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Filed:	9/25/13
60th Day:	11/23/13
75th Day:	12/8/13
Staff:	L. Simon-SF
Staff Report:	10/31/13
Hearing Date:	11/14/13

STAFF REPORT: REGULAR CALENDAR

Consistency Determination No.: **CD-0203-13**

Federal Agency: **U.S. Army Corps of Engineers**

Location: Encinitas and Solana Beach, San Diego County, specifically Segment 1 from the 700 block of Neptune Avenue south to the approximate end of West H Street in Encinitas; and Segment 2 from Tide Park south to the southern city limit at the western extent of Via de la Valle in Solana Beach (**Exhibits 1-6**)

Project Description: Revised 50-Year Coastal Storm Damage Reduction and Beach Nourishment Project

Staff Recommendation: Concurrence

SUMMARY OF STAFF RECOMMENDATION

The U.S. Army Corps of Engineers (Corps) has submitted a consistency determination for the revised Encinitas-Solana Beach Coastal Storm Damage Reduction Project, a 50-year program to nourish two shoreline segments in the cities of Encinitas and Solana Beach (San Diego County) with sand dredged from offshore borrow sites. The purpose of the program is to reduce wave-induced erosion at the base of coastal bluffs in these two segments and reduce the need for additional armoring of the shoreline in these segments. In response to Commission concerns, the Corps has modified the project to include reduced volumes of sand placement and beach widths. At Encinitas, 340,000 cubic yards of sand would be placed on a 7,800-foot-long section of shoreline to extend by approximately 50 feet the existing base year beach width of 110 feet at mean sea level. Renourishment with 220,000 cu.yds. of sand would occur every five years. At Solana Beach, 700,000 cubic yards of sand would be placed on a 7,200-foot-long section of shoreline to extend by approximately 150 feet the existing base year beach width of 70 feet at mean sea level. Renourishment with 290,000 cu.yds. of sand would occur every ten years. Implementation of the Encinitas and Solana Beach project would take approximately 62 and 107 days, respectively, and the Corps anticipates commencing project construction in late 2015.

The staff recommends the Commission find the project is an allowable use as the offshore borrow sites and the beach disposal sites are not environmentally sensitive habitat areas, and the proposed dredged materials are suitable for beach nourishment. While the project holds the potential to adversely affect marine resources, given the limited utility of the other alternatives, and the anticipated negative consequences of the no-project alternative (i.e., further armoring of the shoreline), the staff recommends the Commission find that the proposed beach nourishment project, with its reduced volumes of sand and beach widths, represents the least environmentally damaging feasible method of addressing the inevitable need to reduce storm damage in the project area while reducing adverse impacts to marine resources.

The revised project incorporates changes made by the Corps in response to concerns articulated by the Commission during its objection to the previous version of the project (CD-003-13), and includes (in addition to the aforementioned reduced sand volumes and beach widths) provisions for periodic review by the Commission of future renourishment events; Executive Director review prior to the start of construction of final biological monitoring and mitigation, shoreline monitoring, borrow site monitoring, and water quality protection plans; and submittal of all project monitoring reports to the Executive Director. With these modifications, the staff recommends the Commission find that the project is designed to minimize and avoid adverse impacts to marine resources, includes measures necessary for protection of marine resources throughout the life of the 50-year program, and is consistent with the marine resources, beach nourishment, and dredging and filling policies of the California Coastal Management Program (CCMP; Coastal Act Sections 30230, 30231, and 30233).

The project holds the potential to affect surfing, and in particular to reef breaks offshore of the Encinitas-Solana Beach project area. The revised project now includes reduced sand volumes and beach widths more comparable to historic conditions, surfing and shoreline monitoring measures, Executive Director review of shoreline and surfing monitoring plans prior to the start

of construction, submittal to the Executive Director of all annual monitoring reports, Executive Director review of construction staging and access plans prior to the start of construction, practicable efforts to schedule beach nourishment activities outside the peak summer recreation season, and a mechanism for Commission review of proposed renourishment events prior to their implementation. With these measures, the staff recommends the Commission find the proposed project consistent with the public access and recreation policies of the CCMP (Coastal Act Sections 30210, 30211, 30212, 30213, and 30220).

The Corps will submit the Turbidity and Water Quality Monitoring Plan, the Storm Water Pollution Prevention Plan, and the Oil Spill Prevention and Response Plan to the Executive Director prior to the start of project construction, to allow for review and comment in order to ensure that the project will be undertaken with adequate measures to protect coastal water quality. With these measures and commitments, the staff recommends the Commission find the project is consistent with the water quality protection policies of the CCMP (Coastal Act Sections 30230 and 30231).

The project includes a revised cultural resources monitoring and protection plan. The Corps will use dredged material to construct the initial L-shaped disposal control sand berm at Moonlight Beach in order to avoid excavating at this location, an activity which could disturb archaeological resources that may exist below grade. The Corps also agreed to incorporate into the project Native American consultation during the pre-construction cultural site investigation, and Native American monitoring during berm construction and sand placement at Moonlight Beach. With these measures, the project is consistent with the archaeological resources policy of the California Coastal Management Program (Section 30244 of the Coastal Act).

Commission staff recommends **concurrence** with CD-0203-13.

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EXHIBITS

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

The U.S. Army Corps of Engineers has determined the project consistent to the maximum extent practicable with the California Coastal Management Program (CCMP).

II. MOTION AND RESOLUTION

MOTION:

I move that the Commission concur with consistency determination CD-0203-13 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program.

Staff recommends a **YES** vote on the motion. Passage of this motion will result in an agreement with the determination and adoption of the following resolution and findings. An affirmative vote of the majority of the Commissioners present is required to pass the motion.

RESOLUTION:

*The Commission hereby **concurs** with consistency determination CD-0203-13 by the U.S. Army Corps of Engineers on the grounds that the project is fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program.*

III. FINDINGS AND DECLARATIONS

A. STUDY AREA BACKGROUND AND PROJECT DESCRIPTION.

The Corps of Engineers is proposing a revised Encinitas – Solana Beach Coastal Storm Damage Reduction Project, a 50-year program to nourish beaches in the cities of Encinitas and Solana Beach (San Diego County; **Exhibits 1-6**). (In July 2013 the Commission objected to consistency determination CD-003-13 from the Corps for the original Coastal Storm Damage Reduction Project.) The Corps states in the project *Feasibility Study and Environmental Impact Statement/Environmental Impact Report* (*Feasibility Study*) that erosion of the beaches and coastal bluffs in the San Diego region has occurred at an increasing rate over the past several decades for a number of reasons, and that erosion is projected to increase in the future based on the Coast of California Storm and Tidal Waves Study (CCSTWS) (USACE-LAD, 1991):

Shoreline erosion has narrowed the beaches and depleted them of sand, thus increasing the vulnerability of coastal bluffs to erosion from waves. In addition, water infiltration from rainfall and landscape irrigation has contributed to bluff top erosion,

and has been a factor in bluff failures in localized areas. These events have resulted in the loss of human life and significant damages to public and private property . . . .

Beaches are dynamic environments subject to seasonal movement of sand offshore (erosion) during the winter and onshore (accretion) during the summer. Sand moves within the littoral zone, which is bounded onshore by the beach and offshore by water depth, which typically is at -30 feet (ft) Mean Lower Low Water (MLLW) in the study area. Sand also is transported alongshore within the littoral zone during its offshore-onshore sedimentation cycle. Sand can be lost from the littoral zone by severe storms that carry sand offshore beyond the depths of littoral transport. Sand also becomes lost when transported north or south of the study area to the Carlsbad and La Jolla submarine canyons, respectively, which act as sediment sinks.

Historically, sand that was seasonally lost from the littoral zone was naturally replenished by river-borne sand carried to the coastal zone during high flow conditions, and to a lesser extent by sediment added to the shoreface by erosion of coastal bluffs. Over the last 50 years, urban development in San Diego County has hindered natural sediment conveyance to the coastal zone. Rivers and streams have been altered, and in some cases channelized, reducing the load of sand-sized material conveyed by the stream channels. Dams slow stream flow velocities and reduce the capacity of streams to convey sand to the coastal zone, and sand mining activities also alter stream hydrology and limit downstream movement of sand. As sediment loads have become trapped within the watershed, there have been significant reductions in coastal sediment supply and a trend of net depletion of San Diego beaches. In addition, severe storm events since the 1980s have exacerbated sand loss from the littoral system and have increased the effects of wave attack on bluffs.

Coastal structures have been constructed by cities, residents, and business owners to protect property, whose vulnerability has increased with increased beach erosion. A variety of methods and materials have been historically used to address shoreline erosion, ranging from sand tubes, bluff notch filling, rock riprap revetment, and seawalls. Approximately half of the coastline along the Cities of Encinitas and Solana Beach has been armored to some degree in response to bluff failures, wave damage, and coastal flooding over the last couple of decades.

The *Feasibility Study* examines the proposed project area and states that:

Nearly all of the shoreline in the study area (7.7 miles total), except the shoreline reach at Cardiff, consists of narrow sand and cobble beaches fronting nearshore bluffs.

To better analyze the coastal bluff and shoreline morphology as well as oceanographic conditions, the entire study area was divided into nine geographical areas called reaches. The distinction between reaches is based on differences in seacliff geology, topography, coastal development and beach conditions

. . .

[The] *Without-project analysis and plan formulation was performed on all reaches; however, through that process only portions of reaches 3-5 and 8-9 were identified for viable later alternatives analysis primarily because of susceptibility to future bluff failures, the existence of viable alternatives to address this problem, and sufficient economic value to justify those alternatives. Segment 1 is a portion of the beach within the City of Encinitas city limits that extends approximately 7,800 ft from the 700 block of Neptune Avenue south to West H Street. Segment 2 is the majority of the beach within the City of Solana Beach city limits, approximately 7,200 ft long extending from the southern city limits north to Tide Park, close to the northern city limits of Solana Beach.*

. . .

Segment 1 includes 138 parcels and 112 structures which are mainly private residences located on the top of the bluff. There are some recreation amenities such as Moonlight Beach, a lifeguard building and restroom facilities located at the bottom of the bluff. Segment 2 includes 88 parcels and 81 structures located on the bluff top. This segment contains private residences and Fletcher Cove Beach Park (community building, recreational facilities, restrooms, lifeguard building and public parking).

The revised consistency determination includes the following analysis of the need for the proposed project:

The need for the Project is that ongoing bluff erosion and storm waves along unprotected shorelines threaten public safety and cause structural damages that include catastrophic damage to occupied buildings. Ongoing beach erosion will also result in reduced recreational use of beaches.

The Encinitas-Solana Beach shoreline has narrow beaches with coastal bluffs exposed to crashing waves, particularly during the winter storm season. As sea levels rise, the bluffs will be even more exposed to crashing waves, which carve notches into the bluffs. Bluffs affected by these notches are then prone to episodic collapse. Consequently, public facilities and residential properties on the upper bluff experience land loss and damages to the property.

In addition to the residences at risk, the following public facilities, public structures, and infrastructure are at risk from storm damage and bluff erosion:

City of Encinitas:

- *Coast Hwy 101 (Emergency evacuation route and I-5 alternative)*
- *18" gas line under Hwy 101 & other utilities*
- *Sewer pump station at Cardiff State Parking lot*
- *Restaurants (Beach House, Charthouse, Pacific Grill)*

- *Cardiff State Beach Parking Lot*
- *Cardiff State Beach Campground*
- *Public beach access ways/staircases:*
  - *10 staircases for San Elijo State Beach campground*
  - *State lifeguard access road (north end of day use parking lot)*
  - *Swamis*
  - *D Street*
  - *Stonesteps*
  - *Beacons*
  - *Seabluff*
- *Moonlight Beach Lifeguard Tower*
- *Public roads*

City of Solana Beach:

- *Public beach access stairways at Tide Park , Fletcher Cove and Del Mar Shores*
- *All public shoreline and beaches in the City including Tide Park Beach and Fletcher Cove Beach*
- *Fletcher Cove Community Park*
- *Solana Beach Marine Safety Headquarters*
- *Fletcher Cove Community Center*
- *Lifeguard stations at Tide Park Beach and Del Mar Shores*
- *Stormwater interceptor facilities*
- *Fletcher Cove public access ramp*
- *Multiple public beach parking lots providing free public beach parking*
- *Public roadways*
- *Numerous wet and dry utilities located on or in the bluffs including sewer lines, electric distribution lines, natural gas lines, and existing stormwater facilities*

In addition to this problem, the study area's high demand for recreation with the narrow beach area combined with bluff failures represent a significant safety issue for those recreating. That is, bluff failures can result in injury or death for people recreating on the beach.

The threat of episodic bluff failure due to coastal storm damage has led many property owners to seek emergency seawall permits. The construction of individual seawalls results in substantial armoring of the coast. At the same time, some property owners either cannot afford to construct seawalls or incorrectly assess the risk. In those cases, the failure to armor the parcel would allow structure collapse. If a homeowner does not construct a seawall, once the structure is lost and major public infrastructure is in jeopardy, the affected City would take action, anticipated to be in the form of emergency seawall construction.

> *The narrow beaches also mean less opportunity for recreational use. While the major focus of the Project is on addressing public safety, loss of life and damage to public facilities and residences caused by bluff failure resulting from coastal storm damage, narrowing of beaches used for recreation is a secondary impact. Episodic bluff failure also results in damages to stairways that provide access to beaches located below high bluffs. This loss of access is expected to accelerate with sea level rise.*

Given the existing conditions in the study area and after undertaking a project alternatives analysis (**Exhibit 7**), the Corps is proposing to nourish beaches only in Segment 1 in Encinitas and Segment 2 in Solana Beach over a 50-year period. The *Feasibility Study* states that the proposed project was formulated to "reduce erosion to the base/toe of the coastal bluffs exclusively" and that "residual sloughing at the bluff top edge . . . would not be prevented by a Federal-interest project."

The Corps' previously-proposed project (CD-003-13), reviewed and objected to by the Commission in July 2013, was the alternative that the Corps asserted would maximize National Economic Development (NED) benefits, primarily coastal storm damage reduction, and that the Corps asserted would also be the least environmentally damaging practicable alternative (LEDPA). The Corps' *Feasibility Study* stated that:

> *Based on the coastal storm damage reduction benefits and associated costs, no alternative was economically justified on coastal storm damage reduction benefits only. Recreation benefits are limited to 50% of the total benefits required for justification to ensure recreation is incidental to plan formulation. Consequently, recreation benefits, not to exceed coastal storm damage reduction benefits, were included to determine the alternatives that are economically justified (net benefits greater than zero). All alternatives economically justified with limited recreation benefits are analyzed in a later step with full recreation benefits to determine the National Economic Development (NED) Plan.*
>
> *Among the beach fill alternatives evaluated at Segment 1* [Encinitas], *extending the beach 100 ft MSL and nourishing every 5 years maximizes NED net annual benefits. This result is consistent under low and high sea-level rise scenarios.*
>
> *Among the beach fill alternatives evaluated at Segment 2* [Solana Beach], *extending the beach 200 ft MSL and nourishing every 13 years maximizes NED net annual benefits. Under the high sea-level rise scenario, the alternative that maximizes NED net annual benefits is 300-ft added beach width nourished every 14 years.*

However, as a result of the Commission's July 2013 decision, and in response to the Commission's stated concerns regarding the size (sand volumes and beach widths) of that previous project, the Corps is now proposing to implement an alternative project, not its initially selected project but nevertheless one which it had evaluated in the *Feasibility Study*. The subject

consistency determination discusses the discretion available to the Corps to propose a "non-LEDPA" project, as long as that alternative was analyzed in the NEPA document.
As a result, the proposed Corps project plan is now "Encinitas-1B and Solana Beach-1B." For the initial nourishment event at Encinitas, 340,000 cubic yards (cu.yds.) of sand (reduced from the previously-proposed 680,000 cu.yds.) would be placed on a 7,800-foot-long section of shoreline to extend by approximately 50 feet (reduced from 100 feet) the existing base year beach width of 110 feet at mean sea level, thereby increasing the beach profile width to 160 feet (reduced from the original proposal of 210 feet) under the low sea level rise scenario (**Exhibits 3 and 4**). To obtain this volume of sand, the Corps will dredge approximately 410,000 cu.yds. of material from the SO-6 borrow site (the dredge volumes provided in the *Feasibility Study* for the Encinitas and Solana Beach segments are approximately 10 to 20 percent higher than those required for the beach fills to account for losses during construction operations). The receiver beach extends from the 700 block of Neptune Avenue south to the approximate end of West H Street. The top of the sand berm would be constructed to an elevation of approximately +15 feet mean lower low water (MLLW). Upon completion of the initial nourishment project, the surface of the berm would be flat and approximately 160 feet wide with a slope of 10:1 towards the ocean; the toe of the slope would be located at approximately -10 feet MLLW. Implementation of this initial nourishment project is expected to last 62 days (including 41 days of dredging and disposal). Renourishment of this area with 220,000 cu.yds. of sand (reduced from 280,000 cu.yds.) would occur every five years. At the end of the 50-year project period, the Corps estimates that approximately 2.32 million cu.yds. of sand (reduced from 3.2 million cu.yds.) would be placed along this segment under the low sea level rise scenario, and up to 3.15 million cu.yds. (reduced from 4.03 million cu.yds.) under the high sea level rise scenario.

For the initial nourishment event at Solana Beach, 700,000 cu.yds of sand (reduced from 960,000 cu.yds.) would be placed on a 7,200-foot-long section of shoreline to extend by approximately 150 feet (reduced from 200 feet) the existing base year beach width of 70 feet at mean sea level, thereby increasing the beach profile width to 220 feet (reduced from the original proposal of 270 feet) under the low sea level rise scenario (**Exhibits 5 and 6**). To obtain this volume of sand, the Corps will dredge approximately 860,000 cu.yds. of material from the SO-5 borrow site. The receiver beach extends from Tide Park south to the southern city limit at the western extent of Via de la Valle. The top of the sand berm would be constructed to an elevation of approximately +15 feet mean lower low water (MLLW). Upon completion of the initial nourishment project, the surface of the berm would be flat and approximately 220 feet wide (reduced from the original proposal of 270 feet) with a slope of 10:1 towards the ocean; the toe of the slope would be located at approximately -10 feet MLLW. Implementation of this initial nourishment project is expected to last 107 days (including 86 days of dredging and disposal). Renourishment of this area with 290,000 cu.yds (reduced from 420,000 cu.yds.) of sand would occur every ten years (rather than every thirteen years, and this ten-year cycle would more efficiently coordinate with the every-five-year renourishment schedule at Encinitas). At the end of the 50-year project period, the Corps estimates that approximately 1.87 million cu.yds. of sand (reduced from 2.21 million cu.yds.) would be placed along this segment under the low sea level rise scenario, and up to 2.63 million cu.yds. (reduced from 4.04 million cu.yds.) under the high sea level rise scenario.

For both the Encinitas and Solana Beach segments, future renourishment projects would be triggered by the need to maintain the equilibrium beach width that will be implemented (e.g., if a 50-foot beach width is proposed for the initial placement, renourishment volume will be based on maintaining that 50-foot beach width). The Corps calculates that these trigger widths would be reached every five years at Encinitas and every ten years at Solana Beach.

