR, was posted on the Corps website in January 2011 for all interested parties, including appropriate state and federal agencies, as well as public interested parties and stakeholder groups. Also the Corps public notice was mailed to all Adjacent Property Owners to the beach receiver sites. All comments received on the Corps public notice/EA received during the EA/Draft EIR public review period are summarized below. Note that some comments that were strictly related to the DEIR and not the Corps EA were addressed in the FEIR (not posted in Chapter 7). All FEIR comments and response to comments in Appendix I were reviewed and commented on by the Corps.*

(2) Commentors and issues raised.

A number of comments were received regarding the NOP. These comments were used to guide the preparation of the EA/Draft EIR. A summary of these comments can be found in Section 1.4. Comments were received on the EA during the public notice period and are provided in the table below. Please refer to Appendix I for responses to these comments.

Name	Issue
National Marine Fisheries Service (NMFS)	EFH conservation recommendations including recommending that the Corps adopt Alternative 1, mitigation funding of inlet dredging for Alternative 1, increased inlet dredging funds for Alternative 2, need for monitoring plan for reef and surfgrass impacts if Alternative 2 is selected, needed grunion surveys and monitoring if work occurs from March to April, and new EFH consultation needed if project changes or new info received.
Michael L. Sheedy	Objects to project unless the dredging contractor is supervised during project dredging and that previous RBSP I project caused erosion at Solana Beach.
California State Lands Commission	RBSP I lands were issued a lease that expired in 2004 and new lease needed for RBSP II, need for marine species contingency plan for collisions, noise, and entanglement, more air studies for greenhouse gases cumulative impacts with mitigation that must be verified through the Cal. Climate Action Registry.
August Felando, attorney for the Cal. Lobster and Trap Fisherman's Association (CLTFA)	CLTFA reviewing the EA/DEIR, surfgrass/lobster impacts cannot be mitigated and lobsters need surfgrass to spawn, various values of 2009 fish and lobster landings reported in letter.
USFWS	Impacts of climate change should be outlined to vulnerable areas and beach nourishment should target the vulnerable regions, some of the receiver sites replenishment should be phased to avoid burial impacts to beach invertebrates, evaluate reservoir dredging as an alternative with rail transport, regional impacts to tern and plovers from working in breeding season needs to be evaluated, sediment grain sizes are not clear, relocate North Carlsbad beach site to the south to avoid impacts to Buena Vista lagoon project.

(3) Site ☒was/☐was not visited by the Corps to obtain information in addition to delineating jurisdiction.

(4) Issues identified by the Corps. ☒ *The Corps has no specific unresolved issues other than the normal processing issues identified including compliance with: the Inland Testing Manual, the Section 404(b)(1) guidelines, NHPA compliance, EFH consultation, and insuring impacts to sensitive*

marine resources are avoided, minimized, and mitigated in accordance with the Clean Water Act and NEPA.

(5) Issues/comments forwarded to the applicant. ☐NA/☒Yes.

(6) Applicant replied/provided views. ☐NA/☒Yes.

(7) The following comments are not discussed further in this document as they are outside the Corps purview. ☒ NA/☐ Yes

4. Alternatives Analysis.

a. Basic and Overall Project Purpose (as stated by applicant and independent definition by Corps).

☒ Same as Project Purpose in Paragraph 1.
☐ Revised:

b. Water Dependency Determination:

☒ Same as in Paragraph 1.
☐ Revised:

c. Applicant preferred alternative site and site configuration.

☒ Same as Project Description in Paragraph 1.
☐ Revised: *Explain any difference from Paragraph 1*

Criteria.

Issue	Measurement and/or constraint
Turbidity and coverage impacts to rocky reefs and surf grass	Acres of turbidity plume
Direct fill impacts to invertebrates at receiver sites	Acres of direct fill at receiver sites.
Impacts to wetlands of the U.S. (below HTL)	Acres of direct fill at receiver sites.

d. Off-site locations and configuration(s) for each. (e.g., alternatives located on property not currently owned by the applicant are not practicable under the Section 404(b)(1) Guidelines as this project is the construction or expansion of a single family home and attendant features, such as a driveway, garage, storage shed, or septic field; or the construction or expansion of a barn or other farm building; or the expansion of a small business facility; and involves discharges of dredged or fill material less than two acres into jurisdictional wetlands.)

Regulatory Guidance Letter 93-2 and Section 404(b)(1) Guidelines require that the compliance evaluation procedure be dependent on the seriousness of potential for adverse impacts on the aquatic ecosystems posed by the proposed project. The off-site alternatives analysis should determine if there are any alternative sites that would meet the overall project purpose, would result in less damage to the aquatic ecosystem, and do not have other significant adverse environmental consequences. The Corps has not currently required a strenuous off-site alternatives analysis given our preliminary determination that based on the RBSP I permit monitoring results that no adverse impacts occurred to aquatic resources from the previous regional sand replenishment project. Our previous review of the aquatic impacts from RBSP I determined that since there was no adverse impacts that a more strenuous review was not warranted as the RBSP II project is very similar to the RBSP I project and the proposed project may actually restore valuable sandy habitats to San Diego counties beaches. The proposed project is a beach nourishment project and is water dependent. Other off-site borrow areas and receiver sites have been evaluated as off-site alternatives for dredging and placing the material on the beach, as described below. The final alternatives analysis will be completed when the Corps has completed its Section 404 permit process but the Corps has provided a preliminary review of alternatives in Table 73 and Table 7-4.

Table 7-3
Off-site Alternatives

Alternative	Description
Onshore Borrow Sites	
Dredging sand from dams	This alternative would dredge sand from behind any dam and transport that material to the shoreline via trucks.
Removing dams	The alternative would remove dams in the region to allow sediment to flow naturally to the ocean.
Terminating regional mining activities	This alternative would terminate mining activities to allow sand to travel down the river system to the shoreline.
Upstream Sand Sources – Lake Hodges Dam	This alternative would dredge sand from behind Lake Hodges Dam and transport dredged material to receiver sites.
Offshore Borrow Sites	
SM-1 Oceanside	This would be a new site, a sand fillet between the north Oceanside Harbor Jetty and the Santa Margarita Rivermouth.
SO-7 Batiquitos	This is an RBSP I site that yielded excellent sand. It was expanded to search for new sand for RBSP II, but inadequate volume/capacity remains for replenishment of receiver sites with RBSP II.

Alternative	Description
TP-1 Torrey Pines	This would be a new site recommended by researchers at the Scripps Institution of Oceanography based on current research.
ZS-1 Zuniga Shoal	This would be a new site at Zuniga Shoal just south of Zuniga Jetty.
SS-1 Imperial Beach	This is an RBSP I site that yielded poor sand. It was expanded to search for new and better quality sand for RBSP II.
Feeder Beach Replacement	For this alternative, sand would be replenished at Oceanside and Carlsbad, and would then travel south in the Oceanside Littoral Cell to replenish other San Diego North County beaches. Sand would also be placed at the Mission Beach and Imperial Beach receiver sites to feed their respective littoral cells.