In the revised consistency determination, the Corps examined the proposed beach widths in the context of historic beach width ranges at both Encinitas and Solana Beach:

> *Beach widths along the Encinitas and Solana Beach shorelines have varied substantially over time and still vary according to the wave climate, tides, and the season (e.g., beaches are wider in summer and more narrow in winter). The beaches are reported to have been much wider in the 1970's, and lost much of their sand during the 1982-83 El Nino storms. The figures show the proposed mean beach profile as compared to the projected without project profile. Also shown is the envelope around the extensive profile monitoring undertaken by USACE, SANDAG and the Cities between 1983 and 2010. The label on the figure ("Historic Maximum Sand Level (1983-2012)") represents the highest sand level along the profile for this time period.*
>
> *The beach widths presented in the Project are defined at Mean Sea Level (MSL), meaning that it does not represent a dry beach width. In the most recent beach profile monitoring report (prepared by Coastal Frontiers covering the period Fall 2000 to Fall 2012), MSL beach widths at Moonlight in Encinitas have ranged from 124 feet to 271 feet. The beach profile monitoring report (Coastal Frontiers covering the period Spring 1996 to Fall 2011) shows MSL widths at Fletcher Cove has ranged from 90 to 171 feet.*
>
> *The Segment 1 (Encinitas) target MSL width is 160 feet and the mean Project profile is within the 1983-2010 envelop of measured profiles (Figure 4.8-1).* [**Exhibit 4**]
>
> *The Segment 2 (Solana Beach) target MSL width is 220 feet and the mean Project profile is slightly above the 1983-2010 envelope and matches the historical beach maximum at the MSL elevation (Figure 4.8-2).* [**Exhibit 6**]

The consistency determination examines the beach profile monitoring elements that are included in the proposed project:

> *The beach profile monitoring plan will include semi-annual beach profile surveys along 19 shore perpendicular transects and oblique photos at each of the receiver sites. The beach profile data will be obtained in the Spring and Fall, corresponding to the transitions between the winter and summer wave seasons, commencing prior to construction and continuing until two years post construction. The oblique aerial photos will be obtained semi-annually in the Spring and Fall during the first two years post construction. The transect locations will begin at SD-710 in the north and*

> *end at DM-0560 in Del Mar at the southern end. Monitoring will include the geographical area between the Encinitas and Solana Beach segments of the project, in order to accurately document possible downcoast movement of sand placed in the Encinitas segment.*
>
> *Lagoon entrance monitoring will focus on the condition of three lagoon entrances in the Oceanside Littoral Cell: Batiquitos, San Elijo, and San Dieguito. Monitoring will consist of oblique aerial photography, monthly inspections, and an assessment of lagoon closure and maintenance records. In addition, the USACE will coordinate with the Cities and SANDAG to monitor 1-2 additional transects north of the Los Penasquitos Lagoon as part of the SANDAG Regional Shoreline Monitoring Program for 5 years following the initial beach sand placement.*

The Corps clarified in an email communication to Commission staff on Oct. 15, 2013, that the Corps will also establish two additional beach profile transects north of Los Penasquitos Lagoon as an element of the proposed project in order to monitor possible project impacts on the lagoon entrance channel (i.e., increased sediment input and reduced tidal mixing). These transects will be monitored as standard elements of the project and included in the project's shoreline monitoring reports. Potential impacts to the lagoon from the proposed project were raised by the Commission and in letters received by the Commission during its review of the previous Corps project (CD-003-13; **Exhibit 8**).

The *Feasibility Study* states that sand used for beach nourishment would be dredged by either hopper or cutterhead dredges from three offshore borrow sites and placed directly on the receiver shorelines (**Exhibit 9**). Borrow site SO-6 is 1,900 to 4,900 feet offshore of San Elijo Lagoon and in the extreme southeast corner of the Swami's State Marine Conservation Area; SO-5 is 2,200 to 3,900 feet offshore of the San Dieguito River; and MB-1 is 4,500 to 7,700 feet offshore of Mission Bay. The consistency determination states that all offshore dredging at the three designated borrow sites will occur below the depth of closure (i.e., outside the littoral drift zone and no shallower that -40 feet mean lower low water) at those locations, and only dredged materials physically compatible with receiver beaches will be placed on those beaches.

The *Feasibility Study* states that the borrow sites have been previously defined and mined for prior beach replenishment activities and that:

> *The amount of material to be dredged from these borrow sites varies, both for initial nourishment and for periodic renourishment activities, with each alternative. Borrow sites SO-5 and SO-6 are identified as the primary sites. Material from borrow site SO-5, would be used for Segment 2 (Solana Beach) and material from borrow site SO-6 would be used for Segment 1 (Encinitas) until exhausted at which time SO-5 would provide material for both Encinitas and Solana Beach receiver sites. The volumes necessary for an array of combinations of Segment 1 and Segment 2 alternatives, under the high sea level rise scenario, exceed the total combined volumes of material available at borrow sites SO-5 and SO-6. Borrow site MB-1 would then be used as a*

supplemental source to contribute to the required volume of sand for alternatives under the high sea level rise scenario.

For both the hopper and cutterhead dredging methods, sand would be combined with seawater as part of the dredging process to produce a slurry, which would then be conveyed to the beach either via pipeline or a combination of hopper dredge and pipeline. Existing sand at each receiver site would be used to build a small, "L"-shaped berm just above the mean high tide line on the dry sand to anchor the sand placement operations. For sand placement at Moonlight State Beach, sand dredged from the offshore borrow pit would be used to create the "L" –shaped berm in order to avoid excavation in this area of archaeological significance. The short side of the "L" is perpendicular to the shoreline and approximately the same width as the design beach for each receiver site. The long side is parallel to shore, at the seaward edge of the design beach footprint.

The slurry would be pumped onto the beach into the angle of the "L" between the berm and the bluff toe. This berm would reduce ocean water turbidity allowing all the sand to settle out inside the bermed area while the seawater draining out of the slurry is channeled just inside the long side of the berm until it reaches the open end where it would drain across the shore platform, over the dry sand, and into the ocean. As filling progresses the berm would be continuously extended to maintain its designed length. As the material is deposited behind the berm, the sand would be spread using two bulldozers and one front-end loader to direct the flow of the sand slurry and form a gradual slope to the existing beach elevation.

The Corps states that berm construction at each receiver site may be adjusted from the design requirements during fill placement depending on actual field conditions. The measurements indicated for the width of the berms for each nourishment event are the initial placement widths. The berms would be subject to the forces of the waves and weather once constructed, and would eventually settle down to a natural grade for the beach. The proposed nourishment project is designed to achieve a berm after two years of being reworked by ocean processes (waves, currents, and winds), also referred to as the 2-year equilibrium, as this is the actual project state that would provide the expected storm damage reduction.

Beach nourishment activities (sand dredging, placement, and dispersal) would occur on a 24-hour, 7-day a week (24/7) basis, by operating three shifts per day. Beach operations (i.e., the use of heavy equipment vehicles to move sand previously discharged behind the beach berms) would only occur during the day (12 hours). Approximately two days would be required to set up the pipeline leading from the dredge or monobuoy to the shoreline. The contractor would typically assemble two sets of pipeline to avoid delays associated with moving and setting up the pipelines as each section of sand placement is completed. Sand discharge would be continuous as long as the dredge is operating. The Corps expects to achieve a daily average production rate of approximately 10,000 cu.yds. The estimated project duration is 62 days for Encinitas and 107 days for Solana Beach.

Regarding construction access and staging areas, the consistency determination states that:

> *Under each nourishment alternative, existing public beach access points would be used for the construction equipment and crew at Moonlight Beach in Encinitas. Beach access for the construction equipment and crew at Solana Beach would be provided at Fletcher Cove. Should dredged sediment from San Elijo Lagoon be used as a sand source, Cardiff State Beach north of the City of Solana Beach would be used as a staging area and pipeline corridor. This, however, is highly unlikely given the timing of the projects and the nature of the sediments in the San Elijo Lagoon. Seaside parking lot, located at the southern end of Cardiff State Beach, may be used as an access point to the Solana Beach segment in lieu of Fletcher Cove, which might be too small to accommodate heavy construction equipment. Should equipment need to be temporarily moved off the beach, it would be stored in parking lots at the access points. Any fueling or maintenance activities would occur at the staging areas, and the contractor would be required to provide and comply with a Spill Prevention, Control, and Containment (SPCC) plan for hazardous spill prevention and containment. Any equipment left on the beach overnight will be protected so that any materials that could leak from stored equipment do not enter the ocean; and these areas will be designed not to obstruct or impede public access to or along the shoreline. Public parking areas are available for use by the construction crew. The dredge crew would park at the port of operations for the dredge.*

The Corps expects that all construction activities would be carried out such that the only impacts to public beach access would occur at the point of sand discharge. Approximately 150-300 feet of beach would be inaccessible to the public around the discharge pipeline and berms at Encinitas; approximately 200 feet of beach would be inaccessible at Solana Beach. In addition, there would be intermittent restrictions on public access for approximately 350 feet on either side of the discharge zone at both locations. This space would be needed for maneuvering heavy equipment during construction of the temporary berms and for relocating discharge pipelines.

Regarding project staging plan details, the consistency determination states that:

> *The construction staging plans will assure that: (a) temporary easements for staging areas at Moonlight Beach and Fletcher Cove will be obtained; these areas will have fencing for public safety and security; these areas will be the minimum size necessary and will be operated in conjunction with larger upland staging areas; the USACE will avoid storing vehicles and earthmoving equipment in these areas to the maximum extent practicable to avoid potential water quality impacts; any equipment left on the beach overnight will be protected so that any materials that could leak from stored equipment do not enter the ocean; and these areas will be designed not to obstruct or impede public access to or along the shoreline; (b) the minimum number of public parking spaces (on and off-street) that are required for the staging of equipment, machinery, and employee parking that are otherwise necessary to implement the project will be used; and (c) staging will avoid using to the maximum extent feasible public beach parking lots, but when the use of these lots is unavoidable to implement the project, only the minimum amount of space in these*

lots will be used. The construction staging plan will be submitted to the Executive Director for review prior to the start of project construction.

The revised project includes a comprehensive monitoring program comprised of the following elements which are examined in greater detail in subsequent sections of this report:

- Turbidity and Water Quality Monitoring Plan
- Habitat Monitoring Plan
- Mitigation Monitoring Plan/Mitigation Monitoring and Reporting Program
- Borrow Site Monitoring Plan
- Grunion Monitoring and Avoidance Plan
- Cultural Resources Surveys and Plan
- Cultural Resources Monitoring Plan
- Snowy Plover Avoidance Plan
- Noise Monitoring Plan
- Beach Profile Monitoring Plan
- Surfing Monitoring Plan
- Stormwater Pollution Prevention Plan
- Oil Spill Prevention Plan
- Public Safety Plan
- Air Quality Monitoring Plan
- Construction Staging Plan
- Construction Calendar Plan

The revised consistency determination included a commitment that shoreline, biological, and surfing monitoring will also occur in the geographical area between the Encinitas and Solana Beach segments of the project, in order to accurately document potential project impacts to this area from possible downcoast movement of sand. The Corps also included in the revised consistency determination a commitment to provide copies of the aforementioned monitoring plans to the Executive Director for review when they are published and prior to the start of initial and subsequent project construction. Should the Executive Director identify shortcomings in the design of any of the monitoring plans, and if the Corps and the Executive Director are unable to resolve any disagreements over the plans, the matter will be brought before the Commission for a public hearing and Commission review.

Construction of the proposed initial nourishment projects at Encinitas and Solana Beach is scheduled to commence no earlier than late 2015. Renourishment at Encinitas and Solana Beach would occur every five years and 10 years, respectively, after initial nourishment. In response to concerns regarding the lack of an adequate review mechanism for future renourishment events (i.e., consistency determinations) articulated by the Commission in its objection to the Corps' previous consistency determination in July 2013, the Corps now proposes the following coordination and review mechanism:

<u>Coordination Prior to Renourishment Events</u>. Six months prior to each renourishment event, the USACE will notify the Executive Director and provide for

> *his review: (a) the results of all monitoring that the plans discussed in these conditions required to be performed since completion of the previous nourishment event (e.g., physical, biological, surfing); (b) an explanation of the status of completed and/or ongoing mitigation efforts associated with the original nourishment event; and (c) the proposed sand volume, beach width, and borrow site location for the upcoming nourishment event. The USACE will include in this notification its conclusions as to whether the project remains consistent to the maximum extent practicable with the enforceable policies of the CCMP. The Executive Director may bring these conclusions, along with the Executive Director's analysis and recommendation for Commission action, to the Commission for a public hearing and a Commission determination as to whether the project remains consistent to the maximum extent practicable with the enforceable policies of the CCMP. As provided by the CZMA regulations, if the Commission determines the project has changed substantially or that the proposed project will affect coastal uses or resources substantially different than originally described, the Commission may request that the USACE take appropriate remedial action, prior to any subsequent renourishment event or may notify the USACE of activities which the Commission believes should be subject to a supplemental consistency determination, prior to any subsequent renourishment event.*

The Commission's adopted findings for its objection to the previous consistency determination (CD-003-13) for the Encinitas-Solana Beach project included a recommended modification that called for the submittal of a new consistency determination to the Commission prior to each renourishment event, as part of a phased review process. However, the Commission finds that the Corps' proposed coordination and review mechanism incorporated into the project as indicated above provides the Commission the means by which it can: (1) undertake a timely and adequate review of renourishment events over the 50-year life of the project; and (2) with the monitoring reports that will be submitted by the Corps, determine whether the project remains consistent with the enforceable policies of the CCMP. In addition to this commitment by the Corps incorporated into the consistency determination, the Commission retains its normal ability to monitor the instant project just as it can monitor any other previously reviewed federal agency activity through the re-opener provisions of 15 CFR §930.45 of the NOAA federal consistency regulations.

The Corps has also incorporated an adaptive management program into the proposed project, which ensures that the Commission will be able to participate in adjusting the project's future renourishment events should monitoring results indicate project impacts to coastal resources different from those currently predicted:

> *Adaptive Management is a systematic approach for improving resource management by learning from post-project monitoring outcomes. Adaptive Management focuses on learning and adapting in order to create and maintain sustainable resource systems.*

The purpose of the proposed Adaptive Management Program is to the provide flexibility over the 50-year life of the Project to modify/adjust future renourishment events in terms of timing, location, volume, construction methods and other elements of the Project if post-construction monitoring data indicates that Project-related impacts are substantially different (e.g., greater or lesser) that those predicted by the Integrated Report. The key steps in the Adaptive Management process are the following:

- *Design;*
- *Implement;*
- *Monitor;*
- *Evaluate;*
- *Assess; and*
- *Adjust.*

Potential scenarios that could trigger an Adaptive Management action include no impacts, impacts are larger than expected, impacts are smaller than expected, higher erosion in the project area, slower erosion in the project area, climate change and sea level rise beyond maximum predicted levels.

The key actions that the USACE will use in the implementation of the Adaptive Management Program include the following:

- *Monitor biological resources and monitor beach widths;*
- *Coordinate with State and Federal regulatory agencies including CCC, USFWS, CDFW to review monitoring data;*
- *Utilize the resulting data systematically for learning and improvement and,*
- *Adjust future renourishment events based on monitoring program findings.*

Comment letters received by the Commission in support of the proposed project are provided in **Appendix B.** The City of Solana Beach also submitted a copy of an article from the Summer 2013 issue of *Shore & Beach* on beach nourishment; it is attached to this report as **Appendix C**.

B. MARINE RESOURCES/BEACH NOURISHMENT/DREDGING AND FILLING.
Sections 30230 and 30231 of the Coastal state:

Section 30230. Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

> *Section 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface water flow,*

Section 30233(a) states:

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: …*
>
> > *(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas. …*

Section 30233(b) states:

> *(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.*

Allowable Use. The Commission has historically found that beach nourishment using materials dredged from offshore borrow sites to be an allowable use under Section 30233(a)(5), which allows dredging and filling for mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas. Moreover, Section 30233(b) encourages beach nourishment whenever dredge material is suitable, and material being dredged for the sole purpose of replenishing beaches is inherently suitable for use (assuming, as is the case in this consistency determination, it tests free of contaminants and is predominantly sand sized material). The borrow sites offshore of Encinitas and Solana Beach are not environmentally sensitive areas, as there is no hard-bottom habitat or kelp forests within borrow site footprints. The sandy bottom habitat in those areas do support important but common and widespread populations of benthic and invertebrate species, and impacts to these resources from the proposed project, and mitigation for those impacts, are examined later in this section of the report. The Swami's State Marine Conservation Area (SMCA), established in December 2010, is located offshore of the southern end of the Encinitas segment and extends south to the northern edge of the Solana Beach segment. The existing SO-6 borrow site is located in the extreme southeast corner of this SMCA and was most recently used as a source of beach nourishment materials in SANDAG's Regional Beach Sand Project II (RBSP II) program conducted in September through December 2012. The RBSP II program was reviewed and approved by the Commission in coastal development permit 6-11-018. Dredging at SO-6 for beach nourishment projects is an allowable use under the Swami's SMCA authorizing legislation (see **pages 22 and 33** of this report for

further discussion of the Swami's SMCA). The beach disposal sites are also not environmentally sensitive areas, as they do not presently provide nesting habitat for the Western snowy plover or California least tern due to the lack of suitable sandy areas for such activity (these species may forage in offshore waters adjacent to the beach segments proposed for nourishment). There are no sensitive plant species that inhabit these shoreline reaches. The Commission therefore finds the dredging and nourishment project is an allowable use under Section 30233(a)(5).

Alternatives. Project alternatives considered by the Corps included the following:

1. No Action. No Federal project would occur, and the assumption is made that existing seawalls would be maintained; that public infrastructure and private property will continue to be threatened, and in response, public agencies and private homeowners will continue to be granted permits to build new seawalls, as the Coastal Act requires; and most of the project area shoreline will be armored within 20 to 30 years in an inefficient uncoordinated process after significant loss of land.
2. Managed Retreat. The Corps states that it does not have the statutory authority to implement such a program; in addition, the high cost of real estate in the project area would make implementing this alternative impracticable and infeasible.
3. Beach Nourishment (proposed). Alternate widths were developed in 50-foot increments up to an increased width of 400 feet. The Corps states that this is the most economically and environmentally appropriate alternative.
4. Structural Measures. The Corps examined emergent breakwaters, submerged breakwaters/artificial reefs, groins, notchfills (filling toe notches and seacaves at the base of bluffs with engineered concrete), seawalls, and revetments, and concluded that these alternatives were not feasible due in large measure to Coastal Act concerns, local opposition, and adverse effects on coastal resources.
5. Hybrid – Beach Nourishment and Notch Fill. The Corps examined a combination of narrower nourishment and notch fill to prevent erosion during periods between nourishment events.

In terms of alternatives *within* the category of beach nourishment, the Corps considered a wide range of beach widths and nourishment cycles, and further analyzed the following viable alternatives:

Encinitas:

- EN-1A Beach Nourishment (100-ft beach renourished every 5 years)
- EN-1B Beach Nourishment (50-ft beach renourished every 5 years)
- EN-2A Hybrid (100-ft beach renourished every 10 years and notchfill)
- EN-2A Hybrid (50-ft beach renourished every 5 years and notchfill)
- EN-3 No Action

Solana Beach:

- SB-1A Beach Nourishment (200-ft/300-ft beach renourished every 13-14 years)

- SB-1B Beach Nourishment (150-ft/300-ft beach renourished every 10 years)
- SB-1C Beach Nourishment (100-ft/300-ft beach renourished every 10 years)
- SB-2A Hybrid (150-ft beach renourished every 10 years and notchfill)
- SB-2A Hybrid (100-ft beach renourished every 10 years and notchfill)
- SB-3 No Action

The revised project alternative now selected for each location (EN-1B for Encinitas and SB-1B for Solana Beach) is described in the *Feasibility Study* under low sea-level rise and high sea-level rise prediction scenarios, which results in different predicted rates of erosion, fill volumes, and the design of each alternative. The *Feasibility Study* states that:

> *It is important to understand the potential consequences of the necessary design adaptation should either of the scenarios be realized. The current and historical trends for sea level rise that have been recorded, as described in Appendix B, align with the low sea level rise scenario predictions. Consequently it is the low sea level rise scenario design in each alternative that, at the time of writing this report, is the assumed 2015 'base scenario' for design. Should high sea level rise scenario predictions become evident during the course of the project, adaption of the design to the high sea level rise scenario would be implemented. To achieve that adaption the higher renourishment volumes would be implemented if, or when, any recalibration of sea level indicated the high sea level rise scenario was in evidence. The descriptions herein and the analysis in Section 5.0 of this Integrated Report provide comparable levels of information such that the consequences of the alternatives under either scenario can be effectively considered and compared. As with each of the other alternatives, should the switch to high sea level rise be necessary during the life of the project, renourishment would simply implement the volumes for the high sea level rise scenario from the time the switch is made.*

The Corps concluded in the *Feasibility Study* that a 100-foot beach width nourishment at Encinitas (EN-1A) and a 200-foot beach width nourishment at Solana Beach (SB-1A) provided the greatest net economic benefit and was the least environmentally damaging practicable alternative. However, based on the Commission's objection to CD-003-13 in July 2013 due to potential adverse impacts to coastal resources, the Corps has changed the proposed project to consist of *Feasibility Study* alternatives "Encinitas 1B" and "Solana Beach 1B." This revised project provides reduced volumes of sand placement, reduced beach widths, reduced impacts on nearshore habitat, and coordinated renourishment schedules, but with reductions in coastal storm damage reduction benefits (life safety and infrastructure) over the 50-year life of the project.

As acknowledged by the Corps in the *Feasibility Study*, because the Encinitas and Solana Beach segments have not been artificially nourished in the past at the magnitude (in terms of volume, shoreline length, and beach width) approaching the proposed project, it is not particularly clear the extent to which sand might be mobilized, temporarily cover offshore sensitive habitats along the shoreline from Encinitas to Solana Beach, and/or adversely affect those habitats. As a result, the proposed project includes preliminary monitoring measures to assess the littoral and habitat dynamics, and preliminary mitigation measures should the project result in adverse impacts to

these resources. (These preliminary measures are discussed in more detail below.) However, even before project construction and monitoring has commenced, the Corps acknowledges in the *Feasibility Study* that, if the proposed program were conducted without any mitigation, it would adversely affect some marine resources (though only in a manner that mimics the natural system), and thus, mitigation for those impacts will be required and provided. Given these expected impacts (which are discussed in the "Mitigation" section below), the Commission will first determine whether the Corps' proposed project alternative represents the least environmentally damaging feasible alternative and minimizes the expected impacts to marine resources.

Given that dredging and beach nourishment hold the potential to adversely affect some marine resources in the project area, but given also the Commission's concurrence with the Corps' assessment of the limited utility of other project alternatives, and of the anticipated and well-documented negative consequences of the no-project alternative (i.e., additional armoring of these sections of shoreline in Encinitas and Solana Beach), the Commission agrees that some form of beach nourishment to reduce coastal storm damage, in concept, represents the least environmentally damaging feasible alternative. However, the Commission previously found in its objection to CD-003-13 that the proposed 100-foot-wide addition to Encinitas and the 200-foot-wide addition to Solana Beach were not the least environmentally damaging feasible alternatives to reducing coastal storm damage along these two sections of shoreline. The Commission recommended that the Corps review the project alternatives examined in the *Feasibility Study* and determine if there is an alternative that reduces impacts to marine habitat and resources while still providing storm damage protection to private property and public infrastructure. The Commission now finds that the revised project, with reduced beach widths and sand volumes, comprehensive monitoring and mitigation measures (described in greater detail later in this section), and Commission review of renourishment events, is the least environmentally damaging feasible alternative.

Mitigation. The third test of Section 30233(a) requires the Commission to determine whether "feasible mitigation measures have been provided to minimize adverse environmental effects." The Commission must first examine the primary habitats and species that are present in the project area, analyze the potential impacts on those habitats and species from the proposed offshore dredging and nourishment project, examine the proposed monitoring plans, evaluate the proposed mitigation measures, and then consider whether additional measures are required to find the project consistent with the marine resource policies of the Coastal Act.

Habitats. The project area includes sandy beaches, beach areas with cobble coverage or exposed bedrock, sandy nearshore subtidal areas (broken down in the project area into the littoral zone to -30 feet mean lower low water (MLLW), an inner shelf zone to -80 feet MLLW, and a small portion of the middle shelf zone beyond -80 feet MLLW), and hard-bottom and vegetated habitats which include rocky intertidal shores and nearshore reefs supporting surfgrass beds and kelp forests, including nearshore reefs at Table Tops at the northern end of the Solana Beach segment (**Exhibits 10 and 11**). The *Feasibility Study* summarizes the marine resources in the project area as follows:

> *The 2002 SANDAG seafloor mapping provides the best available comprehensive data of nearshore habitat in the study area (Figure 4.5-1, Figure 4.5-2, and Figure 4.5-3). Similarly, the 2002 SANDAG vegetation map provides the best available quantitative estimates of the vegetative indicator species (Figure 4.5-1 and Figure 4.5-2). Those data include acreage estimates for various habitat types: surfgrass, giant kelp (kelp canopy), and understory algae. The understory category includes several species, including feather boa kelp and sea palm indicators. Indicator species were selected in coordination with resource agencies to be consistent with previous reef characterization surveys and monitoring conducted in the study area (US Navy 1997a, b; MEC 2000b, AMEC 2005). The indicators represent dominant species that are sensitive to varying degrees of sand scour and sedimentation, as follows:*
>
> - *Persistent indicator species considered relatively sensitive to sand scour and sedimentation (sea fans, giant kelp).*
> - *Persistent indicator species considered relatively tolerant of some sand influence (surfgrass, sea palm).*
> - *Opportunistic indicator species considered relatively sand tolerant (feather boa kelp).*

The federal- and state-listed endangered California least tern is known to nest at Batiquitos Lagoon (north of Encinitas) and San Elijo Lagoon (north of Solana Beach), although no nesting has occurred at the latter site since 2005. Least terns forage in nearshore waters up to five miles away from their nesting sites, which includes portions of the project dredge and disposal areas. The federally-listed threatened Western snowy plover is known to nest at Batiquitos and San Elijo lagoons and forages along the shoreline within the Encinitas and Solana Beach project area, including Cardiff State Beach.

Swami's State Marine Conservation Area (SMCA) was designated in December 2010 under the Marine Life Protection Act and is located in the offshore area from southern Encinitas to San Elijo Lagoon (**Exhibit 12**). Take of living marine resources in this area is prohibited except for (1) recreational take by hook-and-line from shore; (2) recreational take of pelagic finfish by spearfishing; and (3) take pursuant to activities authorized under Title 14, CCR, subsection 632(b)(138)(C). This subsection states that:

> *Beach nourishment and other sediment management activities and operation and maintenance of artificial structures inside the conservation area is allowed pursuant to any required federal, state and local permits, or as otherwise authorized by the department* [California Department of Fish and Wildlife].

The SO-6 offshore borrow site (for nourishing the Encinitas segment) is located in the extreme southeast corner of the Swami's SMCA and has been used as a borrow site for regional beach nourishment projects in San Diego County subsequent to the designation of the SMCA, most recently for the RBSP II program in 2012, which was approved by the Commission in coastal development permit 6-11-018.

Impacts. The revised consistency determination examines potential direct and indirect project impacts on the offshore borrow sites, beach receiver sites, sensitive species, and essential fish habitat, and provides the following summary of those potential impacts:

> *Direct impacts from dredging at the borrow sites would include removal of sediment and associated organisms, while construction at the receiver sites would result in burial impacts to marine biota; however, these impacts are considered short-term and localized. Due to the relatively small area affected, and the widespread occurrence and relatively rapid recovery rates of marine invertebrates, direct impacts to marine invertebrates within the borrow and receiver sites are expected to be less than significant. Receiver site construction may also potentially impact grunion spawning; however habitat suitability surveys and construction monitoring would minimize impacts to the species. Restoration and maintenance of stable, wide beaches would be expected to enhance grunion spawning habitat as well as general sandy beach habitat.*
>
> *Indirect effects associated with removal on the forage base for other animals, and indirect effects associated with operation of the dredge equipment such as increased turbidity and noise are also considered short-term and localized and less than significant. However, 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.*
>
> *For Solana Beach, sediment transport modeling estimates indicate a potentially significant impact to intertidal reef platform and reefs with other indicator species for all alternatives in the final array considered. The modeling identified that approximately 6.8 acres nearshore reef habitat would be adversely affected at the end of Year 2 after initial nourishment. No impacts to reefs supporting surfgrass were predicted. The need for renourishment would be based on the equilibrium beach width that would be implemented, thus no additional impacts are anticipated from renourishment. Any impact to nearshore resources would be expected during the initial beach fill as all subsequent nourishments would occur in the same footprint and would be a reduced volume relative to the initial fill. In addition, an adaptive monitoring program is proposed for the project to also account for potential cumulative effects associated with other beach nourishment activities (e.g., opportunistic programs, lagoon maintenance, and the SLERP [San Elijo Lagoon Restoration Project]).*

The Corps states in the revised consistency determination that the project is designed to avoid or minimize impacts to sensitive biological resources to the maximum extent practicable, by selecting reduced fill alternatives that limit fill volume while achieving project objectives:

> *Encinitas, for example, was able to select a beach width that avoids losses of rocky and surf grass habitats while still achieving shoreline protection objectives. Solana*

> *Beach selected an alternative that resulted in no impacts to surf grass resources while impacting minimal reef resources. Fill footprints for both cities avoid any direct impacts to sensitive resources; all estimated impacts are the result of indirect burial.*
>
> *However, for several alternatives, potential project impacts have been identified using a conservative coastal engineering model.*
>
> *Indirect covering of vegetated rocky substrate within the near shore could result from implementation of the Project at the Solana Beach receiver site, requiring mitigation consisting of providing additional rocky substrate in the near shore that can be vegetated, as well as monitoring to record effects and whether any unexpected adverse effects occur. Sand introduced into the system could indirectly impact up to 6.8 acres of marine biological resources (benthic habitat) as a result of burial or degradation of sensitive habitats and resources, under the low sea level rise scenario. Mitigation in the form of a 13.6-acre artificial reef would be required.*

The Commission notes the Corps' acknowledgement in the *Feasibility Study* and in the revised consistency determination that the proposed project will lead to temporary adverse effects on some marine habitat and resources, and in particular to nearshore reef habitat and other offshore areas that could be buried from sand washing off the beach and into the nearshore zone, and potentially to the offshore borrow sites as a result of dredging to supply beach nourishment materials. Correspondence received by the Commission outlining potential marine resource impacts is provided in **Exhibit 13**. While the location, permanence, and significance of these impacts will vary depending on numerous factors, the Corps has committed in the consistency determination to implementing mitigation measures (discussed below) where and when they are deemed required, based on the interagency coordination to be conducted and on the final monitoring and mitigation programs to be developed and included in the project. Those mitigation measures will be designed to reduce any net adverse impacts to a level of insignificance.

Monitoring. The revised consistency determination examines the proposed marine resource and habitat monitoring program:

> *Prior to the implementation of construction of the project, the extent of reef habitat and vegetation throughout and adjacent to the entire predicted equilibrium footprint will be mapped using remote sensing techniques such as multi-spectral aerial photography and/or interferometric side scan sonar. Multi-spectral aerial photography utilizes an airplane to capture multispectral reflectance characteristics that allow the identification and separation of various bottom substrates and vegetation, while interferometric side scan sonar is a type of technology used to interpret seabed features, material, and textures from acoustic backscatter response intensity, as well as, bathymetry. When the techniques are combined, data sets include bathymetry, bottom substrate type, and vegetation type information. Results from similar methodologies were used for this study to provide the baseline data*

(i.e., SANDAG 2002), and the proposed mapping provides the most cost-effective approach for surveying the large study area. This pre-construction monitoring is to establish baseline conditions to compare post-construction conditions against. All data would be geo-rectified, and habitat types digitized as a theme over an aerial image to calculate the coverage of various habitat types and show its distribution. Diver surveys would also be conducted to ground truth or verify remote sensing data. The diver surveys would be at a level appropriate to effectively ensure that data were representative (e.g., 20 random locations for each substrate or habitat type). The proposed mapping would be repeated during years one and two post-construction to determine what long-term impacts result from the project that require mitigation. Based on the data collected, a decision will be made as to whether, and to what extent, mitigation is necessary.

Pre- and post-construction monitoring of the nearshore environment will be conducted to allow for identification of project-related impacts for purposes of delineating mitigation requirements. Given the high degree of sediment transport that occurs in the nearshore zone, sampling at control sites would provide some level of natural variability. By sampling control sites, any change in the sediment cover could be put into a regional/local perspective, and natural variation taken into account. If this was not measured, any increase in sediment cover in the project area would have to be considered project related. This is especially helpful if there is a reduction in surf grass at the project site that may be the result of a natural decline (measured at the reference area) and not a project impact.

Any loss of nearshore rocky reef or surf grass habitat based on Year 2 monitoring results would require mitigation.

While the analysis relies on modeled impacts, actual impacts would be assessed by implementation of a construction monitoring program using established and agreed-upon methods, including use of control sites. Mitigation for indirect nearshore impacts would be triggered only if certain conditions occur during, and persist through, the two year post-construction monitoring period. Because the monitoring program will be used to assess and evaluate actual impacts, some temporal loss of habitat, if impacts were to occur, is unavoidable. Recovery of impacted habitats may also occur as sand is redistributed within the littoral cell; some observed burial of reef or surfgrass habitat would be temporary because sand would be expected to move out of the project area. The two-year post-construction period was established in coordination with the National Marine Fisheries Service and the California Department of Fish and Wildlife to allow sand to equilibrate in the study area.

The general approach for assessing impacts is similar to that used to identify potential project-related impacts to eelgrass as per the Southern California Eelgrass Mitigation Policy (SCEMP; NMFS 1991) and the monitoring protocol used for the RBSP [Regional Beach Sand Project] (Engle 2005). The project area and control site(s) will be surveyed prior to construction, and two years following construction.

> *Given the relatively high natural variation, multiple control sites will be sampled. Potential control areas, chosen for their similarity to potential impact sites, in the general project area include North Carlsbad (in the vicinity of Tamarack Boulevard) and South Carlsbad (north of Palomar Airport Road). Pre-construction (baseline) areal coverage will be compared to Year 2 (post-construction) areal coverage, taking into account any natural variation at control areas to identify potential project-related impacts.*

The expected monitoring schedule includes pre-construction baseline monitoring during the year prior to construction (spring and fall surveys), and post-construction monitoring two years following completion of construction (spring and fall surveys), for both initial nourishment and future renourishment events. The final monitoring plan will be prepared during the pre-construction engineering design phase of the project in consultation with the resource and regulatory agencies, including the Commission.

In addition, the Corps has also incorporated a "borrow site monitoring plan" into the revised project, in order to address concerns, articulated by the Commission in its objection to the previous consistency determination (CD-003-13), and noted by others commenting on the project (e.g., **Exhibit 13**, letter from D. Lees) regarding the potential adverse cumulative effects on benthic and infaunal communities at the project's offshore borrow sites:

> *Prior to the start of project construction, the USACE will submit a borrow site monitoring plan to the Commission's Executive Director for review. The plan will include measures to document the actual areas dredged during each nourishment project, the biological community affected, and the physical and biological temporal changes, including physical (multibeam sonar) and biological (benthic and infaunal sampling) monitoring of the borrow sites and nearby reference sites. The plan will include provisions for pre- and post- dredging surveys of all borrow areas used during nourishment projects. Prior to the start of construction of the first phase of the dredging and nourishment project, the plan will be reviewed by representatives from the California Department of Fish and Wildlife, National Marine Fisheries Service, and the Commission.*

Mitigation Measures. Given the acknowledgement by the Corps that the proposed project would, if conducted without any mitigation, adversely impact marine biological resources (albeit only by replicating a natural influx of sediment), the *Feasibility Study* includes a proposed mitigation measure for this impact and a preliminary biological mitigation plan (**Exhibit 14**):

> *Due to inherent uncertainties associated with estimating impacts based on model predictions, a monitoring program would be implemented to assess actual impacts two years following construction. Mitigation would be triggered only if certain conditions occur during, and persist through, the two year post-construction monitoring period. The two-year post-construction was established in consultation with the National Marine Fisheries Service and the California Department of Fish and Game* [now Wildlife] *to allow sand to equilibrate in the study area and to prevent mitigating for*

short-term impacts. ***The final mitigation and monitoring plan will be prepared during the pre-construction engineering design phase of the project in consultation with resource and regulatory agencies.*** [Emphasis added.]

. . .

If mitigation were required based on results of the post-construction monitoring, rocky reef and surfgrass mitigation shall each be conducted at a 2:1 functional equivalent as discussed in Appendix H. Because it will take at least two years to identify impacts, some temporal loss of habitat, if impacts were to occur, is unavoidable. Recovery of impacted habitats may also occur as sand is redistributed within the littoral cell; some observed burial of reef or surfgrass habitat would be temporary because sand would be expected to move out of the project area. Additionally, if impacts were to occur, future beach fills would be modified to avoid future impacts.

Mitigation would be implemented in the project area at sites to be determined in consultation with the resource and regulatory agencies*. Since potential impacts were identified under all alternatives for Solana Beach (except for the Alternative SB-3 - No Action), potential mitigation areas offshore of Solana Beach were identified (approximately 26 acres) and includes areas that consist primarily of sandy bottom habitat Figure 5.4-9* [**Exhibit 15**]. *No estimated impacts were predicted for Encinitas under all proposed alternatives, and therefore no potential mitigation areas were identified offshore of Encinitas.* [Emphasis added.]

The revised consistency determination provides additional details on the proposed reef habitat Mitigation and Monitoring Plan (MMP):

The Project, as described above, avoids direct impacts to nearshore habitat, and it includes mitigation for indirect burial of nearshore rocky reef habitat in the Solana Beach segment, in accordance with a biological monitoring and mitigation plan. While the Project cannot reasonably avoid all indirect impacts to sensitive nearshore habitat while reducing coastal storm damage reduction and increasing life safety, the impacts are reduced under the revised Project compared to the previously proposed Project, and feasible mitigation measures are included. Mitigation will be based on the results of the monitoring program.

If post-construction monitoring identifies impacts attributable to the project, rocky reef mitigation would be conducted at a 2:1 functional equivalent to the area of reef affected as discussed in Appendix H of the Integrated Report.

Mitigation would be implemented in the project area at sites to be determined in consultation with the resource and regulatory agencies. Since potential impacts were identified under all action alternatives for Solana Beach, potential mitigation areas offshore of Solana Beach were identified (approximately 26 acres) and include areas that consist primarily of sandy bottom habitat, see Figure 5.2-4. No estimated

impacts were predicted for Encinitas, and therefore no potential mitigation areas were identified offshore of Encinitas.

Reef habitat mitigation shall consist of shallow-water, mid-water, or deep-water reef, with mid-water reef prioritized as most similar to the reef impacted by the Project. Shallow water reef would be used for any surfgrass mitigation, mid-water reef would be located inshore of the existing kelp beds, and deep-water reef would be located offshore of the existing kelp beds.

Mid-depth reef would be constructed at sites shown on Figure 5.2-4 at approximately -30 ft MLLW and is the preferred reef mitigation as it is closest to in-kind replacement. Mid- and deep- water reef shall be constructed similar to the SCE [Southern California Edison] Wheeler North Reef constructed as mitigation for the impacts of the San Onofre Nuclear Generating Station.

Deep water reef would be constructed at approximately -40 ft MLLW along the outside edge of the existing reefs. Mitigation using a deep water reef is proposed at a 1.5:1 functional equivalent owing to the higher habitat value for deep water reefs and easier construction in deeper water that is closer to the SCE Wheeler North Reef. This reef would only be constructed if insufficient area of mid-depth reef were available to fully mitigate for observed losses to rocky reef habitat.

In the event of surfgrass impacts and associated mitigation, shallow-water reef would be constructed inshore of the mid-depth mitigation sites shown on Figure 5.2-4 in water shallow enough to support surfgrass. The top of the constructed mitigation reef would be at a final top elevation of -10 to -14 ft MLLW and deep water reef would be constructed at approximately -40 ft MLLW along the outside edge of the existing reefs. Shallow-water reef shall be constructed with a final top elevation of -10 to -14 ft MLLW. Construction of a reef that is shallower than that is not proposed because construction methods would not be practical (e.g., a barge with the reef construction materials would not be able to operate in very shallow water). Although the surfgrass mitigation reef would be deeper than the impacted area, if surfgrass transplants are successful, the slightly deeper reef would replace the lost surfgrass resource.

Although several studies currently are being conducted to determine how to successfully transplant surfgrass and may show potential for success, success rates to date have not been consistent (Reed and Holbrook 2003, Reed et al. 1999). Due to the absence of an established, successful method for mitigation of surfgrass loss, proposed mitigation currently is focused upon restoration of the rocky reef that surfgrass currently uses as habitat. However, as previously described, if it is determined that surfgrass has been affected by the project and a change is shown not to be due to natural variation, an experimental surfgrass transplant shall be implemented. If the in-kind surfgrass mitigation is unsuccessful, as further described in the Integrated Report and consistent with the MMP, the USACE would proceed to

out of kind mitigation after providing the approach to the Executive Director and considering any comments.

The mitigation for nearshore impacts after the first nourishment event would provide permanent mitigation for any recurring temporary impacts to those resources. Initial fill volumes are substantially larger than renourishment events. Impacts from renourishment events are primarily ones of maintenance and are not new impacts. Maintenance impacts are the continuance of impacts from the original fill event rather than allowing the area to recover following a one-time nourishment event.