Table 7-4
On-site Alternatives

Alternative	Description
Nearshore Fill Placement	This alternative would involve nearshore placement of fill that was discussed for RBSP I at four sites: Oceanside, Del Mar, Mission Beach, and Imperial Beach. Placing sediment in the nearshore zone would introduce material to the littoral cell.
Sand Retention	This alternative would utilize sediment management devices such as structures to help hold sand in place. These structures could include offshore groins, artificial reef or other retention devices.
3.2 mcy Alternative	This alternative would place a total of 3.2 mcy on 11 beach fill sites. This alternative proposed an overall higher volume of sand placement and an overall lengthening of the proposed receiver sites than the other proposed alternatives.
Preliminary Receiver sites	For this alternative, previous receiver sites were refined with respect to location and sand placement design through an iterative coordination process with the cities. No additional sites were evaluated and eliminated.
Surf Enhancement	Sand placement for this alternative would have included both onshore and surf zone placement of dredged sand material to improve surfing recreation.
Alternative 1	This alternative would place a total of 1.8 mcy on 10 beach fill sites. This alternative is similar to RBSP I in volume and receiver sits, although Del Mar and Mission Beach are no longer included.
Alternative 2	This alternative would place a total of 2.7 mcy on 11 beach fill sites. This alternative is similar to Alternative 1 with larger volumes at several receiver sites and an additional receiver site.
Alternative 2-R	This alternative would place a total of 2.5 mcy on 10 beach fill sites. This alternative is similar to Alternative 2 with slightly lesser volumes at several receiver sites and one less receiver site in Carlsbad.

e. (☒ NA) Site selected for further analysis and why.

f. On-site configurations.

Regulatory Guidance Letter 93-2 and Section 404(b)(1) Guidelines require that the compliance evaluation procedure be dependent on the seriousness of potential for adverse impacts on the aquatic ecosystems posed by the proposed project. The off-site alternatives analysis should determine if there are any alternative sites that would meet the overall project purpose, would result in less damage to the aquatic ecosystem, and do not have other significant adverse environmental consequences. The Corps has not currently required a strenuous on-site alternatives analysis given our preliminary determination that based on the RBSP I permit monitoring results that no adverse impacts occurred to aquatic resources from the previous regional sand replenishment project. Our previous review of the aquatic impacts from RBSP I determined that since there was no adverse impacts that a more strenuous review was not warranted as the RBSP II project is very similar to the RBSP I project. The proposed project may actually restore valuable sandy habitats to San Diego County beaches.

g. Other alternatives not requiring a permit, including No Action.

Description	Comparison to criteria
No Project/No Federal Action	Under the No Action alternative, no dredging or beach replenishment activities would occur, and erosion at the region's beaches would continue without intervention and this alternative was eliminated as it would not meet the overall project purpose. This alternative would not serve to enhance property protection, recreational opportunities, or the tourism value at specific receiver sites. The No Federal Action alternative which includes both the borrow sites and placement sites located outside of jurisdictional waters of the U.S. would not comply with Inland Testing Manual requirements, would not allow for a less environmentally impacting placement method, and would not meet SANDAG design requirements mandated on a regional level.

h. Alternatives not practicable or reasonable.

Table 7-5 summarizes the alternatives determined to be not practicable or reasonable for RBSP II.

Table 7-5
Alternatives Evaluated for RBSP II but Eliminated due to: (1) not Practicable given the Costs, Logistics, or Technology, (2) not meeting the Overall Project Purpose, (3) not being available, or (4) having greater aquatic or more damaging environmental impacts

Alternative	Reason
Onshore Borrow Sites	
Dredging sand from dams	Transportation and construction from onshore borrow sites would have resulted in greater traffic and air emissions, noise impacts, logistical conflicts with beach users for parking and access, and greater environmental impacts to the areas behind the dams that resulted in the elimination of this alternative from consideration.
Removing dams	The need for local water supplies for the growing population would make it impracticable logistically to remove water supply dams in the region, therefore this alternative was not available and was eliminated.
Terminating regional mining activities	Other sources of mining aggregate would have to be found and would necessitate additional truck trips to carry material, resulting in greater air, noise, traffic, and environmental impacts. Also there would be impracticable logistical concerns with ceasing the mining activities. In addition, there may not be enough material to support local demand and it would not meet the overall project purpose, therefore this alternative was eliminated.
Upstream Sand Sources in major rivers/creeks of San Diego County	The use of upstream sand sources in rivers/creeks would result in greater environmental impacts with respect to transportation, air quality (emissions), noise impacts, aquatic impacts, and logistical constraints with beach users for parking access. Therefore, this alternative was eliminated as being impracticable and having greater aquatic impacts and not being the LEDPA.
Offshore Borrow Sites	
SM-1 Oceanside	This site was eliminated as it contained fairly fine sediments considered marginal for beach nourishment and would not meet ITM requirements.
SO-7 Batiquitos	This site was eliminated as a borrow site because of inadequate remaining volume for replenishment for RBSP II and not meeting the overall project purpose.
TP-1 Torrey Pines	This site contained fine sediment and was determined to be unsuitable for beach nourishment and not meeting ITM requirements.
ZS-1 Zuniga Shoal	This site contained fine sediment and was determined to be unsuitable for beach nourishment and not meeting ITM requirements.
SS-1 Imperial Beach	This site contained fairly fine sediment considered marginal for beach nourishment and not meeting ITM requirements.

Alternative	Reason
Sand Retention	This alternative was eliminated due to having greater aquatic impacts along the coastline and not providing adequate sand to accommodate the beach designs for adequate beach replenishment. Given the proposed action's need for adequate beach replenishment, the inclusion of sand retention structures would reduce the volume of sand to be placed at each of the receiver sites and not provide for adequate beach replenishment.
Nearshore Fill Placement	This method of sand replenishment would not have the same immediate direct beach replenishment benefits to an intended receiver site, and would not fulfill the overall project purpose of the project. Also nearshore placement would have greater aquatic impacts for certain receiver sites. Therefore, this alternative was eliminated.
Feeder Beach Replacement	Benefits of beach replenishment at the southern reaches of the Oceanside Littoral Cell would be difficult to quantify, and would not provide an adequate beach replenishment and not meet the overall project purpose and this alternative was eliminated
3.2 mcy Alternative	The volumes of sand placed at beaches would have increased potential for sand transport to sensitive offshore resources, due to receiver site proximity to such resources and an increased volume dispersed in the nearshore zone that would have had greater aquatic impacts and therefore was not the LEDPA. Therefore, this alternative was eliminated.
Preliminary Receiver Sites	The City of Del Mar decided not to participate in RBSP II. This site was eliminated based on their fiscal decision, not due to engineering or environmental considerations. Additionally, the City of San Diego received sand at Mission and Pacific beaches from a dredging project completed by the USACE at the mouth of Mission Bay. Therefore, the Mission Beach receiver site does not need more sand at this time and was eliminated from RBSP II. Other receiver sites within the Corps NEPA scope area besides the 10 receiver sites were eliminated due to increased aquatic impacts to sensitive marine habitats, potential sand contribution to inlet closures, and other downstream impacts and were rejected as not being the LEDPA.
Surf Enhancement	Due to the additional aquatic impacts associated with dredging and placing more material for surf enhancement alternatives and the added complexity of sand placement within the surf zone, the surf enhancement alternative was determined to be logistically impracticable and not meeting the ITM requirements.
Alternative 1	The volumes of sand placed at beaches would not have been enough to adequately satisfy the purpose and need for this project.
Alternative 2	The volume of sand placed at the additional receiver site would have a higher risk of potentially impacting persistent sensitive resources occurring in close proximity to receiver sites.

i. Least environmentally damaging practicable alternative (LEDPA):

Section 2.2 of this EA/EIR discusses the process by which the alternatives were initially derived, and Section 2.3 provides a summary of alternatives reviewed during the CEQA process that were identified but eliminated from detailed review, including alternate sand sources, placement locations and strategies, and volumes. Two alternatives were selected for detailed evaluation and were evaluated in the Draft EIR/EA. The final Preferred Alternative (Alternative 2-R) would place up to 2.5 mcy of sand at 10 receiver beaches along the San Diego region coastline. Alternative 2-R would utilize sand dredged from one of three borrow sites. The three borrow sites are located offshore along the coast from Encinitas to Mission Beach. The Corps has preliminarily determined that Alternative 2-R may be the LEDPA with all of the proposed avoidance and minimization measures but will need to complete the Section 404 permit process prior to making its final determination under the Section 404(b)(1) guidelines.