The final mitigation and monitoring plans will be prepared during the pre-construction engineering design phase of the project in consultation with resource and regulatory agencies. If mitigation is implemented, mitigation monitoring would also be conducted.

Responding to concerns articulated by the Commission in its objection to the Corps' previous consistency determination (CD-003-13), the Corps has included the following measures into the revised project's Mitigation and Monitoring Plan (MMP) to further ensure maximum protection of marine biological resources during the 50-year life of the project:

The final Mitigation and Monitoring Plan (MMP) shall assure: (a) that biological monitoring of all offshore potential impact areas shall be for a minimum of 1 year pre-construction and 2 years post-construction; (b) that monitoring and analytical methods are adequate to identify and accurately measure all short- and long-term impacts from all aspects of the dredging and nourishment effort; (c) that appropriate mitigation sites are available to address potential impacts; and (d) that the success criteria and analytical methods used are adequate to demonstrate a difference between impact/mitigation site and control sites and shall include the following:

(i) Clear and specific identification of the potential impact areas that will be monitored before and after the beach nourishment efforts, including intertidal reef and nearshore reefs, and change criteria that will be used to establish thresholds of impacts for mitigation;

(ii) Schedule and frequency of monitoring efforts and monitoring reports;

(iii) Discussion of the monitoring and analytical methods that will be used to evaluate the sites based on the change criteria for both short- and long-term impacts;

(iv) Delineation and characterization of the potential mitigation sites that will be used if short- or long-term impacts are identified that meet the threshold triggering the mitigation requirement;

(v) Clear and specific criteria for identifying impacts and for evaluating the success of any necessary mitigation. If statistical tests are proposed, then the plan must specify biologically meaningful effect sizes (i.e., a difference between the control and the impact site, or between the control and the mitigation site) and specify alpha and beta, with alpha equal to beta. The field sampling plan must include sufficient replication to provide a statistical test with at least 80% statistical power (beta=0.2) to detect an effect of the stated size with alpha = 0.2. The proposed replication must be based on preliminary sampling data and a statistical power analysis. Smaller alpha and beta may be used. Alternatively, in the absence of a statistical analysis, project impacts will be measured as the change in the average metric of interest (e.g., area or density) at the potential impact site relative to the reference site. Prior to the start of construction, the USACE shall develop a quantitative sampling and analysis plan in cooperation with the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife, Commission staff, and the USACE Engineering Research and Development Center (ERDC). This plan will include clear criteria to determine whether impacts to natural resources have occurred and whether any necessary mitigation has been successful. Such determinations will not be based simply on "best professional judgment."

(vi) Identification of the control or reference sites that will be used and the results of a preliminary field sample at both control and potential impact sites demonstrating that the control sites are appropriate.

To continue to work cooperatively throughout the final project planning and construction phases, the USACE will provide a copy of the final MMP to the Commission's Executive Director for review, prior to commencement of construction of the first phase of the dredging and nourishment project. The USACE will carefully consider all comments by the Executive Director and will make all reasonable efforts to ensure that the concerns expressed are resolved and any necessary revisions incorporated prior to each construction phase. Any significant disagreement between the USACE and the Executive Director will be brought before the Commission for a public hearing.

Also in response to Commission concerns, the Corps included in the revised project the following measure which clarifies the use of out-of-kind mitigation should such a project be proposed:

<u>Out-of-Kind Mitigation</u>. For any biological mitigation shown necessary by monitoring, the USACE will not proceed to implement any out-of-kind mitigations (e.g., using kelp habitat to mitigate surfgrass impacts, or providing mid-water habitat to mitigate for shallow-water habitat impacts) without first undertaking in-kind mitigation consistent with the MMP. If the USACE later concludes that such in-kind mitigation is infeasible (i.e., failure), it will proceed to the approach for out-of-

kind mitigation consistent with the MMP and will provide the approach to the Executive Director for review. The Corps will carefully consider all comments by the Commission's Executive Director and will make all reasonable efforts to ensure that the concerns expressed are resolved and any necessary revisions incorporated.

Questions were raised by state and federal resource agency staff regarding the adequacy of the above-referenced mitigation plan should monitoring document that the project has adversely affected nearshore reefs (**Exhibits 16-20**). The Corps confirmed to Commission staff that based on the functional equivalent methodology undertaken for the project, the acreage of rocky reef habitat that is determined adversely affected (based on the monitoring results at the end of the second year after completion of initial beach nourishment) would be mitigated by the construction of twice that acreage figure at a mid-depth mitigation area (i.e., at a 2:1 acreage ratio). If mitigation is also needed for effects on shallow water or deep water areas, the acreage of that required mitigation would be adjusted.

The Corps also agreed to incorporate into the revised project additional protective measures for the California grunion, California least tern, and Western snowy plover:

California Grunion. The Project will monitor and avoid potential impacts to grunion in the entire construction area which may include areas beyond the beach sand placement footprint. Most of the equipment would be located above the mean high tide line. During the pre-construction surveys prior to all predicted runs in construction years, surveys will be conducted to assess the potential for suitable grunion spawning habitat (any beaches with a dry beach at spring high tide levels) and will include the placement footprint plus all adjacent beach area including beach access routes, construction staging areas, pipelines, pumps and other equipment or construction activity to minimize potential effects on grunion. Project Staff will also review available literature to address flexibility over the 50-year life of the Project.

The season for grunion is identified as March 15 to September 1. Beach fill sites shall be surveyed for suitable grunion spawning habitat by March 1 to allow for agency coordination of results. Should beach fill occur during the California grunion spawning season, those suitable habitats would be monitored during scheduled grunion spawning runs for grunion spawning in construction area, where practicable establish a buffer extending 100 feet upcoast and downcoast (total 200 feet), until eggs hatch (minimum of one lunar month) and surveys show no subsequent spawning.

California Least Tern. The federal- and state-listed endangered California least tern is known to nest at Batiquitos Lagoon, north of Encinitas. Nesting at San Dieguito Lagoon (south of Solana Beach) was observed for the first time in 2013 since the lagoon was restored in 2008. Least terns may return to San Elijo Lagoon (between Encinitas and Solana Beach) in the future after planned restoration. Least terns forage in nearshore waters as far as five miles away from their nesting sites, although they generally remain within one mile. Least terns use currently the beaches in the

project area for foraging. As a result, over the 50-year life of the project, there could be increased least tern nesting and foraging near the project area. The Corps will work to obtain accurate baseline foraging information and to document measures to be included in the project that will minimize construction period turbidity in offshore waters. It is in the best interest of the project to keep dredged sand on the beach and this is accomplished by building shore-parallel sand berms that allow the water to drain and leave the maximum amount of sand behind. This method also reduces turbidity relative to standard discharge methods.

Western Snowy Plover. The federal-listed threatened Western snowy plover is known to nest at Batiquitos and San Elijo lagoons, forage along the shoreline north and south of the proposed receiver beaches at Encinitas and Solana Beach, and overwinter on a section of beach near Highway 101 north of the Seaside parking lot at Cardiff State Beach.

Prior to each renourishment event, all areas to be used for construction activity shall be surveyed for the presence of western snowy plover. If snowy plovers are present, the USACE will coordinate with the US Fish and Wildlife Service to avoid impacts and monitor effectiveness and compliance for those areas that the Corps is unable to avoid, and the Corps will avoid to the maximum extent feasible those areas occupied by western snowy plover. It is likely that at the time of renourishment the beaches would not be suitable habitat; however this will be confirmed prior to any on-beach construction activities for each of the renourishment events.

Commission Analysis of Project Conformance with Marine Resources, Beach Nourishment, and Dredging and Filling Policies. The Corps has confirmed that the proposed coastal storm damage reduction project and the associated beach nourishment holds the potential to create adverse effects on sensitive marine habitat. To ensure that those effects do not result in a net degradation of marine resources in the areas of concern, the Corps has proposed preliminary monitoring and mitigation programs as described above. Development of such programs is challenging for a number of reasons, but the Corps' revised project, including incorporation of the Commission's suggested measures to reduce project impacts on marine resources, addresses those challenges. The revised monitoring and mitigation plan is an improvement over the original submittal. The predicted level of impact on nearshore reef habitat is derived from the results of previous beach nourishment projects in southern California and from modeling that the Corps acknowledges is subject to "inherent uncertainties." The predicted maximum 6.8 acres of impact to nearshore reefs off Solana Beach and no impacts to surfgrass beds in the project area are only estimates, and the location of reef impacts cannot be identified other than that they will occur within the offshore area out to the depth of closure. The extent of potential project impacts on this habitat will not be confirmed until monitoring undertaken during the first two years after beach replenishment is completed and analyzed.

It is essential that the monitoring program be designed to accurately record project impacts as this program will affect the development and implementation of the final mitigation plan. The

Corps' draft plan was reviewed by the Commission during its review of the previous consistency determination for the project (CD-003-13); the Corps modified the plan to incorporate measures suggested by the Commission that would further increase protection of marine resources. The Corps has also committed to preparing the final monitoring and mitigation plan in continued consultation with state and federal resource agencies, including Commission staff. This will be a challenging task given some areas of disagreement between the state and federal resource agencies and the Corps regarding the current estimation of project impacts to the marine environment and the adequacy of proposed mitigation measures. The issues of concern, expressed by these agencies in letters to the Corps commenting on the *Feasibility Study* earlier this year, include accuracy of the impact assessment methodology used by the Corps; accuracy of predicted impacts to rocky reef habitat and in particular a finding that there would be no impacts to surfgrass; adequacy of reef and surfgrass mitigation strategies; and impacts to benthic invertebrates and the permanent alteration to seafloor topography at the offshore sand borrow sites. However, progress has been made to address these issues and the Corps has committed to continued coordination with the resource and regulatory agencies in the development of the final monitoring and mitigation plans prior to the start of project construction. To that end, and as noted above, the Corps has already agreed to incorporate the Commission's additional marine resource protection measures into the final Mitigation and Monitoring Plan. The Commission expects that continued coordination among the resource and regulatory agencies will result in a successful resolution of the remaining biological monitoring and mitigation issues associated with the project.

The Commission finds that potential project impacts have been further minimized or avoided by the Corps in its revised consistency determination through several project modifications suggested by the Commission during its earlier review of the consistency determination for the previous project (CD-003-13). The reduction by 50 percent in both the volume of sand to be placed, and the beach width to be constructed, on the Encinitas shoreline segment, should reduce the movement of sand from this segment offshore into the Swami's State Marine Conservation Area (SMCA) and reduce potential adverse effects on the marine resources of this SMCA. While some volume of sand will likely move offshore into the SMCA (and back onshore as well as a result of coastal processes and storm events), as the beach reaches an equilibrium state during the two years after nourishment is completed, such sand movement is similar to naturally occurring events. As noted earlier in this report, this SMCA was established with the understanding that beach nourishment and sediment management activities would be allowed to continue within this SMCA, as long as any required federal, state, and local permits or as otherwise authorized by the California Department of Fish and Wildlife were obtained. In addition, the shoreline and biological monitoring programs included in the revised project will provide the Commission (and the other resource and regulatory agencies, as well as other interested parties) with the technical information needed to determine the level of project-related impacts, if any, to the resources of the SMCA, and the need for any mitigation of those impacts.

Concerns were previously raised by the Commission and others about potential downcoast movement of sand from the Solana Beach nourishment segment into the mouth of Los Penasquitos Lagoon. This could potentially interfere with tidal flows entering and exiting the lagoon and adversely affect marine and terrestrial habitat and dependent aquatic and upland

species (evidence for which can be found from the effects on the lagoon entrance from a 2012 upcoast SANDAG beach nourishment project). The Corps has agreed to incorporate into the revised project two additional shoreline monitoring transects north of Los Penasquitos Lagoon. This additional monitoring during the five years after the initial nourishment event will provide useful information as to whether the proposed project contributes to adverse changes in tidal function at Los Penasquitos Lagoon. The expanded monitoring of the offshore borrow pits agreed to by the Corps (as described earlier in this section of the report) will provide critical information to the resource and regulatory agencies as they evaluate potential adverse cumulative effects on marine habitat at these sites from proposed project dredging and from dredging for past and future regional beach nourishment projects sponsored by local and/or regional governments.

The Commission agrees with many of the resource and regulatory agency concerns regarding the potential adverse project effects on biologically sensitive nearshore reef habitat from the creation of wide sandy beaches in the project area. The uncertainties associated with this project, due in large measure to the fact that marine resource impact analysis is based primarily on modeling, make it difficult to accurately predict project impacts. Other factors that complicate the effort to accurately identify and quantify project impacts include the 50-year time period of the subject consistency determination, the large geographical extent of this project, the large volumes of sand to be dredged and placed on the shoreline, the widths of beach to be constructed, the potential adverse impact of sea level rise on the project area over the 50-year time period, the uncertainties noted by the Corps in determining the exact location and severity of project impacts, and the uncertainties in obtaining consistent and adequate funding for mitigation measures throughout the 50-year program time period. Regarding project funding, the Commission notes that when it reviews future renourishment events, the provision by the Corps of continued and adequate funding for all monitoring and mitigation work associated with previous and future nourishment events must be concurrent with funding for dredging and beach nourishment in order for the latter work to remain consistent with the marine resource policies of the California Coastal Management Program. Any lack of such funding for monitoring and mitigation would be immediate grounds for the Commission to invoke the reopener clause of 15 CFR §930.45 and 930.46 of the NOAA federal consistency regulations.

However, the revised project has reduced the potential for adverse effects on marine habitat and the biological productivity and healthy populations of marine resources due to the reduced sand volume placement and beach widths. It has also incorporated improved monitoring and mitigation programs due to the incorporation of Commission measures, continued Commission staff participation in the multi-agency effort to develop the final monitoring and mitigation plans, and the provision for Commission review of future nourishment events. The project includes adaptive management measures to provide for evaluation of the aforementioned elements and, if needed, modifications to the project should they be required to address future adverse project impacts.

When monitoring results from the SANDAG Regional Beach Sand Project II (RBSP II) are published (initial beach nourishment phases were completed in 2012), the Commission staff will review that information to determine whether the beach nourishment projects at three sites in

Encinitas and one site in Solana Beach resulted in impacts to marine resources. If those RBSP II monitoring results indicate that the proposed Corps dredging and nourishment project could potentially lead to habitat impacts not anticipated in the *Feasibility Report* and consistency determination, the Corps has agreed it will work with Commission staff and the other resource and regulatory agencies to determine whether any further changes to the project (prior to the start of construction) are needed in light of those RBSP II monitoring results

As noted earlier in this report, if the monitoring results after the first two years of nourishment (the date at which mitigation requirements for habitat impacts will be determined) indicate resource impacts occurring that were not anticipated in the *Feasibility Study*, the Commission can "re-open" this consistency determination (under federal consistency regulations 15 CFR §§ 930.45 and 930.46) to determine whether the project remains consistent with the Coastal Act and whether any project modifications are necessary.

The Commission agrees that the revised project would benefit the general public and private property owners with the creation of wide sandy beaches within the Encinitas and Solana Beach project segments. Construction of wider sandy beaches where none currently exist would provide habitat for invertebrates, grunion, the Western snowy plover, and the California least tern. The proposed project could also reduce (but not eliminate completely) the demand for shoreline armoring, which in turn would lead to the protection of more natural coastal processes and habitat formation. The proposed project is no longer the maximum NED project but instead is one that results in reduced sand placement volumes, reduced beach widths created, reduced levels of coastal storm damage reduction, reduced adverse effects to marine resources, and improved monitoring and mitigation programs.

The Commission acknowledges that the following modifications to the project were made by the Corps in response to the concerns articulated by the Commission during its objection to the previous version of the project (CD-003-13). The revised project includes:

- A reduced volume of sand and narrower constructed beaches at Encinitas and Solana Beach to minimize potential adverse impacts on sensitive nearshore habitat and on the Swami's SMCA, which in turn would reduce project mitigation requirements;

- Provisions for periodic review by the Commission of future renourishment projects to ensure that project assumptions made at this time regarding impacts to marine resources can be reexamined in light of future environmental conditions (including sea level rise), monitoring results, and mitigation efficiency, which would address some of the impact and mitigation uncertainties that currently exist due to the 50-year life of the program;

- Provisions for Executive Director review of the final biological mitigation and monitoring plans, the turbidity monitoring plan, the stormwater pollution prevention plan, the oil spill prevention and response plan, and the shoreline monitoring plan;

- Detailed biological mitigation and monitoring plans to ensure adequate identification of project impacts and development of adequate mitigation;

- Detailed storm water pollution prevention plan to ensure protection of marine water quality during construction;

- Submittal of all monitoring reports to the Executive Director upon publication;

- Provisions for Executive Director review of out-of-kind mitigation projects should in-kind mitigation be determined infeasible;

- Dredging at the offshore borrow sites will occur only in water no shallower than -40 feet mean lower low water in order to remain outside the depth of closure and avoid impacts to littoral systems;

- Provisions for Executive Director review of the offshore borrow site monitoring plan to ensure adequate evaluation of project impacts on dredged areas throughout the life of the project; and

- Shoreline and biological monitoring of the geographical area between the Encinitas and Solana Beach project segments in order to document potential project impacts in this location.

In conclusion, and with the aforementioned project modifications, the Corps' revised 50-year coastal storm damage reduction program includes reduced sand volumes and beach widths which will minimize the potential for adverse effects on marine resources offshore of Encinitas and Solana Beach. The Commission finds that the program is designed to minimize and avoid adverse impacts to marine resources, and includes measures necessary for protection of marine resources throughout the life of the 50-year program, such that the net effect of the project will maintain the biological productivity and healthy populations of marine resources consistent with Sections 30230 and 30231. The Commission finds that the project is an allowable use under Section 30233, is the least environmentally damaging alternative, and includes adequate mitigation. In sum, the Commission finds that with the modifications that the Corps made to the project subsequent to the Commission's objection in July 2013 to the original project (CD-003-13), the program is now consistent with the marine resources, beach nourishment, and dredging and filling policies of the Coastal Act (Sections 30230, 30231, and 30233).

C. PUBLIC ACCESS AND RECREATION.

The Coastal Act states:

> *Section 30210. In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Section 30211. Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Section 30212

(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (l) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby...

Section 30213. Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred....

Section 30220. Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

Project Area Access and Recreation Resources. The *Feasibility Study* states that one of the purposes of the proposed project is to "restore beaches along the shorelines of the cities of Encinitas and Solana Beach." Ongoing beach erosion results in reduced recreational use of the shoreline and hazards to visitors due to wave attack at the base of the bluffs and the proximity of visitors to the bluffs on narrow beaches. One of the planning objectives used by the Corps to direct formulation of project alternatives is the need to:

Reduce coastal erosion and shoreline narrowing to improve recreational opportunities for beach users within the study area throughout the period of analysis.

In addition, the planning constraints specific to the selection of a proposed project are:

- No adverse impacts to the aesthetics along the shoreline.
- Maintain public access to the beach.
- Preserve the recreational opportunities within the study area.
- Preserve the environmental resources within the study area.

The beaches in the project area are heavily used year-round, and the Corps reports that more than 2.8 million visits took place in 2012. Recreational opportunities are facilitated by a series of state, county, and local parks that provide public access to the shoreline and a variety of recreational opportunities, including beachgoing, sightseeing, surfing, body-boarding, snorkeling, tide-pooling, fishing, and skin and SCUBA diving. However, recreational use of the shoreline is currently limited by the narrow beaches, wave run-up that limits access during high tides, cobble and exposed sandstone rather than sandy beaches, and hazards from potential bluff collapse.

The *Feasibility Study* describes the recreational opportunities present in the proposed beach nourishment segments within both cities:

> *Recreational opportunities within Encinitas receiver site include Stone Steps, which is a popular spot for surfing and fishing. It can be accessed from a public stairway. It also includes Seaside Gardens County Park and Moonlight State Beach. This part of receiver site can be accessed from the north at the stairway at Stone Steps and from the south by the Moonlight State Beach parking area at C Street. Access along the beach is dependent upon tidal stage (SANDAG 2011a).*
>
> *Tide Beach Park and Fletcher Cove Park are located within Solana Beach receiver site. Tide Beach Park can be accessed by a public stairway down the bluffs. Reefs occur at the north end of the receiver site at Table Tops and to a lesser extent at Tide Beach Park. Table Tops is a popular tidepool, fishing, skin and SCUBA diving, and surfing spot. Access to these reefs and Tide Beach Park also is available from the parking area at the south end of Cardiff State Beach. They also can be accessed from the south starting at Fletcher Cove. Stairways to the beach are located at North Seascape Surf Beach Park, near the middle of the receiver site, and Del Mar Shores near the south end of the receiver site. Access along the beach is dependent upon tidal stage. Table 4.13-2 presents a list of the beaches in the project study area.*
>
> *Surfing is the recreational act of riding breaking waves and is an important part of the local culture. Within the project area, the surf site known as Swamis was made popular by The Beach Boys in their 1963 musical hit, "Surfin USA". Waves can be ridden using various equipment such as surfboards (e.g., longboards and shortboards), stand up paddle boards, body boards, boogie boards, wave skis, kayaks, sailboards, and kiteboards. In the project study area, surfing is most often defined as riding waves on longboards and shortboards (USACE 2012a). Table 4.13-3 lists the surf sites within Encinitas and Solana Beach.*

As described previously in **Sections III.A** and **III.B** of this report, the beaches in the project area have been severely eroding since the 1980s. While the primary purpose of the project is to reduce coastal storm damage from wave attack at the base of the bluffs and subsequent bluff failure, the sand nourishment of the two shoreline segments in Encinitas and Solana Beach will concurrently enhance and protect public access and recreation by expanding the width of the sandy beaches, allowing beachgoers to recreate further seaward of eroding bluff faces, and potentially reducing the need for additional armoring along these shoreline segments. The Corps states that the additional sand placed on the two shoreline segments would not result in conditions that exceed the historic beach profile conditions and would thereafter become part of the natural variable littoral system.

As described previously in **Section III.A**, the Corps examined the proposed beach widths in the context of historic beach width ranges at both Encinitas and Solana Beach. Beach widths along these shorelines vary substantially over time according to wave climate, tides, and the season. **Exhibits 4 and 6** illustrate the proposed mean beach profile as compared to

the projected without project profile, the envelope around the extensive profile monitoring undertaken by the Corps, SANDAG and the Cities between 1983 and 2010, and the "Historic Maximum Sand Level (1983-2012)" representing the highest sand level along the profile for this time period. The consistency determination compares the historic beach widths with the proposed project's beach widths:

> *The beach widths presented in the Project are defined at Mean Sea Level (MSL), meaning that it does not represent a dry beach width. In the most recent beach profile monitoring report (prepared by Coastal Frontiers covering the period Fall 2000 to Fall 2012), MSL beach widths at Moonlight in Encinitas have ranged from 124 feet to 271 feet. The beach profile monitoring report (Coastal Frontiers covering the period Spring 1996 to Fall 2011) shows MSL widths at Fletcher Cove has ranged from 90 to 171 feet.*
>
> *The Segment 1 (Encinitas) target MSL width is 160 feet and the mean Project profile is within the 1983-2010 envelop of measured profiles (Figure 4.8-1).* [**Exhibit 4**]
>
> *The Segment 2 (Solana Beach) target MSL width is 220 feet and the mean Project profile is slightly above the 1983-2010 envelop and matches the historical beach maximum at the MSL elevation (Figure 4.8-2).* [**Exhibit 6**]

The significant public access and recreation benefits associated with the proposed project are accompanied, however, by potential adverse effects on public access and recreation, including sand nourishment occurring during the summer season, construction activities on the beach at and near the point of sand discharge, and short-term increases in turbidity in nearshore waters. Most significant, however, are possible changes to surfing sites due to the potential over time for sand placed on the beach to migrate and bury offshore reefs which provide unique surfing opportunities along this stretch of San Diego County shoreline.

Project Construction Impacts. The *Feasibility Study* examines potential construction-related project impacts in the Encinitas shoreline segment:

> *The construction activity at the Encinitas receiver site would continually progress down the beach. Recreational activities such as surfing and fishing, as well as other beach activities would be less accessible during the period of construction. Under both low and high sea level rise scenarios, approximately 150-325 ft of the receiver site would be inaccessible to the public around the discharge pipeline and berms. In addition, there would be intermittent restrictions on public access for approximately 350 ft on either side of this discharge zone. This space would be needed for maneuvering heavy equipment during construction of the temporary berms and for relocating discharge pipelines. The access restriction would result in a temporary redistribution of beach activities to the adjacent areas, or other portions of this receiver site. However, as the daily construction effort continues to travel down the beach, the public accessibility would also change and only result in temporary construction effects . . . The sections of the receiver site restricted would be relatively*

> *small and construction would be managed to accommodate planned activities. Long-term, a beneficial impact would result from the increased sand and wider span of beach area, increasing the amount of usable recreation area, as well as safeguarding the bluff face and stairway. Construction staging for equipment and crew is proposed at Moonlight Beach, which would result in intermittent placement of heavy equipment and crew parking. Moonlight Beach provides restrooms, showers, snack bar and picnic tables and is popular for surfing, fishing and other uses which would only be impacted during sand replenishment for that portion of the project. Otherwise, those amenities would remain open, even with staging activities. 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. 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.*

The *Feasibility Study* reports that the construction restrictions identified above for the Encinitas shoreline segment also apply to the Solana Beach segment. Expected construction staging effects at Solana Beach are as follows:

> *Construction staging for equipment and crew is proposed at Fletcher Cove and South Cardiff. The Fletcher Cove amenities of restrooms, showers, picnic tables, basketball and volleyball may be closed periodically during sand nourishment. Access and activities impacted include Table Tops tidepool and Beach Park. The existing narrow accessibility of the beach is dependent on tidal stage. Under both low and high sea level rise scenarios, nourishment activities would require daily closure of approximately 200 ft of receiver site. Construction and special events or activities schedules would be coordinated; and ample notice would be given to potentially affected groups. If the affected groups are not able to temporarily move the activities to an adjacent location, then construction would be required to be rescheduled around these special activities. The sections of the receiver site restricted would be relatively small and construction would be managed to accommodate planned activities. Therefore, implementation would not result in substantial loss or interference of recreational activities during construction.*

The *Feasibility Study* addresses potential impacts from turbidity increases during project construction:

> *Turbidity would be generated by the project, which could result in temporary impacts to water clarity as discussed in Section 5.3. 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.*

The Corps reports that offshore dredging and sand placement would last approximately 62 days at Encinitas and 107 days at Solana Beach**,** and that these activities might occur

partially within the summer recreation season. In response to a Commission staff inquiry in early 2012 regarding the project construction schedule, the Corps has stated that due to the length of time that the initial nourishment project will take, it is not feasible for the long-term project to work seasonally and avoid the summer months. However, the Commission believes that with adequate planning, and given that project implementation would not occur until late 2015 at the earliest, the Corps should be able to avoid summertime construction as much as possible in order to minimize adverse impacts to public access and recreation. In the most recent communication from the Corps on this matter, the agency stated that if it is possible to avoid the summer months, it would work to do so but that it is currently unable to predict when project funding would be made available in the fiscal year in which the construction contract would be awarded.

To address the potential project impacts on public access and recreation due to ocean water turbidity increases during sand placement, construction staging activities at shoreline locations, and the proposed construction schedule, the Corps has incorporated the following measures into the revised project consistency determination:

> (1) submittal of the final turbidity and water quality monitoring plan (including weekly monitoring at the dredge and beach receiver sites for salinity, pH, temperature, dissolved oxygen, and turbidity/light transmissivity, and baseline monitoring prior to construction) to the Executive Director for review prior to the start of project construction;
>
> (2) submittal of the draft construction staging plan to the Executive Director for review prior to the start of project construction to ensure that: (a) staging will avoid public beaches; (b) the minimum number of public parking spaces (on and off-street) that are required for the staging of equipment, machinery, and employee parking that are otherwise necessary to implement the project will be used; and (c) staging will avoid using to the maximum extent feasible public beach parking lots, but when the use of these lots is unavoidable to implement the project, only the minimum amount of space in these lots will be used.
>
> (3) submittal of the draft construction calendar to the Executive Director for review prior to the start of project construction, which will include every practicable effort to schedule beach nourishment activities outside the peak summer recreation season in order to minimize project impacts on public access and recreation.

With these measures, the Commission finds that proposed project is consistent with the public access and recreation policies of the CCMP (Coastal Act Sections 30210, 30211, 30212, 30213, and 30220):

Surfing Impacts. As indicated above, the recreational activity that is most at risk from proposed beach nourishment, particularly in the Encinitas segment and the northern end of the Solana Beach segment, is surfing. In its reviews of beach nourishment projects in San

Diego and Orange Counties over the past decade, the Commission has required detailed monitoring of potential adverse effects on surfing. The *Feasibility Study* reports that:

> *Beginning in 2012, as part of the SANDAG RBSP II project* [Regional Beach Sand Project], *video monitoring of several surf spots will be initiated by SANDAG in conjunction with the Surfrider Foundation to establish a video-based Surf Monitoring Program.*
>
> *Utilizing technology provided by CoastalCOMS, a company which specializes in video-based coastal monitoring, this new Surfrider program will establish a baseline for surf quality at six San Diego County beaches where RBSP II beach fills are to occur, and will include daily observations of surf quality with the help of a newly-installed video monitoring system.*
>
> *Cameras monitoring the RBSP II project will create a long-term video archive, assess changes in beach width and shoreline position, and track potential changes in surf quality and "surfability." The beaches to be monitored in the project study area from south to north, are:*
>
> - *Fletcher Cove in Solana Beach;*
> - *Seaside Reef at the boundary of Solana Beach and Encinitas;*
> - *Cardiff Reef in Encinitas; and,*
> - *Moonlight Beach / D St. in Encinitas.*
>
> *Surf quality parameters will be measured from live video monitoring using analytics designed to detect breaking wave face heights, break zone activity level, and wave locations. Volunteers will also utilize CoastalCOMS software to review video archives for an assessment of conditions at each surf spot.*

In the Commission's concurrence with consistency determination CD-029-11 for the San Clemente Shoreline Protection Project (which has yet to commence constrcution, as of the date of this report), the Corps agreed to a condition that provided for monitoring of project impacts to surfing. The findings associated with that condition stated:

> *This monitoring would include direct surveys of the beach and seabed morphology to determine changes in beach and seabed morphology, define the sediment transport patterns at the shoreline, and ultimately identify the short term and long term beach erosion processes. The survey methods would consist of topographic measurements, bathymetric measurements, surf quality observations, and video stereo photogrammetric methods. Monitoring would begin one year before construction (for the surf quality observations) and continue for the 50- year period of the project. The monitoring would measure beach widths, topography, bathymetry, and surf quality (surfability).*

The *Feasibility Study* examines the surfing resources of the project area and the potential impacts from beach nourishment on surfing. Detailed descriptions of individual surfing sites are provided in Appendix B of the *Feasibility Study* and are classified geographically as located north of the Encinitas receiver site, within the Encinitas receiver site, between the Encinitas and Solana Beach receiver sites, within the Solana Beach receiver site, and south of the Solana Beach site (**Exhibits 21 and 22**). There are several well-known, iconic surf sites at (and between) the two beach receiver sites, including Stone Steps, Swami's, Cardiff Reef, Table Tops, and Pillbox. These are reef breaks (as contrasted with more frequent beach breaks) which are highly valued surf spots due to the unique waves that break over the underwater reefs at these locations. This section of the San Diego County coastline is internationally known for its surfing opportunities and this recreational activity contributes significantly to the regional economy. The Commission's analysis of potential project impacts on surfing includes (in addition to the surfing sites within the Encinitas and Solana Beach nourishment segments) surfing sites in that section of shoreline between the two project segments. This is due to the predominant downcoast littoral drift of sand in this region and the proposed beach nourishment, which in combination could adversely affect surfing locations up- or downcoast of the two beach disposal sites.

The *Feasibility Study* reports that:

> *Each reef break within the study area was analyzed with respect to Project induced changes in sedimentation. If a beach fill alternative fills in the low areas around a naturally high relief reef, this can change the way the wave breaks over the reef. A silted in reef can make a reef break behave more like a beach break, with lower breaking intensities, shorter ride lengths, lower peel angles, and more closed out conditions. For the beach nourishment options and sea level rise scenarios, changes are likely at some of the reefs.*

The *Feasibility Study* next reviewed the expected changes from the project to surf spots within and adjacent to the nourishment sites. Below are conclusions from the *Study* for several of the more iconic surf spots in the project area:

> Stone Steps
> *There are conflicting reports on whether Stone Steps is a reef or beach break. WannaSurf.com and Surf-Forecast.com state that it is beach break, but with specific break locations during large swells. It is likely that this is a typical reef-beach break with rights and lefts. From the bathymetric contours it seems that whatever reef does exist is low relief. The surf site is not as clearly defined as a classical reef break since it is generally low relief. Peaks are more shifty, similar to a beach break, but there may be some reef focusing effect from the subtle variation in bottom contours. Bottom contours are mostly straight and parallel. The nearest profile is SD-675.*
>
> *The total profile volume is greater than the profile volume standard deviation, so measurable Project induced changes to surfing at this reef are likely. Thus, this surf site would be expected to behave more like a beach break under the alternatives*

analyzed. As reefs change to more like beach breaks, the reef effect is expected to be reduced as it becomes buried by sand. For beginning surfers, who generally go straight towards shore and do not take advantage of the peeling breakers along reefs, there would be very little change to their surfing experience at Stone Steps. For other surfers, the change would likely result in reduced peel angles, more closeouts, reduced section lengths, shorter rides, and reduced surfability.

Swamis and Boneyards

Swamis is the premier surf site within the project domain. The wave peels right over a bedrock reef for up to ¼ mile during large swell. The outside reef is known as Boneyards and only breaks during the largest west swells. During smaller days, a few lefts can be found. The breaking intensity is normally semi-hollow but can be mushy during south swells and during higher tides (Cleary and Stern, 1998). Since this is a well defined reef break, with waves breaking near the same location with regularity, it is possible to determine the peel angle and ride length. An analysis of four aerial photographs spanning 2003 through 2009 revealed peel angles ranging from 52 to 65 degrees with the median being 53 degrees and ride lengths from 170 to 980 feet. The peel line and wave crests for a long period west swell occurring on January 3, 2006. Surfers can be seen floating just to the south and west of the whitewash. Typical of shallow areas with broken waves, the LiDAR measured elevation contours reveal no data over the reef and in the surf zone, so detailed wave transformation is not possible here. The deep water wave energy polar spectral plot is provided by CDIP (2011) at the 100 Torrey Pines gage for the condition shown in the figure. The year two, Project induced net change in profile volume under all alternatives analyzed are less than the profile volume standard deviation, so Project induced changes to surfing at this reef are not likely.

Table Tops

Table Tops is a hollow right reef break and is best represented by profile SD-610. The total profile volume is greater than the profile volume standard deviation, so measurable reef changes are likely. If this surf site were measurably changed to more like a reef-beach break, it is expected that the reef exposure above the sandy bottom would become less pronounced and the break would become somewhat less hollow, with lower breaker intensities. This could be considered an improvement for intermediate surfers, but would likely be a detriment to more advanced surfers. If the sand thickness were further increased, the reef could become completely buried, changing the surf site to a beach break. If this were to occur, the rather unique albeit fickle nature of this surf site would be lost, changing it to yet another beach break. Since this is currently an advanced surf site and it is far from shore, beginning surfers are not likely to attempt this surf site and would not experience any change to their surfing experience. For other surfers however this would likely result in more closeouts, shorter rides, and reduced surfability.

Pillbox & Southside

Pillbox is a right-peeling reef-beach break and the surf spot called Southside is a left-peeling reef-beach break. These surf sites are best represented by profile SD-600. The total profile volume is greater than the profile volume standard deviation, so measurable reef changes are likely. With the added sand these two surf sites would become more like beach breaks, reducing their reef tendencies. Beginning surfers would not likely experience any change to their surfing experience, but for other surfers this would result in more closeouts, shorter rides, and less surfability.

The *Feasibility Study* summarizes the overall expected impacts from beach nourishment on surfing in the project area:

- The locations of the break point of surfsites are expected to move seaward proportional to the amount of beach widening.
- Most waves at beach breaks that would have been surfable prior to project implementation would still likely be surfable after implementation.
- An overall reduction in backwash as a result of beach nourishment combined with sea level rise would likely result in an increase in the frequency in which a site would be surfable.
- Changing a surf site from a reef break to more of a beach break could reduce the surfing frequency.
- The overall frequency of surfable waves within the study area is not expected to change significantly.

The *Feasibility Study* also notes that surfing at Stone Steps and Table Tops could be affected by reduced peel angles, more closeouts, reduced section lengths, shorter rides, reduced surfability, less hollow breaks, and lower breaker intensities.

The *Feasibility Study* then concludes that the proposed project will affect reef break surfing but that these impacts will not be permanent or significant:

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 closeout 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 this project and existing beaches is not anticipated to substantially change these processes.

Both placement sites are located in proximity to reefs that may be temporarily impacted by sand. Placement of sand at both 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. Appendix B9 of Appendix B presents details regarding the potential changes at surf spots in the vicinity of the receiver sites, summarized in Table 5.12-2 below. As described 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 not preclude the viability of the breaks.

The project may cause potentially beneficial impacts to surfing in some areas 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 result from sand placement as bathymetric changes are short term and would ultimately revert to pre-project conditions after a relatively short period. Therefore, implementation of the Alternatives would not preclude the viability of existing or planned land or water activities (including surfing).

The primary recreation issue before the Commission is whether the proposed nourishment of the two beach segments in Encinitas and Solana Beach to reduce coastal storm damage would adversely affect surfing such that the project could not be found consistent with the Coastal Act's recreation policies. As noted above and in the *Feasibility Study*, the project by its nature would create wide sandy beaches that in turn support a range of significant public access and recreation benefits. The *Feasibility Study* also makes clear that several iconic surf breaks in the project area will be covered in sand, at least temporarily and perhaps longer, and as a result the historic surfing experience at those locations will change. However, the Corps determined that the demonstrated change in surfing quality that will occur in the project area as a result of the beach nourishment is neither a beneficial or detrimental impact. The Corps concluded that because surfing visits are a relatively small proportion of total recreational visits in the study area and because it does not expect surfing visits to the project area to increase as much as other types of

recreation visits, the impacts to surfing were not quantified and even if they were, the results would not have affected the selection of the project plan.

The Commission disagrees with the Corps' valuation and weighing of the resulting relative value of recreational activities. The loss of unique surfing breaks, whether during initial nourishment, during the estimated two-year period in which the new sand reaches an equilibrium profile along the nourished shoreline, or for a longer period of time, is an adverse effect on coastal recreation. The Commission acknowledges that uncertainty exists as to whether the proposed beach nourishment would create temporary and minor impacts on surfing or more significant and long-term changes in the reefs that generate the unique surf breaks in the project area. This uncertainty is documented in the *Feasibility Study* and in comments submitted by the Surfrider Foundation on the previous Corps consistency determination (see most recent letter in **Exhibit 23**).

However, the fact that surfing represents a small portion of overall recreational visits to the project area (and should therefore be less crucial to the decision-making process) is irrelevant. The value of many coastal recreational activities cannot be reduced to sheer numbers of participants. The fact that a relatively small percentage of visitors take advantage of coastal resources to engage in a particular activity does not make that activity, those resources, or those visitors any less important or less deserving of acknowledgement or protection under the Coastal Act. The Commission enjoys a long tradition of protecting coastal access and recreation opportunities and locations that may see only a handful of visitors in a week or month or year. The numbers of surfers are undoubtedly dwarfed by the numbers of sunbathers along the shoreline in the project area on an annual basis. However, protection of those locations that provide surfing opportunities for beginners through experts, particularly where surf breaks are unique, remains a bedrock principle under Coastal Act access and recreation policies.

Equally disconcerting was the decision by the Corps not to quantify surfing benefits and impacts in its assessment of the overall project recreational benefits and costs, particularly in light of the demonstrated economic benefits from surfing and related activities on local and regional economies (**Exhibits 24 and 25**). This Corps decision undervalues, both from economic and social perspectives, surfing and the unique and internationally known reef- and point-break surf spots located in the Encinitas-Solana Beach project area. And, despite the best efforts of many organizations over the last 20 years, including the Commission, there are no known successful means to create new or replacement offshore surf breaks to offset breaks permanently lost or reduced in quality. The Commission therefore believes that in looking at the Corps' *Feasibility Study* from a Coastal Act perspective, it falls short in adequately valuing and protecting the surfing resources in Encinitas and Solana Beach.