5. Evaluation of the 404(b)(1) Guidelines. (☐NA)

a. Factual determinations.

Physical Substrate. ☐ See Existing Conditions, paragraph 1 ☒ *The proposed project would discharge beach-compatible sand over approximately 181 acres of waters of the U.S. (assuming the High Tide Line as the jurisdictional boundary) based on Alternative 2-R. Standard earthmoving equipment would be used for all sediment discharge activities in the project area, which would result in substrate disturbance throughout the receiver sites. Temporary impacts to substrate would, therefore, occur to the beach. Sediment discharged to the beach is anticipated to be of slightly larger grain size. While slight differences in the beach slope, color, and texture would exist just after sand placement, these would not be substantial and would dissipate over time.* *In addition, offshore substrate would be temporarily impacted due to natural sediment transport after discharge activities are completed. The proposed borrow sites are primarily comprised of sandy substrate. Borrow sites were designed to specifically avoid reef areas and known historic and recreational resources.*
Water circulation, fluctuation, and salinity. ☐ Addressed in the Water Quality Certification. ☒ *Proposed sediment discharge during project implementation would result in temporary changes to the topography of the receiver sites, which is the intent of the action. In addition, dredging activities at the borrow sites would create relatively slight depressions in the sea floor surface. The proposed activities would not alter water circulation, fluctuation, or salinity in jurisdictional areas throughout the project areas. As a result, the proposed project would not result in long-term*

adverse impacts to currents, circulation, or drainage patterns in the project area.
Suspended particulate/turbidity. ☐ Turbidity controls in Water Quality Certification. ☒ *Dredging and sand placement operations would generate temporary turbidity plumes and elevated suspended sediment concentrations. However, these suspended sediments would not contain toxic contaminants and the extent of the plumes would be limited. Monitoring during RBSP I did not identify turbidity plumes that exceeded permitted thresholds. Because slightly larger-grained sand would be used for RBSP II, sand is anticipated to settle faster and less extensive turbidity plumes are anticipated. Impacts to the aquatic environment would not be adverse.* *A monitoring program would be implemented during project construction that would include turbidity plume monitoring. Monitoring of turbidity plumes would occur consistent with RWQCB 401 certification requirements, as identified in Section 2.5.*
Contaminant availability. ☐ General Condition requires clean fill. ☒ *The proposed project would utilize offshore dredged material to fill local receiver beaches and alter the beach substrate and topography, as described in Appendix G. A Sampling and Analysis Plan (SAP) was prepared and implemented to evaluate grain size and determine the potential for contaminated sediment. Based on the SAP results (Appendix E). The physical and chemical properties of the borrow site materials were evaluated by EPA and the Corps. SAPR results indicate that there are no contaminant levels in the borrow sites that exceed ITM criteria. The ITM process has been completed by EPA and the Corps.*
Aquatic ecosystem and organism. ☒ Wetland/wildlife evaluations, please see paragraphs 5, 6, 7 & 8. *Alternative 2-R should not have adverse impacts to the aquatic environment due to its similarity to the RBSP I project and the Corps previous review of the monitoring results of RBSP I and lack of adverse impacts to the aquatic ecosystem and organisms from the RBSP I project.*
Proposed disposal site. ☒ Public interest, paragraph 7. *The ten proposed receiver beach disposal sites meet ITM requirements (Corps and EPA ITM determination) and shall be further evaluated during the EA/EIR but should not have adverse impacts to the aquatic environment due to their similarity to the RBSP I project and the Corps previous review of the monitoring results of RBSP I and lack of adverse impacts to the aquatic ecosystem and organisms from the RBSP I project.*
Cumulative effects on the aquatic ecosystem. ☒ See Paragraph 7.e. for more detailed information. *The 10 proposed disposal and three borrow sites meet ITM requirements (preliminary Corps and EPA ITM determination) and shall be further evaluated during the EA/EIR but should not have adverse cumulative impacts to the aquatic environment due to their similarity to the RBSP I project and the Corps previous review of the monitoring results of RBSP I and lack of adverse impacts to the aquatic ecosystem. Additional already Corps permitted inlet dredging and beach nourishment projects at Batiquitos*

lagoon, Aqua Hedionda lagoon, San Elijo lagoon, San Dieguito lagoon, and Los Penasquitos lagoon may increase the beach profiles in these areas but should not cumulatively adversely impact the aquatic ecosystem when combined with the proposed RBSP II project. Other Corps Civil Works and other Federal/State agency studies and projects are at San Elijo Lagoon, Encinitas and Solana Beach, Mission Bay, Imperial Beach, Tijuana Rivermouth/Goat Canyon Dredging/ Beach Nourishment Project, Tijuana Rivermouth Dredging, Imperial beach nourishment with Corps San Diego harbor dredging, Coronado Beach Nourishment, US Coast Guard Ballast Point Dredging and Imperial nearshore beach nourishment, and Oceanside harbor dredging/nourishment. These projects may also increase the beach profiles at these receiver beaches but when combined with RBSP II and other permitted Corps lagoon dredging/nourishment projects should not have an adverse long term cumulative effect on the aquatic ecosystem.
Secondary effects on the aquatic ecosystem. ☒ See Paragraph 7.e. *There should be minor temporary secondary effects during and immediately after construction to the aquatic ecosystem at the 10 receiver and three borrow sites (turbidity, beach and nearshore slope changes, larger grain size at the receiver sites, localized coverage impacts to rocky reefs, surfgrass, kelp) but these secondary effects should not be adverse as they are temporal and based on the RBSP I monitoring reviews by the Corps and the other resource agencies. The Corps made a determination after the RBSP I project was completed that there were no adverse secondary effects to the aquatic ecosystem.*

b. Restrictions on discharges (230.10).

(1) It ☐has/☐has not been demonstrated in paragraph 5 that there are no practicable nor less damaging alternatives which could satisfy the project's basic purpose. The activity ☐is/☐is not located in a special aquatic site (wetlands, sanctuaries, and refuges, mudflats, vegetated shallows, coral reefs, riffle & pool complexes). The activity ☐does/☒does not need to be located in a special aquatic site to fulfill its basic purpose.

(2) The proposed activity ☐does/☒does not violate applicable State water quality standards or Section 307 prohibitions or effluent standards (☐based on information from the certifying agency that the Corps could proceed with a provisional determination). The proposed activity ☐does/☐does not jeopardize the continued existence of federally listed threatened or endangered species or affects their critical habitat. The proposed activity ☐does/☒does not violate the requirements of a federally designate marine sanctuary.

(3) The activity ☐will/☒will not cause or contribute to significant degradation of waters of the United States, including adverse effects on human health; life

stages of aquatic organisms' ecosystem diversity, productivity and stability; and recreation, esthetic, and economic values.

(4) Appropriate and practicable steps ☒have/☐have not been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (see Paragraph 8 for description of mitigative actions).

6. Public Interest Review: All public interest factors have been reviewed as summarized here. Both cumulative and secondary impacts on the public interest were considered. Public interest factors that have had additional information relevant to the decision are discussed in number 7. If a factor has been determined to be not applicable, the Negligible Effect box is checked.