The Corps states that the proposed project will adversely affect several surfing areas as a result of reefs being covered with sand as the widened beaches reach an equilibrium state, but that these effects will either be temporary as sand moves on and off these reefs within the nearshore zone, or that any effects will not be significant as surfing will not be eliminated but only modified. The Corps also acknowledges that there is a degree of uncertainty involved in determining and evaluating potential project effects on surfing. The Commission acknowledges

the Corps' point that a further reduced level of nourishment (or none at all) also creates uncertainties, as future shoreline protection devices could themselves degrade surf breaks. The dynamic nature of this segment of shoreline, and in particular the changes in beach width and composition since the 1980s, the future changes inherent with sea level rise, and the seasonal movement of sand within the littoral zone make it difficult at best for the Commission to predict with some degree of certainty how beach nourishment will affect surfing in the project area.

A storm damage reduction program consistent with the Coastal Act's public access and recreation policies would be designed to avoid an irreversible loss of unique surf spots, and would provide the Commission with the ability to propose and advocate project modifications as soon as it became clear that the project was adversely affecting surfing. As described earlier in **Section III.A** of this report, the Corps has incorporated into the project a coordination and review mechanism which provides the Commission the means by which it can: (1) undertake a timely and adequate review of renourishment events during the 50-year life of the project (including the proposed sand volumes, beach widths, and borrow sites) and their potential impact on surfing; and (2) with the surfing and shoreline monitoring reports that will be submitted by the Corps, determine whether the project remains consistent with the enforceable recreation policies of the CCMP. In addition to this commitment by the Corps incorporated into the revised project and consistency determination, the Commission retains its ability to monitor previously reviewed federal agency activities (e.g., the subject 50-year coastal storm damage reduction program) through the re-opener provisions of 15 CFR §930.45 of the NOAA federal consistency regulations.

In addition to this review mechanism, and because implementation of the proposed project is not currently scheduled to begin until late 2015 at the earliest, the Corps and the Commission will by then have received the results from the ongoing surfing monitoring program included in SANDAG's Regional Beach Sand Project II (RBSP II, described earlier in this section of the report). These monitoring results will be analyzed by the Corps and the Commission for potentially useful information on RBSP II-related sand movement and nourishment effects on surfing in the proposed project area. This information could potentially reduce the level of uncertainty in evaluating potential surfing impacts from the proposed project. The Corps has agreed to work with the Commission staff to consider modifications to the proposed project should the RBSP II monitoring results indicate that the Corps project could lead to surfing impacts not anticipated in the *Feasibility Report*.

The Corps has also included in the revised project other measures which the Commission previously determined were necessary to minimize and avoid adverse impacts to unique surfing sites in the Encinitas and Solana Beach region, and to bring the project into conformance with the access and recreation policies of the CCMP. The revised project includes:

> (1) Reduced sand volumes and beach widths (as compared to the original proposed project) by 50 percent in the Encinitas segment and 25 percent in the Solana Beach segment;
>
> (2) A Surfing Monitoring Plan that includes the following features:

- Adequate baseline data collection, including, if feasible, a full year of pre-construction monitoring to determine the baseline condition (conditions at the project area and, as appropriate, at control sites).

- Identification of locations to be monitored, the length of the pre-project monitoring, and interest groups to be involved in establishing the monitoring effort to identify surfing or surf quality changes that might be attributable to the nourishment project, including identifying criteria for a determination of what constitutes a significant alteration or impact. Monitoring will include the geographical area between the Encinitas and Solana Beach segments of the project, in order to accurately document possible downcoast movement of sand placed in the Encinitas segment.

- Another location within the region might also be chosen to act as a control site to help determine if there are changes within the region to surfing conditions that could be attributable to other factors other than project implementation.

- Supplementing the "wave observation" component of the surf monitoring with observations about the surfing activities, including a usage scale of surfers in the water, both morning and mid-day, and describing the average and maximum ride lengths.

- If observer counts are too difficult for one observer, video may be used to augment observer counts.

- When collecting user data, the analysis should be disaggregated into weekday and weekend data.

- For mid-day observations on days when surfers are kept out of the water by lifeguards, these should be recorded as restricted use days (not zero use days).

- Establishing mechanisms for informing the local community about the project, and encouraging public comments on surfing quality (or other recreational concerns), including but not limited to: (i) a web site, (ii) pre-construction notifications to the public; and (iii) signs.

(3) Executive Director review of final shoreline and surfing monitoring plans prior to the start of project construction;

(4) Annual submittal of ongoing shoreline and surfing monitoring reports to the Executive Director;

(5) Shoreline and surfing monitoring in the geographical area between the Encinitas and Solana Beach nourishment segments to document potential project impacts from downcoast movement of sand; and

(6) Practicable efforts to schedule beach nourishment activities outside the peak summer recreation season.

With the incorporation of these measures into the revised project, the Commission finds that while the project holds the potential to affect surfing (and in particular to reef breaks offshore of the Encinitas-Solana Beach project area), the project now includes reduced sand volumes and beach widths more comparable to historic conditions, surfing and shoreline monitoring measures, Executive Director review of shoreline and surfing monitoring plans prior to the start of construction, submittal to the Executive Director of all annual monitoring reports, and a mechanism for Commission review of proposed renourishment events prior to their implementation. In addition, the reduced volumes of sand to be placed on both shoreline segments and the reduced width of the proposed beach fills is expected to reduce the potential for significant adverse impacts to reef surfing breaks. These project measures and modifications, along with the Commission's statutory ability to monitor previously reviewed federal agency activities through the re-opener provisions of 15 CFR §930.45 of the NOAA federal consistency regulations, provide the Commission with: (1) sufficient means to monitor the proposed project for the geographical extent and significance of adverse impacts to surfing that may arise during and after completion of nourishment events; and (2) mechanisms to work with the Corps to implement modifications to the project should significant adverse effects to surfing be documented through the monitoring measures. With these measures, the Commission finds that the proposed project is consistent with the public access and recreation policies of the CCMP (Coastal Act Sections 30210, 30211, 30212, 30213, and 30220).

D. WATER QUALITY.

The Coastal Act states:

Section 30230. *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231. *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface water flow, encouraging waste water reclamation,*

maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Water quality impacts can occur at either the offshore borrow site or at the beach replenishment site, due to fuel spill and contaminant releases, or excessive turbidity from dredging or disposal. The Corps proposes to minimize these effects through adherence to a Turbidity and Water Quality Monitoring Plan, Stormwater Pollution Prevention Plan (SWPPP), and an Oil Spill Prevention and Response Plan (OSPRP).

The consistency determination states that:

The primary goal of the Project [is] to keep the dredged sand on the beach. This is accomplished by building shore-parallel sand berms that allow the water to drain and leave the maximum amount of sand behind. This construction method also reduces turbidity relative to standard discharge methods.

The Turbidity and Water Quality Monitoring Plan will include weekly monitoring at the dredge and beach receiver sites for salinity, pH, temperature, dissolved oxygen, and turbidity/light transmissivity; monthly water samples will be taken and analyzed for total dissolved solids. Baseline conditions will be established by conducting monitoring events the week before construction starts and the week after construction ends.

The Commission has generally considered open ocean turbidity from beach nourishment projects, with their predominantly large grain sizes, to be a minor impact. The *Feasibility Study* reports that:

Impacts to water and sediment quality from the project are expected to be similar to those for beach nourishment projects performed as part of the RBSP I and RBSP II, specifically, the borrow sites proposed for this project (SO-5 and SO-6). The potential and measured impacts to water and sediment quality, which are described in a series of reports (SANDAG 2011a, AMEC 2002b), are used to assist in assessing the potential impacts for this project, where appropriate.

The *Feasibility Study* examined water and sediment quality at the offshore borrow sites (used previously in SANDAG's RBSP I and II projects) and proposed beach receiver sites, and summarizes potential water quality impacts from the proposed project:

Dredging of sands from the borrow sites and placement of material at the receiver sites would result in short-term elevated turbidity levels and suspended sediment concentrations, but no appreciable long-term 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 overall project. If monitoring indicated that suspended particulate concentrations outside the zone of initial dilution exceeded permissible limits, dredge operations would be modified to reduce turbidity to permissible levels. Therefore, impacts to water quality from dredging at the borrow sites and placement of material at the receiver sites would not violate water quality objectives or compromise beneficial uses listed in the Basin Plan; therefore, the impact would be less than significant.

Potential impacts to sediment quality at receiver sites could result from contaminants in dredged material or differences in physical characteristics of dredged material. SANDAG did not identify any significant impacts to sediment quality at receiver sites located within the project area based on the characterization of the SO-6 and SO-5 borrow sites. Sediment placed at Segments 1 and 2 would not exceed ER-L or ER-M guidelines (see Table 4.3-7), and both borrow and receiver sites have similar median grain size, proportions of sand, proportions of silt/clays, and TOC content. Thus, placing dredged material from SO-5 and SO-6 at the receiver sites would not affect sediment quality. Therefore, placement of sand would not alter sediment quality at the receiver sites that would be harmful to aquatic life or human health, and any impacts would be less than significant.

There would be no significant impacts to water or sediment quality, and accordingly, no mitigation measures are necessary. However, turbidity monitoring will be undertaken during dredging and placement of fill to determine if measures are necessary to reduce impacts during construction.

The *Feasibility Study* next describes the project water quality monitoring plan that will be implemented:

The Water Quality Monitoring Plan will include weekly monitoring at the dredge and beach receiver sites for salinity, pH, temperature, dissolved oxygen, and light transmissivity; monthly water samples will be taken and analyzed for total dissolved solids. Dredging will be controlled to keep water quality impacts to acceptable levels. Controls include modifying the dredging operation. Locations of the eight survey stations are described below:

A. 100 ft up current of the dredging operations, safety permitting.
B. 100 ft down current of the dredging operations, safety permitting.
C. 300 ft down current of the dredging operations.
D. 300 ft up current - Control site (area not affected by dredging operations).
E. 100 ft north of the beach placement just off of the beach at approximately the -20 ft isobath.
F. 100 ft south of the beach placement just off of the beach at approximately the -20 ft isobath.
G. 300 ft south of the beach placement just off of the beach at approximately the -20 ft isobath.

H. Control site 300 ft north of the beach placement site (area not affected by disposal operations) at approximately the -20 ft isobath.

If monitoring detects high levels of turbidity, best management practice (BMP) measures will be taken to reduce turbidity to within acceptable levels. Measures to reduce turbidity at the dredge include modifications to the dredging operation to reduce turbidity such as ensuring that the dredge remains on the bottom and doesn't bounce or that the dredge is shut off when raising or lowering the dredge cutterhead to the sea bottom. Measures to reduce turbidity at the beach site include discharging sand behind berms that channel runoff into a single point resulting in a longer path for water to run before entering the ocean allowing for more sand to settle and reducing turbidity.

The consistency determination further states that the project contractor will be required to prepare and implement a Storm Water Pollution Prevention Plan that will:

. . . assure that: (a) the contractor will not store any construction materials or waste where it will be or could potentially be subject to wave erosion and dispersion; (b) no machinery will be placed, stored or otherwise located in the intertidal zone at any time, except for the minimum necessary to implement the project; (c) construction equipment will not be washed on the beach; (d) where practicable, the contractor will use biodegradable (e.g., vegetable oil-based) lubricants and hydraulic fluids, and/or electric or natural gas powered equipment; and (e) immediately upon completion of construction and/or when the staging site is no longer needed, the site shall be returned to its preconstruction state.

The project contractor will also be required to prepare and implement an Oil Spill Prevention Plan for hazardous spill prevention and containment:

Maintenance for land-based vehicles will occur in staging area away from beach and sensitive areas and proper BMPs will be used during vehicle fueling. Any equipment left on the beach overnight will be protected so that any materials that could leak from stored equipment do not enter the ocean; and these areas will be designed not to obstruct or impede public access to or along the shoreline.

In addition, the Corps will submit the Turbidity and Water Quality Monitoring Plan, the Storm Water Pollution Prevention Plan, and the Oil Spill Prevention and Response Plan to the Executive Director prior to the start of project construction, to allow for review and comment in order to ensure that the project will be undertaken with adequate measures to protect coastal water quality. Therefore, the Commission finds that with these measures and commitments, the project is consistent with the water quality protection policies of the CCMP (Coastal Act Sections 30230 and 30231).

E. ARCHAEOLOGICAL RESOURCES.
The Coastal Act states:

> Section 30244. *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

The Corps stated in the project Feasibility Study/EIS/EIR that under Section 106 of the National Historic Preservation Act, initial Tribal coordination regarding potential project impacts on cultural resources commenced in 2003, State Historic Preservation Officer coordination began in 2005, and renewed coordination with both entities was initiated in April 2012. The Feasibility Study/EIS/EIR further stated that:

> *A records and literature search was conducted at the South Coastal Information Center at San Diego State University, which is part of the California Historical Resources Information System (CHRIS), a statewide system for managing information on prehistoric and historical resources identified in California. It is authorized and directed by the State Office of Historic Preservation (OHP). The information available at these centers consists of current and historic maps, historic register lists, site records, and survey reports. Historic registers include the National Register of Historic Places (2000), the California State Historic Resources Inventory (2000), the California Points of Historical Interests (1992), and the California Historical Landmarks (1996).*
>
> *The search did not identify any previously recorded historic properties within the areas of potential effects (APE). A 0.5-mile radius of the APE indicates that sacred sites have been identified and recorded on the bluffs above the shoreline. With erosion, some of these artifacts have ended up underwater for divers to find. The APE was surveyed by a USACE Staff Archaeologist in June 2004 and again in June 2012. No cultural material was located. A search at the California Native American Heritage Commission (CNAHC) determined that no sacred sites are recorded within the project area.*

However, the California Department of Parks and Recreation, in a *Feasibility Study/EIS/EIR* comment letter dated February 26, 2013, expressed concerns about potential project impacts on an archaeological site at Moonlight State Beach (located in the Encinitas segment of the proposed project):

> *Within the last six months, federally-listed archaeological site CA-SDI-17402 (also listed as P37026506/SDM-S-83) has been located on the beach itself. Recorded prior to WWII by Malcolm Rogers of the San Diego Museum of Man, it should have shown up in your South Coastal Information Center search . . . Section 4.8.3 statement (p. 264, line 20) that no onshore cultural materials were located needs to be changed. It is the shallow nature and unknown western boundary of this site (C14 dated so far from 3800 bp to 1800 bp) that would be affected by the use of existing sand to create*

> *an "L" – shaped berm to anchor sand placement (Section 3.3.4, p. 122, lines 37-40). Advanced testing of this western edge is essential in designing the berm construction and sand placement strategy. This is not just a monitoring situation at the time of construction, but something that could conceivably change the sand replacement strategy.*

The revised consistency determination states that after receiving the above comment, the Corps further investigated the matter and determined that the cultural site had not been identified as within the APE because its location was not correctly identified. The consistency determination states that:

> *An archaeological site located at Moonlight Beach has been partially recovered by the City of Encinitas as part of recently completed effort to reconstruct the public facilities at Moonlight Beach. This cultural resource site was located approximately 100 feet east of the mean high tide line, east of an existing sea wall. The western extent of the site is unknown. A complete survey of this site, including trenching to locate subsurface features, will be conducted west of the sea wall prior to construction and any portion of the site within the proposed fill area will be avoided if it still exists. Trenching is necessary to determine if the site exists at all west of the sea wall and, if it does, to determine the boundaries of the site to enable avoidance. Any portion of the site located on the beach, west of the sea wall, has likely eroded away, however the proposed surveys will be used to confirm this assumption. The Project, therefore, will avoid impacts to any known cultural resources. Additionally, the Project includes a monitoring program for unknown cultural resources and the standard construction clause to halt construction activities should any unknown resources be detected will be included in the construction contract specifications.*
>
> *A cultural resource survey of the borrow site would also be performed prior to construction. A cultural resource survey of the mitigation sites would be needed prior to mitigation construction.*

The consistency determination next describes the cultural resources monitoring plan to be implemented:

> *Cultural Resources Mitigation Measure 1 (CR-1): To avoid potentially significant impacts, a monitoring program designed to identify cultural resources encountered during dredging operations will be implemented. Monitoring procedures would be specified in a monitoring plan that is approved before dredging is initiated. 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, construction in that area should cease until the requirements of 36 CFR 800.13(b) are met. Then the dredging operation would be permanently*

relocated away from that site and a 250-ft-wide buffer would be established around the site. Underwater investigations will be conducted prior to disturbance; if cultural resources are found, they will be evaluated for National Register eligibility. With implementation of the mitigation measure CR-1, potential impacts to sensitive cultural resources would be reduced to less than significant.

Monitoring procedures would be specified in a monitoring plan that is approved before dredging is initiated. 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, construction in that area should cease until the requirements of 36 CFR 800.13(b) are met. Then the dredging operation would be permanently relocated away from that site and a 250-ft-wide buffer would be established around the site. Underwater investigations will be conducted prior to disturbance; if cultural resources are found, they will be evaluated for National Register eligibility.

In addition, the Corps has agreed to use dredged material to construct the initial L-shaped berm at Moonlight Beach in order to avoid excavating at this location to create the disposal control berm. The Corps also agreed to incorporate into the project Native American consultation during the pre-construction cultural site investigation, and Native American monitoring during berm construction and sand placement at Moonlight Beach, the latter undertaken to the extent allowed by public safety considerations. With the above commitments, the Commission finds that the project is consistent with the archaeological resources policy of the California Coastal Management Program (Section 30244 of the Coastal Act).

F. RELATED COMMISSION ACTION.

Initially in 2000, and subsequently in 2011, the Commission has twice approved the countywide San Diego County beach nourishment program conducted by the San Diego Association of Governments (SANDAG Regional Beach Sand Project (RBSP) I and II - CDPs 6-00-038 (with several amendments) and 6-11-018). The permit conditions for both projects required, among other things, monitoring of recreational (including surfing) and biological impacts monitoring. Under the first of these permits, SANDAG placed approximately two million cu. yds. of sand on 12 San Diego County Beaches (RBSP I), completed in the Spring and Summer of 2001. The Commission's findings on RBSP II noted:

Extensive monitoring was completed in association with RBSP I and found no significant impacts to biological resources. The Commission also did not receive any adverse comments in regard to public access during or following construction of RBSP I.

The second of these permits (RBSP II) involved placing 1.5 million cu. yds. on eight San Diego County Beaches between September and December 2012. During the Commission's review of this permit the paramount issue of concern appeared to be grunion protection and monitoring,

and the Commission adopted an extensive set of conditions and criteria to monitor and protect grunions. The Commission also adopted conditions requiring beach sand monitoring, biological monitoring, surf break monitoring, Executive Director review and approval of the Final Monitoring Plan, and of final Staging Plans, Lagoon monitoring and mitigation, and applicant assumption of risk.

In consistency determination CD-029-11, the Corps of Engineers proposed and the Commission conditionally concurred with the San Clemente Shoreline Protection Project, a fifty-year beach nourishment program for San Clemente State Beach in northern San Diego County. This program consisted of initial nourishment of approximately 251,000 cubic yards of sand dredged from an offshore location and placed on a 50-foot-wide by 3,400-foot-long section of beach centered on the San Clemente Pier, with periodic renourishment every six years when the beach erodes to its base width of 35 feet. Dredging and placement would occur between late August and March to avoid the peak recreation, least tern breeding, and grunion spawning seasons. The Commission adopted nine conditions to assure the project's monitoring and mitigation measures are effective, adequate to protect, and, if impacts occur, mitigate the project's effects on marine resources, water quality, and public access and recreation. The Corps agreed to the conditions, although this project has yet to be implemented.

G. OTHER APPROVALS.

The *Feasibility Study* includes discussion of agency coordination undertaken by the Corps for the proposed project and other approvals that the Corps will obtain prior to the start of construction in late 2015. These include:

- A U.S. Fish and Wildlife Service Planning Aid Report and Coordination Act Report will help to document existing conditions, determine impacts of alternatives on fish and wildlife resources, recommend types and amounts of mitigation for habitat losses, and recognize opportunities for environmental restoration. The Corps will coordinate with USFWS and supervise the interagency contract as part of its environmental impact studies task. If necessary, Section 7 consultation pursuant to the federal Endangered Species Act will be initiated. A Biological Assessment will be prepared by the Corps and a Biological Opinion will be prepared by the USFWS and/or the National Marine Fisheries Service.

- The proposed project has been coordinated with the Corps' Regulatory Branch, which is responsible for issuing the Section 404 permit for dredging. Coordination with the Corps Regulatory Branch is ongoing. The Corps does not issue itself a 404 permit, but must comply with the federal Clean Water Act. The Corps will complete a 404(b)(1) analysis to ensure project compliance with the Clean Water Act.

- The Corps will continue coordinating with the National Marine Fisheries Service throughout the NEPA process and construction activities.

- The Corps will continue coordinating with the California State Lands Commission throughout the NEPA process and construction activities.

- The Corps will continue coordinating with the California Department of Fish and Wildlife throughout the NEPA process and construction activities, including coordination relative to California listed species and Species of Special Concern.

- Under Section 106 of the National Historic Preservation Ac, initial State Historic Preservation Office coordination was undertaken in 2005 and initial Tribal coordination was undertaken in 2003. Renewed coordination with SHPO and Tribal authorities was initiated in 2012.

- The Corps will continue coordinating with the San Diego Regional Water Quality Control Board throughout the Clean Water Act compliance process, including Section 401 water quality certification if appropriate.

APPENDIX A

SUBSTANTIVE FILE DOCUMENTS

1. CD-0203-13 (U.S. Army Corps of Engineers, Revised Encinitas-Solana Beach Coastal Storm Damage Reduction Project).
2. CD-003-13 (U.S. Army Corps of Engineers, Encinitas-Solana Beach Coastal Storm Damage Reduction Project).
3. Feasibility Study/EIS/EIR, Encinitas-Solana Beach Coastal Storm Damage Reduction Project, U.S. Army Corps of Engineers, December 2012.
4. CD-029-11 (U.S. Army Corps of Engineers, San Clemente Shoreline Protection Project).
5. Coastal Development Permits 6-11-018 and 6-00-038 (and Amendments A1 to A3), SANDAG Regional Beach Sand Projects I and II.
6. Appendix D to the SANDAG Regional Beach Sand Project EIR/EA, Evaluation of Impacts to Marine Resources and Water Quality from Dredging of Sands from Offshore Borrow Sites and Beach Replenishment at Oceanside, Carlsbad, Leucadia, Encinitas, Cardiff, Solana Beach, Del Mar, Torrey Pines, Mission Beach, and Imperial Beach, CA, March 2000.
7. Surfonomics 101, Paul Kvinta, CNN Money, June 5, 2013.
8. Surfonomics Quantifies the Worth of Waves, Gregory Thomas, The Washington Post, August 24, 2012.
9. February 26, 2013, comment letter from National Marine Fisheries Service to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
10. February 26, 2013, comment letter from U.S. Environmental Protection Agency to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
11. February 26, 2013, comment letter from California Department of Parks and Recreation to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
12. February 27, 2013, comment letter from California Department of Fish and Wildlife to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
13. March 5, 2013, comment letter from U.S. Fish and Wildlife Service to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
14. Undated comment letter from Surfrider Foundation to U.S. Army Corps of Engineers on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
15. May 8, 2013, letter from Surfrider Foundation to City of Solana Beach and City of Encinitas on Encinitas-Solana Beach Feasibility Study/EIS/EIR.
16. May 14, 2013, letter from Surfrider Foundation to California Coastal Commission on Encinitas-Solana Beach Feasibility Study/EIS/EIR.

APPENDIX B

LETTERS SUPPORTING PROJECT

City of Encinitas

October 31, 2013

Mr. Larry Simon
California Coastal Commission
45 Fremont Street
San Francisco, California 94105

Subject: USACE Federal Consistency Hearing CD-0203-13 (Encinitas-Solana Beach Coastal Storm Damage Reduction Project, San Diego County)

Dear Larry Simon,

The purpose of this letter is to strongly support the revised CD-0203-13 submitted by the US Army Corps of Engineers regarding Encinitas/Solana Beach Coastal Storm Damage Reduction Project. The project size has been significantly reduced in both cities based on concerns raised at the July 2013 hearing in Ventura. The cities have also met with all parties involved to address their concerns and have included any additional monitoring that was requested.

Across the board, coastal engineers agree that the sand transport system has been blocked in North County. The cities of Encinitas and Solana Beach are fully aware of the implications of the destruction that happens when sandy beaches turn into cobble beaches. Coast Highway 101, coastal bluffs and public access locations will be under attack by waves during every high tide, high surf event. In Encinitas, the majority of beaches are also in the jurisdiction of the California State Parks System so by approving this project you also improve recreation for the Cardiff State Camprounds, Beacons State Beach, Moonlight State Beach, Cardiff Reef and South Cardiff State Beach. The California Department of Boating and Waterways recognized this over a decade ago and encouraged a partnership with the US Army Corps of Engineers to improve recreation while also protecting the shoreline from coastal erosion called the USACE Storm Damage Reduction Project. Just like repairing a highway, small cities must partner with Caltrans and the Federal Highway Authority to obtain the funding and expertise to maintain and improve the transportation corridor.

San Diego County has successfully implemented two Regional Beach Sand Projects (RBSP) with no adverse impacts to habitat or surfing. In addition, the City of Encinitas also conducted a Coastal Habitat Study and it was determined that by placing sand on the beach we actually improve the habitat in the nearshore environment specifically for shorebirds, gruions and sand crabs. In 2006, the City of Encinitas was also voted #3 Surfing Town by the Surfer Magazine post the Regional Beach Sand Project in 2001.

As the local sponsors, we have worked for over a decade to develop a comprehensive and long-term program that provides long term shoreline protection benefits, a wider recreational public beach, and protection of important coastal resources and to provide some resiliency to future sea level rise. The Project also incorporates many monitoring components as well as adaptive management strategies to modify the size, location and timing of the future, smaller renourishment fills if needed in the future.

Tel 760/633-2600 FAX 760/633-2627, 505 South Vulcan Avenue, Encinitas, CA 92024 TDD 760/633-2700

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We thank you for your recommendation of support for the USACE Coastal Storm Damage Reduction Project planned for the cities of Solana Beach and Encinitas. The Project is consistent with Statewide and regional shoreline management goals and will help to implement the San Diego Coastal Regional Sediment Management Plan (2009) which recognized that the Solana Beach and Encinitas shorelines would benefit from regional sediment management programs including beach restoration. We strongly urge the Commission to support the project. Please contact me at 760-633-2632 if you have any questions or need any additional information.

Sincerely,

Gus Vina
Encinitas City Manager

Tel 760/633-2600 FAX 760/633-2627, 505 South Vulcan Avenue, Encinitas, CA 92024 TDD 760/633-2700

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CITY OF SOLANA BEACH
635 SOUTH HIGHWAY 101 • SOLANA BEACH, CALIFORNIA 92075-2215 • (858) 720-2400
www.cityofsolanabeach.org FAX (858) 792-6513 / (858) 755-1782

October 31, 2013

Mr. Larry Simon
California Coastal Commission
45 Fremont Street
San Francisco, California 94105

Subject: USACE Federal Consistency Hearing CD-0203-13 (Encinitas-Solana Beach Coastal Storm Damage Reduction Project, San Diego County)

Dear Larry:

The purpose of this letter is to express our strong support for the revised Consistency Determination that has been submitted by the USACE. The Cities heard the Commissioners loud and clear at the July and August meetings on the Proposed Project. City Staff has worked tirelessly to revise the project to address the comments raised by the Commissioners and to develop a revised project that is responsive to expressed concerns as much as possible. Importantly, the project size has been significantly reduced in both cities as requested by the Commission. In addition, we have had face to face meetings and conference calls with other agencies and important stakeholders including California State Parks, U.S. Fish and Wildlife Service, the Los Penasquitos Lagoon Foundation and the Surfrider Foundation.

We believe that the Proposed Project, as revised and reduced in size, is a better project and that the additional design features and more robust monitoring program we have incorporated will be even more protective of important cultural resources, biological resources, coastal lagoons and surfing resources.

Coastal erosion is expected to worsen with sea level rise and the project is a recognized adaptation strategy outlined in the "*Sea Level Rise Policy Guidance*" issued by the CCC in October 2013. Coastal erosion is a very significant problem in both cities and one that threatens key public facilities, public structures, infrastructure and homes in both cities. Implementation of this coastal storm damage reduction project would provide long-term protection for the following public facilities, public structures, and infrastructure.

As recognized in your staff report and in the EIR/EIS, in the absence of this Project, continued armoring of the shoreline would occur with the entire shoreline of both cities expected to become fully armored within the next 50-years. With this Project, the cities, State and USACE will be providing an alternative to continued structural armoring of the coast. Importantly, implementation of this long-term shoreline protection program was one of the key assumptions made in the recently Certified Solana Beach LCP LUP and is the basis for many of the policies addressing coastal hazards and the future need for shoreline protection.

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As the local sponsors, we have worked for over a decade to develop a comprehensive and long-term program that provides long term shoreline protection benefits, a wider recreational public beach, and protection of important coastal resources and to provide some resiliency to future sea level rise. The Project also incorporates many monitoring components as well as adaptive management strategies to modify the size, location and timing of the future, smaller renourishment fills if needed in the future.

We thank you and request your recommendation of support for the USACE Coastal Storm Damage Reduction Project planned for the cities of Solana Beach and Encinitas. The Project is consistent with Statewide and regional shoreline management goals and will help to implement the San Diego Coastal Regional Sediment Management Plan (2009) which recognized that the Solana Beach and Encinitas shorelines would benefit from regional sediment management programs including beach restoration. We strongly urge the Commission to support the project. Please contact me at 858-720-2400 if you have any questions or need any additional information.

Sincerely,

David Ott
City Manager

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CITY OF OCEANSIDE

Department of Harbor and Beaches

October 30, 2013

Mary Shallenberger, Chair
California Coastal Commission
45 Fremont Street
San Francisco, California 94105

Subject: Support for Item Thu-11a: USACE Federal Consistency Hearing CD-0203-13, Encinitas-Solana Beach Coastal Storm Damage Reduction Project

Dear Chair Shallenberger:

The purpose of this letter is to strongly encourage your support for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project (beach nourishment project) that will be heard before the California Coastal Commission on November 14, 2013 (Item Thu-11a). As requested by the Commission at the July 2013 hearing, both cities have reduced the size of the project in their respective cities are proposing to place smaller volumes of sand both initially and during all subsequent re-nourishment cycles.

With your support, this project will reduce coastal storm damages to public infrastructure, improve public safety by reducing the threat of bluff failures, and will reduce coastal erosion and shoreline narrowing, thereby improving recreational opportunities.

The Cities of Encinitas and Solana Beach are the local partners and sponsors of this project and have been working with the USACE for more than a decade to identify, evaluate, and implement a long-term solution to the coastal erosion problem facing the cities. Coastal erosion is a very significant problem in both cities and one that threatens key public facilities, public structures, infrastructure and homes. Coastal erosion is expected to worsen with sea level rise and the project is a recognized adaptation strategy outlined in the "*Sea Level Rise Policy Guidance*" issued by the CCC in October 2013.

Since 2000, the Cities and the State of California have invested significant financial resources and countless staff hours studying a range of alternatives, including structures such as seawalls, breakwaters, groins and "soft" solutions and "green infrastructure," including near-term beach nourishment projects to address beach erosion problems, as well as, long-term beach nourishment projects as an adaption strategy to address sea level rise. Implementation of the coastal storm damage reduction project would provide long-term protection for public facilities, public structures, and infrastructure:

The goal of this project is to restore the shoreline by resupplying sand to the coast, thereby protecting vital public infrastructure including Highway 101, the Solana Beach Marine Safety Center, the Fletcher Cove Community Center, all of the public beach access points, public beach parking lots, the public beaches themselves and existing residential and commercial bluff top development. The project includes provisions for adaptive management that would

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enable the project to be revised to avoid future impacts and to address rising sea levels. There are no anticipated adverse effects on biological resources in the Swami's State Marine Conservation Area (SMCA), as noted in the Draft EIR/EIS, and California State law clearly allows beach nourishment inside the conservation area.

The CCC Staff Report correctly noted that in the absence of this project, continued armoring of the shoreline is expected. In fact, it is projected that in the absence of this project, the entire shoreline of both cities will likely become fully armored within the next 50-years. With this project, the Cities, State and USACE will be providing an alternative to continued structural armoring of the coast. Importantly, this project is consistent with the recently released CCC Sea Level Rise Policy Guidance document released for public review on October 15, 2013. Implementation of this long-term shoreline protection program was one of the key assumptions made in the recently Certified Solana Beach LCP LUP and is the basis for many of the policies addressing coastal hazards and the future need for shoreline protection.

The Cities have worked proactively and diligently with local stakeholders to develop a comprehensive and long-term program that provides long-term shoreline protection benefits, a wider recreational public beach and protection of important coastal resources. The Project also incorporates surfing monitoring and adaptive management strategies to modify the size, location and timing of the future, smaller renourishment fills if needed.

More than two decades ago, the Solana Beach coastline was identified by the U.S. Army Corps of Engineers (*State of the Coast Report*, 1991) as an area of high coastal erosion risk in California. The project has received consistent State support and funding through the Department of Boating and Waterways via the California Public Beach Restoration Act. The Project will implement the San Diego Coastal Regional Sediment Management Plan (2009), which recognized that the Solana Beach and Encinitas shorelines would benefit from regional sediment management programs including beach restoration. We strongly urge you to vote in favor of this project when it comes before you in November 2013. Thank you for your consideration.

Sincerely,

J. F. Quan

Frank Quan
Harbor & Beaches Coordinator
City of Oceanside

CC: Mayor Nichols, City of Solana Beach
Mayor Barth, City of Encinitas
USACE, LA District Commander
Dr. Charles Lester, CCC Executive Director
Larry Simon, CCC Federal Consistency Coordinator

LEUCADIA 101

THE *Art and Soul* of ENCINITAS

RECEIVED

OCT 24 2013

CALIFORNIA
COASTAL COMMISSION

Larry Simon
California Coastal Commission
45 Fremont St.
San Francisco, CA 94105

Re: USACE Encinitas/Solana Beach Coastal Storm Damage Reduction Federal Consistency

Dear Mr. Simon:

On behalf of the Leucadia 101 Main Street Association I am writing to express our support for the Encinitas/Solana Beach Coastal Storm Damage Reduction Federal Consistency Project. We respectfully request that the California Coastal Commission, at its upcoming hearing, vote to approve the US Army Corps of Engineers consistency determination for the above-referenced item.

Our organization has approximately 150 members comprised of residents and local businesses within the City of Encinitas and more specifically the beach community of Leucadia.

The massive depletion of sand that our beaches have suffered is a man made tragedy. The construction of such hard structures along the coast as Camp Pendleton's Del Mar boat basin, the Oceanside jetty and boat harbor, non-flushing lagoons resulting from upstream damming, and railroad and highway bridges, have effectively cut off the plentiful natural normal southward flow of sand to our beaches.

The Army Corps project will offer 50 years of better public access to our beaches and a nonstructural alternative that will restore and enhance the ocean experience for our residents and visitors to our city. Furthermore, wider sandy beaches will protect valuable infrastructure along the coast, including beach access facilities and historic Highway 101. This will also increase public safety on our beaches by reducing the likelihood of catastrophic bluff collapses that have sadly already taken lives.

In 2007, the city of Encinitas conducted an economic analysis on the financial impact of our beaches in Encinitas. That study reflected the fact that local businesses, including retail, restaurants and hotels, enjoyed in excess of a $40 million annual benefit because of the presence of healthy beaches.

We respectfully request that the Coastal Commission adopt the positive staff recommendation regarding the Army Corps's proposed reduced sand replenishment project.

Sincerely,

William Morrison
President, Leucadia 101 Main Street Association

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APPENDIX C

BEACH NOURISHMENT ARTICLE FROM
SHORE & BEACH, SUMMER 2013

Simon, Larry@Coastal

From: Tina Estell <testell@cosb.org>
Sent: Monday, September 23, 2013 2:29 PM
To: Lester, Charles@Coastal; Sarb, Sherilyn@Coastal; Simon, Larry@Coastal
Cc: David Ott
Subject: Beach nourishment
Attachments: houstonDean_81_3.pdf

Please accept this email on behalf of City Manager David Ott:

Hello Larry, Sherilyn and Dr. Lester;

Attached for your review and distribution please find a recent article on beach nourishment that appeared in the summer volume of the American Shore and Beach Preservation Association publication *Shore and Beach*.

We think that this article would be useful for some of the Commissioners and could help them to gain a better understanding on coastal processes and the basic function of a protective beach.

Thank you.

Sincerely,

David Ott
City Manager

ARP - C

Beach nourishment provides a legacy for future generations

By

James R. Houston[1] and Robert G. Dean[2]
1: U.S. Army Engineer Research and Development Center
3909 Halls Ferry Road, Vicksburg, MS 39180
james.r.houston@usace.army.mil
2: Department of Civil and Coastal Engineering
University of Florida, Gainesville, FL 32611
dean@coastal.ufl.edu

ABSTRACT

A number of well-known U.S. beaches have been nourished and performed quite well, but their performance characteristics and benefits are generally not well recognized. This paper discusses the performance of individual nourished beaches in Santa Monica Bay and Coronado/Silver Strand in California, Delray and Miami Beaches in Florida, and Harrison County, Mississippi. In addition, performances of several beach nourishments in statewide programs in New Jersey and Florida are presented. Performances of these beach nourishments are discussed in the context of the recreational, aesthetic, environmental, and storm damage reduction services they provide. Some of these beach nourishments have remained stable for 60-70 years. The wide beaches produced by the nourishments have won U.S. and worldwide fame for their beauty; attracted huge numbers of tourists, producing remarkable economic returns much greater than the cost of nourishments; and provided significant protection from storms. For each case, there are brief sections describing economic benefits of the nourishments and lessons learned from their performance.

ADDITIONAL KEYWORDS: Beach nourishment, storm damage reduction, tourism, economic development.

Manuscript submitted 28 January 2013, revised and accepted 26 April 2013.

Our nation and all coastal countries will face major decisions at various times in the future as to the most appropriate response to rising sea levels and other causes of beach erosion. The response options range from relocation to beach nourishment to structures. The appropriate decision will not be a "one size fits all" and is dependent on local features and other characteristics. The choice of a response option should not be taken lightly and should be examined and planned in an atmosphere in which deliberate and rational factors can be weighed along with their uncertainties. Inappropriate choices, whether they be relocation, nourishment, or structures can be unduly expensive. An essential ingredient in fully understanding the benefits and consequences of individual responses are case studies including the long-term performance of projects that have been in place for sufficient time scales to judge their performance, thereby forming a solid basis for predicting their future benefits and costs. Although in most settings the performance of beach nourishment projects can be predicted within about 25%, a well-documented case study is worth a thousand calculations to the engineer and especially the lay person! Beach nourishment is the only shoreline stabilization alternative that maintains the recreational, aesthetic, environmental, and storm damage reduction features of a natural beach.

This paper was motivated by the recognition that a number of well-known U.S. beaches have been nourished, have performed quite well, and their history as nourished beaches is not recognized by the average beachgoer and, to a lesser extent, by some specialists. We consider five cases of individual nourished beaches and also nourished beaches that are part of two state nourishment programs in a variety of settings along the Pacific, Atlantic, and Gulf coastlines and provide reviews of their nourishment background, their performance, and the various services that they provide. We leave the issue of detailed analyses of why these projects have performed so well to another day and probably to other investigators. However, these projects stand as solid examples of the utility of beach nourishment as a response option to sea level rise and other erosive agents.

We hope that this paper will stimulate similar examinations of the performance and utility of beach nourishment projects in other coastal countries. Because this paper is initially intended for a U.S. audience, English units are applied.

SANTA MONICA BAY BEACHES, CALIFORNIA

Introduction

The Beach Boys, "Baywatch" TV series, and rollerblading on the boardwalk at Venice Beach (Figure 1) are all icons of the southern California life style known worldwide. They are associated with beaches in Santa Monica Bay, California, which most people assume are naturally wide. However, Santa Monica Bay beaches were narrow prior to human addition of substantial quantities of sand 50-70 years ago that produced wide and stable beaches (California Department of Boating and Waterways and State Coastal Conservancy — CDBW 2002).