+ Beneficial effect
0 Negligible effect
- Adverse effect
M Neutral as result of mitigative action

+	0	-	M	
☐	☒	☐	☐	Conservation.
☒	☒	☐	☐	Economics.
☒	☐	☐	☐	Aesthetics.
☐	☒	☐	☐	General environmental concerns.
☐	☒	☐	☐	Wetlands.
☐	☒	☐	☐	Historic properties.
☒	☐	☐	☐	Fish and wildlife values
☐	☒	☐	☐	Flood hazards.
☐	☒	☐	☐	Floodplain values.
☐	☒	☐	☐	Land use.
☐	☒	☐	☐	Navigation.
☒	☐	☐	☐	Shore erosion and accretion.
☒	☒	☐	☐	Recreation.
☐	☒	☐	☐	Water supply and conservation.
☐	☒	☐	☐	Water quality.
☐	☒	☐	☐	Energy needs.
☒	☒	☐	☐	Safety.
☐	☒	☐	☐	Food and fiber production.
☐	☒	☐	☐	Mineral needs.
☐	☒	☐	☐	Considerations of property ownership.
☒	☐	☐	☐	Needs and welfare of the people.

7. Effects, policies and other laws.

   a. ☐NA

   Public Interest Factors.

   Specific public interest factors examined in this document include conservation, recreation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values land use, navigation, shoreline erosion and accretion, water quality, and safety, as well as the cumulative effects thereof.

Factor	Discussion
Conservation	The proposed project would provide sand nourishment and enlarge beaches on a temporary basis. Any marine preserve areas designated by the Marine Life Protection Act (MLPA) specifically allow for sand replenishment projects like RBSP II. The proposed project would not change land use patterns or conflict with any conservation plans or land use plans governing the project area.
Recreation	There would be no long-term significant impacts to recreational fisheries, surfing, swimming, beach use, or diving. Anticipated changes from either of the alternatives include temporary beach closures, with the length of time and locations of receiver site access restriction being varied. This would only have a temporary localized effect on recreational activities, but these activities could be shifted to adjacent beach/offshore areas. No adverse impacts to water-related recreation are anticipated. After project implementation, recreational benefits associated with bigger beaches are anticipated. Slightly larger grain-size sand is proposed for placement at many of the receiver sites. While the difference in the appearance of the sand may be noticeable for a short time, the grain size would not substantially affect the profile of the beach and would not affect recreational uses at the receiver sites.
Economics	Sand replenishment activities would occur in uninhabited areas reserved for recreational uses. These efforts would not directly impact population or housing developments. The proposed project would result in the temporary increase in beach area and would result in economic benefits associated with both local and visitor recreational users. It is assumed that the level of beach use at the site would remain at current levels or increase slightly.
Aesthetics	The proposed project would place larger grained sand on identified receiver beaches. Although some turbidity would result from sand placement and initial intermixing with the surf zone, these effects would be negligible because this area is already subject to tidal washing and natural suspension of particulate matter. In addition, some turbidity at the location of dredging activities is anticipated, but these impacts would be temporary and are not expected to extend to areas of recreational diving. After project implementation, larger and longer lasting beaches would result in benefits to aesthetics in the region. Although the sand proposed for placement on receiver sites would be of slightly larger grain size than the existing beaches, and would have a slightly different color, any

Factor	Discussion
	noticeable differences would be short-term as it bleaches from the sun and mixes with the existing beach sand. The placement footprint would be apparent immediately after construction and would have a different color and slope; however, the placement area would quickly blend with the existing beach. The difference in grain size is not anticipated to result in long-term noticeable differences to beach slope.
General Environmental Concerns	The proposed project has been designed to address general environmental concerns and to minimize and avoid significant environmental impacts. No significant environmental impacts are anticipated and specific long-term monitoring efforts are required upon project completion to ensure impacts remain less than significant.
Wetlands	No special aquatic sites would be adversely impacted by the proposed project, including wetlands, mudflats, coral reefs, pool and riffle areas, vegetated shallows, or sanctuaries and refuges, as defined in 40 C.F.R. 230.40-45. There is a very low potential for some indirect impact to sensitive marine habitats due to sedimentation based on model predictions as the sand placed on receiver sites is distributed through the littoral cell. In most of the areas predicted to experience additional sand, the natural variability of sand in the system annually and seasonally is greater than the additional sand predictions, and no effects to sensitive resources are anticipated. Monitoring conducted after RBSP I to confirm the absence of significant impacts to biological nearshore resources confirmed this conclusion. Under Alternative 2-R, there are some focused areas with persistent sensitive marine resources where higher volumes of sand would be placed than that under RBSP I and there are model predictions of greater sedimentation. These areas are also predicted to experience sedimentation within the existing natural variability of the nearshore zone, but given the natural variability of the reef systems in the region and the difficulty in predicting future wave climate and weather patterns, monitoring would be conducted to confirm that no adverse impacts occur.
Historic Properties	At the receiver and borrow sites, the potential for impacts is limited due to the absence of any known identified cultural resources within the receiver sites and the low potential for the placement of sand to affect existing cultural resources that have not been identified. At borrow sites, archival research and vibracore analysis indicated that there is a low to moderate potential for impacts during dredge activities. These potential impacts would be minimized through avoidance of high sensitivity areas and implementation of a monitoring program prior to and during the dredge operation to verify that no impacts to submerged NRHP- or CRHR-eligible archaeological resources occur. If such resources are identified, they would be recorded and the required consultation under Section 106 for discovery situations would be implemented. Measures to avoid the resources would be undertaken.
Fish and Wildlife Values	The receiver sites are public beaches with high levels of recreation as the focal land use rather than biological species use. Species of concern in the project vicinity include snowy plover, California least tern, grunion, Pismo clam, and marine mammals. The primary use of the project sites and adjacent offshore areas would be foraging habitat by shorebirds. The larger grain size of sand proposed for placement on receiver sites is not anticipated to adversely affect fish and wildlife

Factor	Discussion
	values. Monitoring documented recovery of invertebrate populations and continued species use of beaches at Encinitas receiver sites after implementation of RBSP I. Sand placed at those receiver sites were similar in grain size to that proposed for placement under RBSP II, therefore, similar recovery and use is anticipated. Turbidity is anticipated to be localized and similar to storm event conditions. No significant impacts are anticipated. The monitoring program outlined in Section 2.5 would ensure grunion (species of special concern) and threatened and endangered bird species are not significantly impacted. The Corps must comply with EFH regulations through coordination with NMFS.
Land Use	The proposed replenishment action would not preclude the viability of any planned land use, either onshore or offshore.
Navigation/Traffic	The proposed beach replenishment discharge and dredge and transport activities would be noticed through the U.S. Coast Guard and coordinated with known local fishermen. The small increases in traffic volumes due to replenishment activities would be temporary and no long-term impacts to existing traffic and circulation patterns would occur. The improvement of the beaches with sand replenishment may induce additional use that would marginally increase localized congestion and parking.
Shoreline Erosion and Accretion	The beaches in San Diego are characterized by a dynamic cycle of accretion and erosion. The proposed project would not alter the natural cycle but is intended to reduce the visible effects of erosion trends through the addition of material to the general littoral cycle. The sand proposed for placement on receiver beaches would be slightly larger in grain size than existing beaches and may remain on the beaches slightly longer due to this difference. This difference would be relatively small overall, however, and would not substantially alter patterns of erosion or accretion in the littoral zone. In addition, there would be a temporary benefit to beaches by increasing the beach width and providing additional protection against bluff erosion. Model results indicate that beaches are anticipated to remain wider for up to 5 years.
Water Quality	Reduced water clarity, discoloration of surface waters, and changes to water quality associated with turbidity plumes are expected but would not persist once dredging operations were completed. Therefore, impacts to the aquatic environment would be less than significant. The Corps shall adopt the Section 401 water quality certification from the California Regional Water Quality Control Board as a special condition of the Corps permit.
Safety	Active construction zones at each receiver site would be closed to public access to prevent an unsafe condition. Additionally, safety buffers would be established around dredge areas and the mono buoy, and planned activities would be noticed through the U.S. Coast Guard. Immediately after sand placement, slightly steeper slopes may exist along the placement footprint, although these will be constructed on a 10:1 slope and are not anticipated to create a safety hazard. In addition, the sand proposed for placement as part of RBPS II has a slightly larger grain size than existing beaches. This difference in grain size is not substantial, however, and would not affect the ability of the beach to return to the natural profile as wave action distributes the sand along the beach and in the nearshore zone. No adverse safety impacts have

Factor	Discussion
	been identified. Section 2.4 provides further discussion on safety measures that would be implemented during project construction.
Cumulative Impacts	The proposed project would not have a significant effect on any of the evaluated factors and no adverse cumulative impacts are anticipated. Section 7.e, below, provides a detailed discussion of cumulatively considerable projects. The 10 proposed disposal and three borrow sites meet ITM requirements (final Corps and EPA ITM determination) and shall be further evaluated during the the Corps permit process but should not have adverse cumulative impacts to the evaluated public interest factors due to their similarity to the RBSP I project and the Corps previous review of the monitoring results of RBSP I and lack of adverse impacts to the evaluated public interest factors from the RBSP I project. Additional already Corps permitted inlet dredging and beach nourishment projects at Batiquitos lagoon, Aqua Hedionda lagoon, San Elijo lagoon, San Dieguito lagoon, and Los Penasquitos lagoon may increase the beach profiles in these areas but should not cumulatively adversely impact the public interest when combined with the proposed RBSP II project. Other Corps Civil Works studies and projects at San Elijo lagoon, Encinitas/ Solana Beach, Imperial Beach, Mission Beach, and Oceanside harbor dredging/nourishment may also increase the beach profiles at these receiver beaches but when combined with RBSP II and other permitted Corps lagoon dredging/nourishment projects should not have an adverse cumulative impact on the public interest factors.

b. Endangered Species Act. ☐ NA

The proposed project:

(1) Will not affect these threatened or endangered species:

☐Any/☒ *It has been determined that the following threatened or endangered species found within the project area would not be affected as a result of implementation of the proposed project: the California least tern, western snowy plover, Belding's savannah sparrow, light-footed clapper rail, tidewater goby, and black or white abalone.*

During RBSP I, design features were implemented to protect foraging and nesting habitat. Similar design features would be used for RBSP II, as appropriate. Design features could include managing and minimizing turbidity plumes, and shielding and directing construction lighting toward the ocean and away from the back beaches and lagoon. Critical habitat (designated and 2011 proposed) for the snowy plover would be avoided, as described in Section 2.5. With the implementation of the described avoidance and mitigation features, the proposed project would result in no effect to the *listed species mentioned above for the 10 receiver sites and all three of the borrow sites.*

(2) May affect, but is not likely to adversely affect:

Species: *There are no federal or state-listed species under the federal and state Endangered Species Acts with the potential for effect in the project area.*

(3) ☐Will/☒Will not adversely modify designated critical habitat for the: *western snowy plover. The proposed project would avoid sand placement in designated and proposed critical habitat for the western snowy plover (plover).*

(4) ☐Is/☒Is not likely to jeopardize the continued existence of the *California least tern and the plover. Federal and state-listed species under the federal and state Endangered Species Acts with the potential to occur in the project area primarily include two Federally listed birds: the California least tern (tern) and the plover. During RBSP I, design features were implemented to protect foraging and nesting habitat. Similar design features would be used for RBSP II, as appropriate. Design features include managing and minimizing turbidity plumes, and shielding and directing construction lighting at the Batiquitos receiver site toward the ocean and away from the back beaches and lagoon. The Batiquitos site, which is located within 500 feet of snowy plover nest sites, would be constructed after September 15 (or August 1 with verification of cessation of nesting activity at the W-2 nest site), which would minimize the potential to impact snowy plovers. Nest sites are more than 0.5 mile away from the Imperial Beach site. Avoiding construction at the Batiquitos receiver site during the breeding season and the distance of the Imperial Beach receiver site from existing nest sites would result in no effect to snowy plover. With the implementation of the described features, the proposed project would not affect or jeopardize the existence of the listed species mentioned above.*

(5) The Services ☐concurred/☐provided a Biological Opinion(s).

The Corps has determined that the project would result in no effect to threatened or endangered species. Therefore, no consultation with the Service is required.

c. Essential Fish Habitat (EFH). Adverse impacts to Essential Fish Habitat ☐will/☒ will not result from the proposed project. *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 receiver and borrow 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 dredging or loss of prey items at borrow or receiver sites due to dredging or nourishment). Similarly, temporary adverse impacts to lifestages 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, and are discussed in Section 2.5. The Corps has received EFH conservation recommendations from NMFS in the letter dated March 14, 2011, including recommending that the Corps adopt Alternative 1, funding of inlet dredging for Alternative 1, increased inlet dredging funds for Alternative 2, need for monitoring plan for reef and surfgrass impacts if Alternative 2 is selected, needed grunion surveys and monitoring if work occurs from March to April, and new EFH consultation needed if project changes or new info received.*

d. Historic Properties. The proposed project ☐will/☒will not have any effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance based on ☐letter from SHPO/☒ *No identified historic properties are located within or in the vicinity of the receiver and borrow sites of the proposed project. Although there are no known resources eligible for listing in the NRHP, the potential for such resources exist at the borrow sites. Therefore, consultation with the State Historic Preservation Officer pursuant to Section 106 of the NHPA of 1966, as amended, would be required.*

e. Cumulative & Secondary Impacts.

The geographic area for the proposed beach nourishment project spans San Diego regional beaches from Oceanside to Imperial Beach. No significant cumulative impacts associated with the implementation of the proposed project are anticipated. As included in Table 5-1 of the EA/EIR, USACE is currently permitting, or has recently authorized, the following nourishment projects:

- *Maintenance dredging and nourishment at Los Peñasquitos Lagoon,*
- *Maintenance dredging and nourishment at San Elijo Lagoon,*

- *Restoration of San Dieguito Lagoon and maintenance of the inlet with beach nourishment,*
- *Solana Beach opportunistic beach fill program (2008-2013),*
- *Carlsbad opportunistic beach fill program (2006–2011)*
- *Encinitas opportunistic beach fill program (2010–2015)*
- *Maintenance dredging/beach nourishment at Batiquitos Lagoon*
- *Maintenance dredging/beach nourishment at Aqua Hedionda Lagoon.*
- *Oceanside harbor dredging/beach nourishment*
- *Mission Bay Dredging/Mission beach nourishment*
- *Tijuana River Fate and Transport Study Nourishment project site south of TJ Rivermouth*
- *Tijuana Rivermouth Dredging and Beach Nourishment with USFWS Refuge Office for TJ rivermouth closures*
- *United States Coast Guard Mooring Ballast Point Dredge*
- *USACE San Diego Harbor Entrance Channel Maintenance Dredge*

(1) *Baseline*. The shoreline area has wetlands, rocky reefs, kelp, and surfgrass. The shoreline contained within San Diego County has many receiver sites that were impacted by the RBSP I project that encompass the baseline of the currently proposed project. Corps permits for the period 1988 to 2011 have authorized the fill of 200-300 acres of the San Diego shoreline. The projection is that authorizations will continue ☒at the current rate/☐ increase/☐ because other beach nourishment and dredging projects shall continue. Natural resource issues of particular concern [from Corps & non-Corps activities] are loss of sandy beach material from upstream retention dams, basins, flood control activities, sand mining, and lagoons and accelerated erosion of sandy beaches from littoral processes and manmade structures.

(2) Context. The proposed project is ☒typical of /☐a precedent /☐very large compared to other activities in the watersheds. *As discussed, the proposed project is designed to be similar to RBSP I, which was implemented in 2001. Future conditions are expected to be similar to the results of RBSP I but the*

amount of sand to be placed by the RBSP II project would be increased compared to RBSP I. Besides Corps authorized projects, other activities include a number of maintenance and opportunistic sand nourishment projects. Resulting natural resource changes and stresses include upstream dams and detention facilities, harbor improvements, changes in littoral scour from manmade structures, flood control and aggregate mining, and other sediment reduction practices that have impacted sediment transport to these regional beaches. These resources are also being affected by loss of replenishment sources in the major rivers that previously supplied sand to these beaches as each of these major watersheds has become built out with more impermeable surfaces. The RBSP II project and other future periodic replenishment projects are the currently favored solutions to restoring the beaches of San Diego County.

(3) Mitigation and Monitoring. *The project would not result in significant or adverse impacts to any of the receiver site or borrow site areas. The Corps is currently not proposing any aquatic resource compensatory mitigation as a result of implementation of the proposed project. Specific long-term monitoring is proposed after construction at Solana Beach to confirm no significant impacts occur. If significant long-term impacts do occur, then SANDAG would implement action to mitigate those impacts based on Corps input. Mitigation for any significant impacts to sensitive marine habitats would be restoration of like habitat at a minimum 2:1 ratio, unless the Corps receives and approves a functional assessment model and mitigation plan that restores the functions impacted.*

f. Corps Wetland Policy. Based on the public interest review herein, the beneficial effects of the project outweigh the detrimental impacts of the project.

g. (☐NA) Water Quality Certification under Section 401 of the Clean Water Act ☐has/☒has not yet been issued by ☐/☒State (*California RWQCB*)/ ☐Commonwealth.

h. Coastal Zone Management (CZM) consistency/permit: Issuance of a State permit certifies that the project is consistent with the CZM plan. ☒ There is no evidence or indication from the *CCC and the Local Jurisdictions* at this time that the project is inconsistent with their CZM plan. The Corps shall ensure that a Federal CZM Consistency Determination is obtained from the CCC once a local CDP is issued by the CCC.

i. Other authorizations. *The applicant is not relieved of the burden to obtain all other relevant state and local authorizations not otherwise listed here. Please see Table 7-6 for a listing of local permits by jurisdiction and type.*

Table 7-6
Local Jurisdiction Approvals

Jurisdiction	Type
City of Oceanside	Noise ordinance exemption Local authorization to utilize sovereign lands
City of Carlsbad	Noise variance
City of Encinitas	Noise ordinance exemption
City of Solana Beach	Noise ordinance exemption
City of San Diego	Local authorization to utilize sovereign lands
City of Imperial Beach	Noise variance
San Diego Unified Port District	Coastal development permit (for Imperial Beach)

j. (☒NA) Significant Issues of Overriding National Importance.

8. Compensation and other mitigation actions.

a. Compensatory Mitigation

(1) Is compensatory mitigation required? ☐ yes ☒ no [If "no," do not complete the rest of this section]

(2) Is the impact in the service area of an approved mitigation bank?
☐ yes ☒ no

(i) Does the mitigation bank have appropriate number and resource type of credits available? ☐ yes ☒ no

(3) Is the impact in the service area of an approved in-lieu fee program?
☐ yes ☒ no

(i) Does the in-lieu fee program have appropriate number and resource type of credits available? ☐ yes ☒ no

(4) Check the selected compensatory mitigation option(s):
☐ mitigation bank credits
☐ in-lieu fee program credits
☒ permittee-responsible mitigation under a watershed approach
☐ permittee-responsible mitigation, on-site and in-kind

☐ permittee-responsible mitigation, off-site and out-of-kind

(5) If a selected compensatory mitigation option deviates from the order of the options presented in §332.3(b)(2)-(6), explain why the selected compensatory mitigation option is environmentally preferable. Address the criteria provided in §332.3(a)(1) (i.e., the likelihood for ecological success and sustainability, the location of the compensation site relative to the impact site and their significance within the watershed, and the costs of the compensatory mitigation project):

(6) Other Mitigation Actions

As part of the permits issued for RBSP I, a monitoring program was developed and implemented with elements occurring during the preconstruction, construction, and postconstruction phases. That monitoring effort, combined with other projects and research over the last 10 years has provided valuable information to guide design of RBSP II. While a detailed monitoring plan for RBSP II cannot be prepared until permit conditions are known, like RBSP I, it is appropriate for the EA/EIR to describe the framework of the monitoring program that would be implemented for RBSP II based on the information available at this time and lessons learned from RBSP I monitoring. Postconstruction monitoring for RBSP I was primarily conducted to confirm that modeling predictions were accurate in anticipating that no significant impacts would occur. It is anticipated that the modeling approach for RBSP II, which is similar to RBSP I but uses updated information and more precise baseline data, would provide similar certainty in sand transport predictions. In general, where RBSP I monitoring confirmed no impacts occurred and receiver sites and volumes are similar for RBSP II, no postconstruction monitoring is proposed. The intent of monitoring would be to verify that:

1. *the project is carried out consistent with project design features as well as permit conditions, and*
2. *there are no long-term, significant impacts to sensitive biological resources in specific locations under Alternative 2-R where there is greater risk of deposition and modeling uncertainty. If significant impacts are identified through monitoring, then mitigation would be required.*

This section describes the framework for monitoring and mitigation for RBSP II. The final details would be determined upon selection of an alternative and negotiation of permit conditions with the resource agencies. Items such as exact monitoring locations would depend on the alternative to be implemented. Monitoring can be divided into three distinct phases:

1. *preconstruction (initiated approximately 6 months prior to construction),*
2. *during construction (approximately 8-month duration), and*
3. *postconstruction (proposed to last 4 years after construction is complete*

Preconstruction monitoring would focus on verification of environmental constraints prior to construction, and also to establish a pre-project baseline for physical and biological conditions that would be subject to construction or postconstruction monitoring. Monitoring during construction would be required to ensure compliance with specific permit conditions and that site-specific resources are not significantly impacted (e.g., cultural resources) because of the highly dynamic ocean system. Postconstruction monitoring would be conducted for 4 years after implementation of RBSP II to understand project performance and to confirm no significant impacts occur to resources as a result of project implementation. Table 7-7 summarizes the monitoring that would be performed during each of the three construction phases by element.

Table 7-7
Summary of Monitoring Elements and Timing Requirements for RBSP II

Monitoring Element	***Monitoring Phase***		
	Pre-construction	***During Construction***	***Post-construction***
Beach Conditions	✔		✔
Lagoon Conditions	✔		✔
Water Quality (Turbidity)		✔	
Biological Site Constraints	✔		
Nearshore Biological Resources	✔		✔
Threatened and Endangered Species		✔	
Grunion	✔	✔	
Marine Mammal and Turtle	✔	✔	
Pismo Clam	✔		
Cultural Resources	✔	✔	

Preconstruction Monitoring

In this phase, monitoring would be primarily conducted to support finalization of construction details (e.g., anchor plans, pipeline routes), and to establish baseline existing conditions at long-term monitoring locations. Preconstruction monitoring tasks for RBSP II would establish baseline data at physical profile locations, lagoon mouths, and long-term biological monitoring locations. Assessment of receiver sites for potential habitat suitability to support spawning by California grunion would be conducted, depending on construction periods relative to spawning runs, to minimize adverse impacts. Contractor educational efforts would also be initiated to alert workers to measures included in the Marine Mammal and Turtle Contingency Plan and to potential sensitive cultural resources and impact minimization measures to be implemented during construction.

Monitoring during Construction

During the approximately 8-month construction phase, monitoring would be conducted to comply with permit conditions regarding turbidity and used to identify concerns and solutions in the immediate time frame, with the anticipation that adjustments could be made and significant impacts avoided. As with RBSP I, SANDAG is committed to coordinating with commercial fishermen to avoid gear loss in the transit and dredge areas. Other specifics of the Notice to Mariners procedure prior to and during construction are discussed in Section 2.4.1.

Postconstruction Monitoring

Postconstruction monitoring would be primarily focused on confirming the absence of significant impacts to sensitive nearshore biological resources and lagoon conditions that may occur as a result of project-related sediment transport. Additional physical monitoring would be conducted as part of the ongoing coastal profile program, with an enhanced program for 4 years after implementation of RBSP II. As noted above, RBSP I had a broad spectrum of postconstruction monitoring for nearshore biological resources, as the processes and impacts associated with large-scale regional sand placement were relatively unknown in 2000. Monitoring from RBSP I did not identify significant long-term impacts to nearshore biological resources as a result of placement at the different receiver sites. This confirmed model-predicted *results and no mitigation was required. It is anticipated that potential impacts would be similar with RBSP II for those receiver sites with the same sand volumes, placement locations, and similar sand transport modeling results as RBSP I. Monitoring for RBSP II would therefore focus on sites that would receive larger volumes of sand and have a higher potential for sedimentation of persistent sensitive marine habitats, specifically under Alternative 2-R. Focused monitoring would be conducted at Solana Beach.*

Assessment of lagoon conditions in the post-RBSP I period indicated that the impact of the nourishment program was modest and short lived at Agua Hedionda, San Elijo, San Dieguito, and Los Peñasquitos lagoons. The findings at Batiquitos Lagoon were inconclusive due to insufficient baseline information and ongoing basin configuration changes during the post-RBSP I period. To be cautious, SANDAG contributed to ongoing lagoon maintenance after implementation of RBSP I. No increase in maintenance efforts at regional lagoons is anticipated as a result of RBSP II implementation under Alternatives 1 or 2. SANDAG would continue to implement an existing lagoon observation and analysis program to document lagoon conditions. The effort would focus on two jetty-stabilized lagoon entrances (Agua Hedionda and Batiquitos) and three unstabilized lagoon entrances (San Elijo, San Dieguito, and Los Peñasquitos) located in the Oceanside Littoral Cell.

Avoidance measures to avoid impacts are as follows:

- *Dredging Operations - Regardless of the dredge type, the U.S. Coast Guard would post a Notice to Mariners with the coordinates of dredging activity so that ocean users could avoid the activity.*
- *Training Dikes - Training dikes would be constructed to reduce turbidity and aid in the retention of pumped sand at receiving beaches.*
- *Beach Building - SANDAG would notify the local jurisdiction and the local print media of the activity. Those entities would publicize the upcoming activity.*
- *Equipment Management/Personnel Parking - Because beach replenishment activities would occur on a constant basis at the site and use only the fewest machines necessary, there would be minimal need for equipment storage and the vehicles would either be active or temporarily idle on the receiver site itself.*

- *Schedule - The exact timing for particular receiver sites would depend on the contractor selected to implement the dredging and disposal activities, the alternative selected for implementation, and construction work windows that may be required at receiver sites in proximity to sensitive species nesting sites. Scheduling would be coordinated to the maximum extent possible to avoid conflicts with national holidays and scheduled major beach events.*
- *Public Safety/Beach Closures - The entire reach of beach within receiver sites would not be closed for the entire duration of construction. Closure areas would shift as replenishment activities move along the shoreline and would be maintained on a 24-hour basis within immediately affected portions of the receiver site.*
- *Offshore Closures/Coordination with Commercial Fishermen - A proactive effort would be made to coordinate with commercial fishermen in advance of dredging and during dredge operations to avoid conflicts and fishing gear loss.*

9. General evaluation criteria under the public interest review. We considered the following within this document:

- The relative extent of the public and private need for the proposed structure or work. (e.g. Public benefits include employment opportunities and a potential increase in the local tax base. Private benefits include land use and economic return on the property; for transportation projects benefits include safety, capacity and congestion issues. *The proposed action would serve 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.*
- ☒There are no unresolved conflicts as to resource use. *Section 2.4.3 provides a full discussion of the design features/specific methods to be incorporated into final design or the contractor's specifications to avoid significant impacts and minimize potential adverse impacts. Furthermore, the analysis in the EA/EIR illustrates that no mitigation measures are needed to reduce impacts with adherence to the design features discussed in Section 2.4.3.*

- The extent and permanence of the beneficial and/or detrimental effects, which the proposed work is likely to have on the public, and private uses to which the area is suited. *The proposed project would create short-term, minor impacts to general water quality, air quality in the immediate project vicinity, and availability of the beach recreational use; however, these impacts would return to baseline when construction activities cease. Conversely, the proposed project would provide long-term benefits to recreation by expanding beach areas and nourishing two of the three regional littoral cells.*

10. Determinations.

Final determinations will be made by USACE prior to approving the environmental documentation for the proposed project.

a. Public Hearing Request: ☐NA

Public meetings were held in 2010 for the proposed project as part of the public scoping process under CEQA at the following locations and times:

- ***June 3** – Shoreline Preservation Working Group Meeting, SANDAG, 7th Floor (Conference Room 7), 401 B Street, San Diego, CA 92101*
  - *12:30–2 p.m.*
- ***June 3** - Encinitas City Hall Poinsettia Room, 505 S. Vulcan Ave., Encinitas, CA 92024*
  - *6:00–7:30 p.m.*
- ***June 8** - Dempsey Holder Safety Center, 950 Ocean Lane, Imperial Beach, CA 91932*
  - *6:00–7:30 p.m.*

Public meetings were held in 2011 for the proposed project as part of the public review period for the EA at the following locations and times:

- ***February 2** - Encinitas City Hall Poinsettia Room, 505 S. Vulcan Ave., Encinitas, CA 92024*
  - *6:00–7:30 p.m.*
- ***February 3** - Shoreline Preservation Working Group Meeting, SANDAG, 7th Floor (Conference Room 7), 401 B Street, San Diego, CA 92101*
  - *1:15–2:45 p.m.*

- ***February 3** - Dempsey Holder Safety Center, 950 Ocean Lane, Imperial Beach, CA 91932*
    - *6:00–7:30 p.m.*

A total of two comment letters were received during public review.

☐ I have reviewed and evaluated the requests for a public hearing. There is sufficient information available to evaluate the proposed project; therefore, the requests for a public hearing are denied.

b. Section 176(c) of the Clean Air Act General Conformity Rule Review: The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit action.

c. Relevant Presidential Executive Orders.

(1) EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians. ☐This action has no substantial direct effect on one or more Indian tribes. *Explain, if appropriate.*

(2) EO 11988, Floodplain Management. ☐Not in a floodplain. (☒Alternatives to location within the floodplain, minimization, and compensation of the effects were considered above.)

(3) EO 12898, Environmental Justice. In accordance with Title III of the Civil Right Act of 1964 and Executive Order 12898, it has been determined that the project would not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin nor would it have a disproportionate effect on minority or low-income communities.

(4) EO 13112, Invasive Species.
☒ There were no invasive species issues involved.
☐ The evaluation above included invasive species concerns in the analysis of impacts at the project site and associated compensatory mitigation projects.

☐ Through special conditions, the permittee will be required to control the introduction and spread of exotic species.

(5) EO 13212 and 13302, Energy Supply and Availability. ☒The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety. (☐The review was expedited and/or other actions were taken to the extent permitted by law and regulation to accelerate completion of this energy-related (including pipeline safety) project while maintaining safety, public health, and environmental protections.)

b. Finding of No Significant Impact (FONSI). Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

c. Compliance with 404(b)(1) guidelines. ☐NA

Having completed the evaluation in paragraph 5, I have determined that the proposed discharge ☐complies/☐does not comply with the 404(b) (1) guidelines.

d. Public Interest Determination: I find that issuance of a Department of the Army permit ☐is not/☐is contrary to the public interest.

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CHAPTER 8.0
CONSULTATION AND COORDINATION

8.1 AGENCY COORDINATION VIA SHORELINE PRESERVATION WORKING GROUP

Close coordination has occurred between SANDAG, the USACE, local jurisdictions, and regulatory agencies since the inception of this project. Since the successful implementation of RBSP I in 2001, the Working Group has worked to design a second regional sand replenishment project to increase recreational capacity, enhance tourism potential, and further improve property and infrastructure protection. As identified in Chapter 2.0, the Working Group is composed of representatives from a number of member agencies. In addition, there are a number of technical and community advisors. Agencies active in the Working Group are identified below:

Member Agencies

- County of San Diego
- City of Carlsbad
- City of Coronado
- City of Del Mar
- City of Encinitas
- City of Imperial Beach
- City of Oceanside
- City of San Diego
- City of Solana Beach
- San Diego Unified Port District
- U.S. Navy

Technical Advisors

- California Coastal Commission
- National Marine Fisheries Service
- San Diego Regional Water Quality Control Board
- California Department of Fish & Game
- State Department of Parks and Recreation

- State Lands Commission
- State Department of Boating & Waterways
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service

Community Advisors

- California Coastal Coalition (CalCoast)
- California Environmental Rights Foundation (CERF)
- California Lobster and Trap Fishermen's Association (CLTFA)
- Economic Development Corporation
- Greater San Diego Chamber of Commerce
- San Diego Council of Divers, Inc.
- San Diego North County Convention and Visitors Bureau
- Scripps Institution of Oceanography
- Southern California Tribal Chairmen's Association (SCTCA)
- Surfrider Foundation

The alternatives analyzed in this document are the result of an iterative process to present information to the resource agencies, obtain their input, and incorporate modifications into project design. Two resource agency meetings were held on October 1, 2009, and October 6, 2010, to facilitate this process as discussed below. The resource agencies listed below were participants in the process.

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Department of Fish and Game
- California Regional Water Quality Control Board (Region 9)
- California Coastal Commission

A second meeting was held with regulatory and permitting agencies on October 6, 2010, to present the results of the modeling and discuss potential monitoring requirements for the project.

8.2 PUBLIC COORDINATION

Extensive public coordination has occurred, and will continue to occur, as part of this proposed project. Public involvement opportunities to date include ongoing Working Group meetings, which are open to the public; the EIR notification process via the NOP; and other presentations to various stakeholder groups. When the EA/EIR is considered for certification by the SANDAG Board there will be a public hearing on the document. Individual jurisdictions will likely have public meetings and utilize the certified EA/EIR for local discretionary actions such as issuing coastal permits or noise variances.

8.2.1 Working Group Meetings

The Working Group generally meets on the first Thursday of every month. (The meeting is not scheduled in August.) Meetings are open to the general public and materials are posted to www.sandag.org/shoreline.

8.2.2 Notice of Preparation to Prepare the Draft EIR

In conformance with CEQA, an NOP to prepare a Draft EIR was distributed by SANDAG to numerous federal, state, and local agencies involved with funding or approving the action, and to other interested organizations and members of the public. A copy of the NOP, the NOP distribution list and copies of all letters received in response to the NOP are provided in Appendix A. Section 1.4 of this document provides a summary of the comments received in response to the NOP.

8.2.3 Other Meetings with Interested Parties

In December 2009, SANDAG staff met with various stakeholder groups who were identified as a result of RBSP I, or who have expressed an interest in the proposed project. Meetings were held with Surfrider, Sierra Club, Scripps Institution of Oceanography, CERF, and WildCoast. An additional meeting was held with the commercial fisherman interest group in April 2010. Many of these same groups attend the Working Group meetings and participate in that forum as well.

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CHAPTER 9.0
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CLARIFICATION ON APPENDICES C, E, AND G
ALTERNATIVE 3

The Regional Beach Sand Project (RBSP) II originally evaluated three alternatives: 1.8 million cubic yards (mcy) (Alternative 1), 2.7 mcy (Alternative 2), and 3.2 mcy (Alternative 3). Alternative 3 would have involved the placement of 3.2 mcy of sand at up to 11 receiver sites. Alternative 3 was eliminated from consideration as an alternative for RBSP II during preparation of the Draft EIR/EA, and is discussed in Alternatives Eliminated from Detailed Review (Section 2.3). Some of the technical studies included as Appendices to this EA/Final EIR evaluated Alternative 3, and still include references to that eliminated alternative. Alternative 3 is referenced specifically in Appendix C Biological Resources Technical Report, Appendix E Sampling and Analysis Results Report for Grain Size and Chemistry, and Appendix G Shoreline Morphology.

APPENDIX A

PUBLIC SCOPING INFORMATION

This appendix is provided in digital format in the enclosed CD.

APPENDIX B

SAN DIEGO REGIONAL BEACH SAND PROJECT II
FINAL PHASE 1 REPORT

This appendix is provided in digital format in the enclosed CD.

APPENDIX C

BIOLOGICAL RESOURCES TECHNICAL REPORT

This appendix is provided in digital format in the enclosed CD.

APPENDIX D

CULTURAL RESOURCES TECHNICAL REPORT

This appendix is provided in digital format in the enclosed CD.

APPENDIX E

SAMPLING AND ANALYSIS RESULTS REPORT FOR GRAIN SIZE AND CHEMISTRY

This appendix is provided in digital format in the enclosed CD.

APPENDIX F

CLIMATE CHANGE REGULATORY FRAMEWORK

This appendix is provided in digital format in the enclosed CD.

APPENDIX G

SHORELINE MORPHOLOGY REPORT

This appendix is provided in digital format in the enclosed CD.

APPENDIX H

URBEMIS MODEL OUTPUT AND DRAFT RONA

This appendix is provided in digital format in the enclosed CD.

APPENDIX I

COMMENT LETTERS AND RESPONSES

This appendix is provided in digital format in the enclosed CD.

APPENDIX J

NEPA PUBLIC NOTICE ISSUED BY CORPS

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