The Santa Monica Bay coast extends almost 40 mi from Point Dume on its northwest coast to Palos Verdes Point on its southeast coast (Figure 2). Prior to 1825, the area received intermittent but substantial quantities of sand from the Los Angeles River, which discharged through Ballona Creek. Ballona Creek presently empties into Santa Monica Bay just south of Marina del Rey (Figure 2). However, in 1825 during unusually heavy floods, the Los Angeles River changed its

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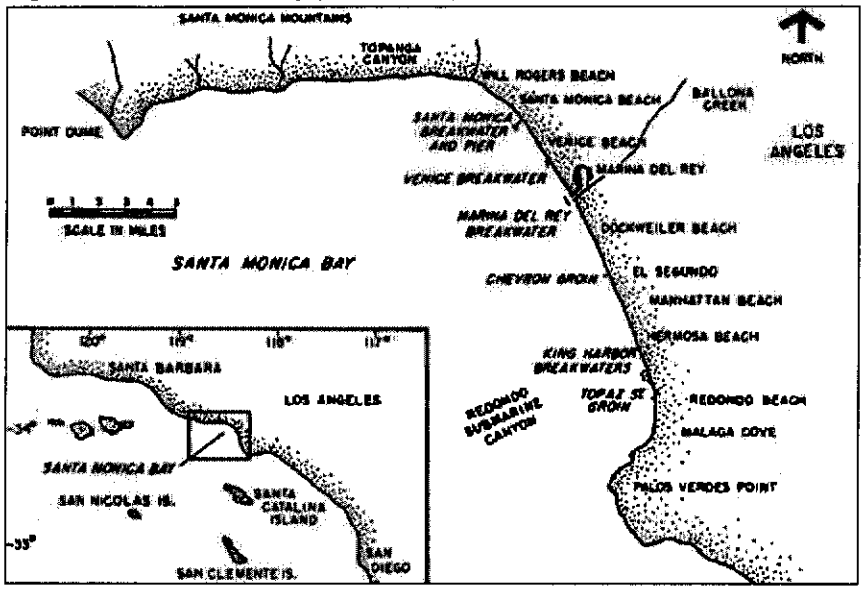
Figure 1. Rollerblading on the Venice Beach boardwalk.

Figure 2. Santa Monica Bay (CDBW 2002).



course and has since discharged into San Pedro Bay, a littoral cell about 25 mi to the south (Pardee 1960). During floods of 1862 and 1884, some of the flow was through Ballona Creek, but since 1884 all of the discharge of the Los Angeles River has been into San Pedro Bay. During the great flood of March 1938, it is estimated that the Los Angeles River deposited about 6 million cu. yd. of sediment into San Pedro Bay, demonstrating how significant the river was to the sediment budget of Santa Monica Bay (Wiegel 1994).

The annual sediment supply to Santa Monica Bay is now estimated to be only about 60,000 cu. yd., including sediment passing around Point Dume, bluff erosion along the western portion of the Bay, and sediment from small streams of the Santa Monica Mountains and Ballona Creek (Leidersdorf *et al.* 1994). Sediment transport is from the northwest to southeast and is estimated to have a potential of 200,000 to 250,000 cu. yd. a year (CDBW 2002). Just south of Redondo Beach, the transport direction reverses to the north because the coast curvature causes a northern current. The Redondo Submarine Canyon is a sediment sink for material flowing from both the north and south.

As a result of the cutoff of sediment from the Los Angeles River, high rates of alongshore sediment transport, and the loss of sediment down Redondo Submarine Canyon, Santa Monica Bay beaches became sediment starved prior to the 20th century. Before 1935, beach widths typically ranged from 50 to 150 ft (CDBW 2002). Johnson (1935) noted that many of the beaches were "...too badly eroded to be of value as bathing beaches." Figure 3 is an example of a crowd using the narrow beach at Venice Beach in 1925.

Human made beaches

Since 1938, 31.6 million cu. yd. of sand have been placed on the Santa Monica Bay beaches, about 93% of which was not placed specifically for beach nourishment but became available from construction projects, where beach placement was an expedient method of disposing of excess sand. This sand from 11 projects from 1938 to 1989 created wide beaches in an area that before 1938 was characterized by narrow beaches (Table 1). Construction related to the Hyperion Sewage Treatment Facility, located just inland of Dockweiler Beach, contributed more than half of the sand (17.1 million cu. yd.). The construction of Marina del Rey contributed 10.1 million cu. yd. Construction at the Scattergood Generating Station, a gas-fired steam electric generating station at Dockweiler Beach, added 2.4 million cu. yd. and beach nourishment projects contributed 2.1 million cu. yd.

The 31.6 million cu. yd. of sand dramatically widened beaches from Santa Monica Beach to Redondo Beach. Between surveys in 1935 and 1990, Santa Monica and Venice Beaches widened by an average of almost 400 ft, Dockweiler Beach by 500 ft, Manhattan and Hermosa Beaches by 250 ft and more, and Redondo Beach by 150 ft. The sand has been remarkably stable as can be seen in representative beach profiles at Venice Beach in 1935, 1953, and 1990 (Figure 4). Venice Beach (Figure 5) has been named one of the 10 top beaches in the world (EpicAdventurer 2012), top 10 best city beaches in the world (Touropia

2012), top 10 great American Beaches (YahooTravel 2012a), and received a 2012 Travelers Choice Awards for being one of the top 25 beaches in the world (TripAdvisor 2012).

The length of time that sand placed on Santa Monica Bay beaches has remained is striking. Over 90% of the 31.6 million cu. yd. was placed 50-75 years ago, yet most of the sand remains in place. Not only did Dockweiler and Venice Beaches, where the sand was directly deposited, benefit, but downdrift beaches have grown dramatically. Reppucci (2012) gives an excellent account of the growth of the beach in Manhattan Beach, which is about 10 miles downdrift of Venice Beach. Beach width was 190 ft in 1910, but dropped to about 108 ft in 1938. From 1938 to 2011, the beach width grew from 108 ft to about 420 ft due primarily to the addition of sand from 1938 to 1963 updrift at Venice and Dockweiler Beaches and Marina del Rey. Hermosa Beach, which is about 2 miles further downdrift to the southeast of Manhattan Beach, is almost the same width as Manhattan Beach, and Figure 6 shows there has been almost no change in beach width in the last 17 years at Hermosa Beach.

The iconic beaches of Santa Monica Bay have remained wide for so long that most residents believe these beaches are naturally wide and humans had no hand in their development. Recognizing the need to educate the public on the origin of the wide beaches at Manhattan Beach and to celebrate the centennial of the establishment of the city, the Manhattan Beach Historical Society convinced the city of Manhattan Beach (2012) to install historical beach-width measurement benchmarks and two historical centennial plaques on the Manhattan Beach Pier. One plaque will show a 1912 beach width of 180 ft and the other a 2012 beach width of 430 ft.

Structures have contributed to stabilizing sand placed on Santa Monica Bay beaches. The shore from Topanga Canyon to Malaga Cove currently has five shore-parallel breakwaters, three shore-perpendicular jetties, 19 groins, five revetments, and six open-pile piers (Patsch and Griggs 2006). The stability of Santa Monica Bay beaches has been attributed partially to the structural compartmentalization of the shoreline with Flick (1993) noting that these structures

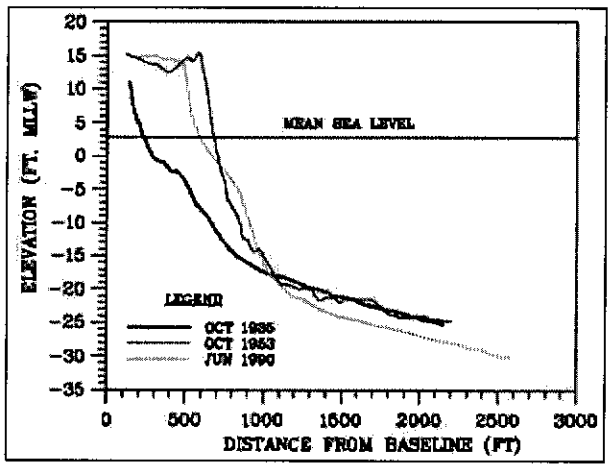


Figure 3 (above). Venice Beach in 1925.

Figure 4 (left). Representative beach profiles at Venice Beach showing remarkable stability between 1953 and 1990 (CDBW 2002).

Table 1. Sand placement in Santa Monica Bay

Date	Placement location	Source	Purpose	Quantity (millions of cu. yd.)
1938	Dockweiler Beach	Hyperion	Disposal	1.8
1945	Venice Beach	Hyperion	Disposal	0.2
1947	Venice/ Dockweiler Beach	Hyperion	Disposal	13.9
1947	Redondo Beach	Onshore	Nourishment	0.1
1956	Dockweiler Beach	Scattergood	Disposal	2.4
1960-62	Dockweiler Beach	Marina del Rey	Disposal	3.2
1963	Dockweiler Beach	Marina del Rey	Disposal	6.9
1968-69	Redondo Beach	Offshore	Nourishment	1.4
1984	El Segundo	Offshore	Nourishment	0.6
1988	Dockweiler Beach	Hyperion	Disposal	0.2
1988-89	El Segundo	Hyperion	Disposal	1.0

Source: Leidersdorf *et al.* 1994.

Figure 5. A wide, appealing beach at Venice Beach.

are extremely effective in limiting alongshore transport and retaining sand.

The impact that structures can have on littoral transport was not fully appreciated early in the development of harbors in Santa Monica Bay. For example, the Santa Monica Beach offshore breakwater was constructed in 1934 with the intent of creating a harbor, but with little realization of downdrift impacts. The breakwater caused too much sedimentation for development of a harbor and produced downdrift erosion of beaches in Santa Monica and Venice. Periodic sand bypassing was initiated in 1939 to offset the interruption of littoral transport. The experience at Santa Monica Beach led to the realization that the construction of breakwaters for development of Marina del Rey Harbor would interrupt littoral flow, so periodic sand bypassing was included in project design and no significant downdrift erosion has occurred (Leidersdorf *et al.* 1994). The King Harbor North Breakwater (Figure 2) is 5,200 ft long and a littoral barrier. However, it is just north of Redondo Submarine Canyon and thus prevents sand from going down the canyon and being lost to the littoral system. Similarly, the 600-ft-long Topaz Street Groin (Figure 2) prevents sand moving north in the area of littoral current reversal to enter the Canyon and be lost to the littoral system (Leidersdorf *et al.* 1994). The most recent littoral barrier, the Chevron Groin (Figure 2), was constructed in 1970 to protect shore crossing of oil pipelines. Beach nourishment on either side of the groin was an integral part of project design. Leidersdorf *et al.* (1994) concluded that the effect of structures in Santa Monica Bay has been to, "... effectively compartmentalize the shoreline in the central and southern portions of the Bay, thereby retarding littoral drift and reducing the rate of sediment loss down Redondo Canyon." The combination of large quantities of sand placed 50-70 years ago and structures that slow littoral transport and prevent sand loss down Redondo Submarine Canyon has led to wide, stable beaches that characterize the central and southern portions of Santa Monica Bay.

Economic benefits

Houston (2013) showed that travel and tourism was the largest employer and earner of foreign exchange of any U.S. industry and beaches were the leading tourist destination. A 2012 survey by TripAdvisor (2011) found that beaches are the leading U.S. tourist destination, with 44% of survey respondents planning beach vacations. An ABC/*Washington Post* (2012) poll found beaches were the most popular summer vacation destination, with Americans spending 40% of their vacation days at the beach and 52% of respondents planning a beach vacation some time in the next 12 months. Going to the beach is not just an American obsession, with Expedia.com (2012) finding in a survey of 8,599 adults in 21 countries that "...the beach is by far the favorite destination for the majority of the world's travelers."

According to Investopia (2012), California is the number one tourist destination in the U.S. and "...the tourism powerhouse of America." Domestic and international visitors spent $102.3 billion in California in 2011, generating $11.1 billion in taxes including $4.7 billion in federal taxes (California Travel and Tourism Commission 2012). Beach tourism is especially important in southern California since over 97% of beach visitors in California visit beaches south of San Francisco (King and Symes 2003). YahooTravel (2012b) and *Travel and Leisure* (2012) rank Venice Beach as the busiest beach in America with 16 million tourist visits. This is almost 50% more visits than the combined visits to Yellowstone (3.3 million), Yosemite (4.0 million), and the Grand Canyon (4.4 million) (National Park Service 2012). Santa Monica beaches are a magnet for tourists from around the world. For example, Venice Beach has the greatest tourist expenditures ($343 million) of any beach in California with 55% of those at the beach not from California and 27% from other countries (King and Symes 2003).

Suppose sand placement in Santa Monica Bay from 1938 to 1963 had not occurred and beaches were too badly eroded to have much value as bathing beaches as Johnson noted in 1935. King and Symes (2003) showed the impact on the economy if southern California beaches were not available. Three quarters of households surveyed said that they would travel outside California more than

they do now if California beaches were unavailable. Two-thirds of overnight visitors surveyed at beaches said that they would either not come to the area or would come less often if there were no beaches. King and Symes estimated that if beaches in southern California were not available, the California economy would suffer an economic loss of $8.3 billion and the U.S. economy a loss of $6 billion. The state and federal government would lose about $1.5 billion in tax revenue. Had the sand placement in Santa Monica Bay from 1938 to 1963 not occurred, it is doubtful that Santa Monica Bay beaches would be the international icons that they are today.

Lessons learned

The success of the placement of sand in Santa Monica Bay illustrates the importance of using sand as a resource. Over 90% of the sand was placed to dispose of it at the least cost. It happened that the least cost was to put the sand on nearby beaches. In the case of the excavations of sand for the Hyperion Sewage Treatment Plant and the Scattergood power plant, large eductors were used to pump the sand the least distance and at the least cost, which was to nearby beaches (Herron 1980). Very often, the least cost for disposal of sand dredged from inlets is ocean placement at depths where it does not get back into the littoral system. All sand should be placed on nearby beaches. The U.S. Army Corps of Engineers (2012a) is working to manage sediment on a regional basis, where dredged material is viewed as a resource, and this may help in getting more sand back on beaches. However, it is still bound by Title 33 in the Code of Federal Regulations that calls for "... discharge of dredged or fill material into waters of the U.S. or ocean waters in the least costly manner, at the least costly and most practicable location, and consistent with engineering and environmental requirements." (Code of Federal Regulations 1988). Navigation channels interrupt the natural flow of sediment along a coast and dredging them and disposing sand outside the littoral system causes environmental impacts and should not be considered consistent with environmental requirements.

Much has been learned from the construction in Santa Monica Bay of structures that affect littoral transport. Early construction projects caused downdrift erosion of beaches. However, since then projects have been planned to mitigate impacts on downdrift beaches by bypassing sand, for example. The placement of terminal structures on either side of the littoral cells just north and south of the Redondo Submarine Canyon has prevented loss of sand to the littoral system. The overall effect of structures from Topanga Canyon to Malaga Cove has been to limit alongshore transport and retain sand, leading to the long-term stability of the beaches.

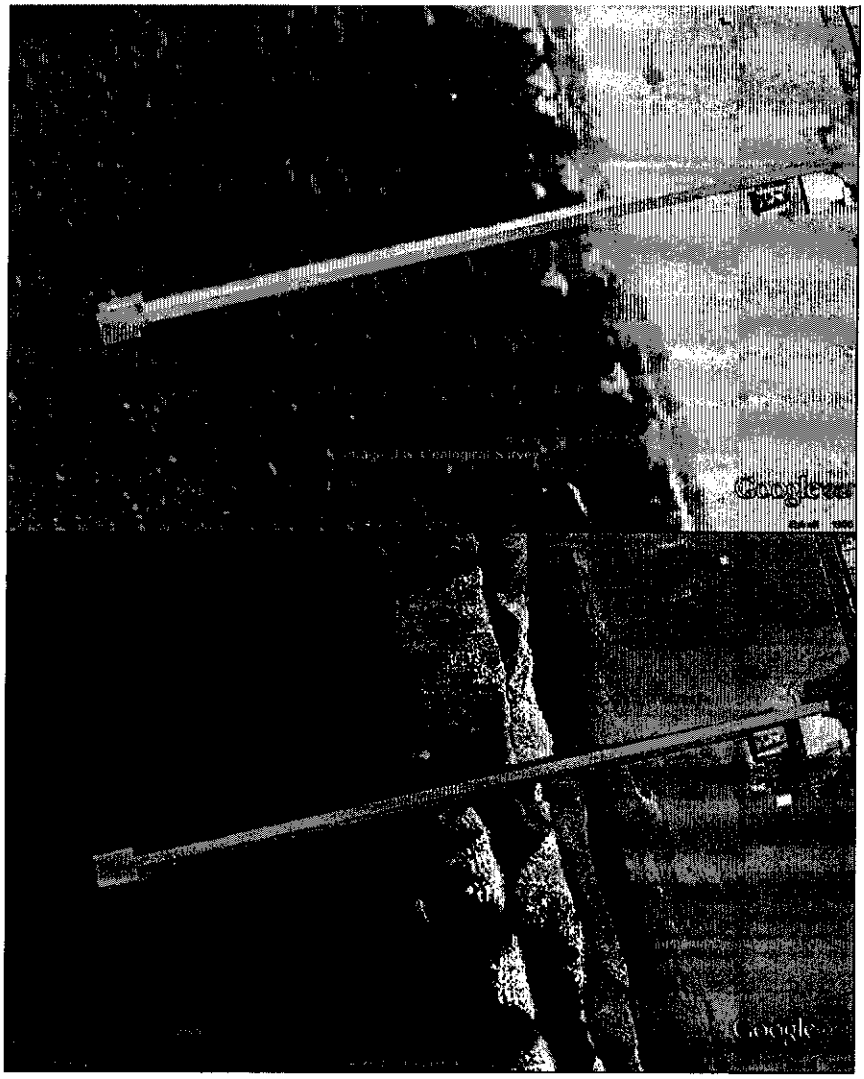


Figure 6 (below). Pier at Hermosa Beach with beach width about 420 ft. Top photo taken 30 May 1994 and bottom 7 March 2011 (courtesy of Google Earth and U.S. Geological Survey).

CORONADO AND SILVER STRAND BEACHES, SAN DIEGO, CALIFORNIA

Introduction

Like the beaches of Santa Monica Bay, Coronado and Silver Strand Beaches are icons of southern California. These beaches extend about 10 miles east and south from the base of the Zuniga jetty at the south entrance to San Diego Bay to the Silver Strand State Beach (Figure 7). Silver Strand received its name from the "silver shell," a bivalve whose shells are often on the beach at water's edge. In addition, the sand contains mica, a mineral that gives the beach a silver sheen. Coronado Beach (Figure 8) was named as America's Best Beach in 2012 by "Dr. Beach," Professor Stephen P. Leatherman of Florida International University (Reuters 2012). Beach width is one criterion in Dr. Leatherman's evaluation. Like the beaches of Santa Monica Bay, Coronado and Silver Strand Beaches are wide and stable as a result of humans disposing excess sand.

The Silver Strand littoral cell in the U.S. extends for about 16 mi from Point Loma to the U.S.-Mexican border (Figure 7) and then about 20 mi south of the border to Punta El Descanso, Mexico. North of the Tijuana river, the Silver Strand littoral cell is one of the few cells in southern California with a significant northerly transport of sand, caused by the

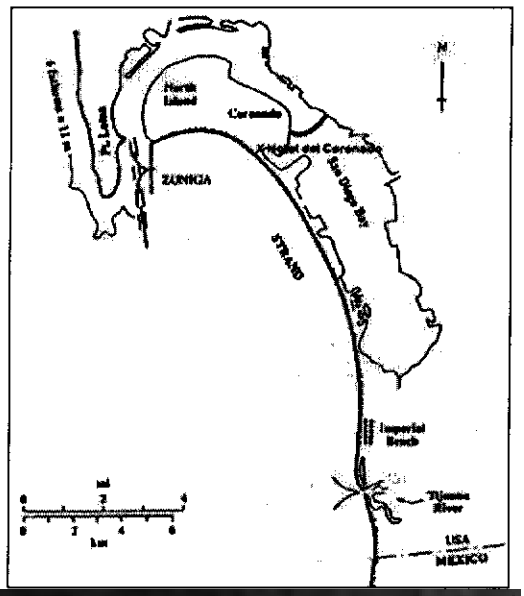
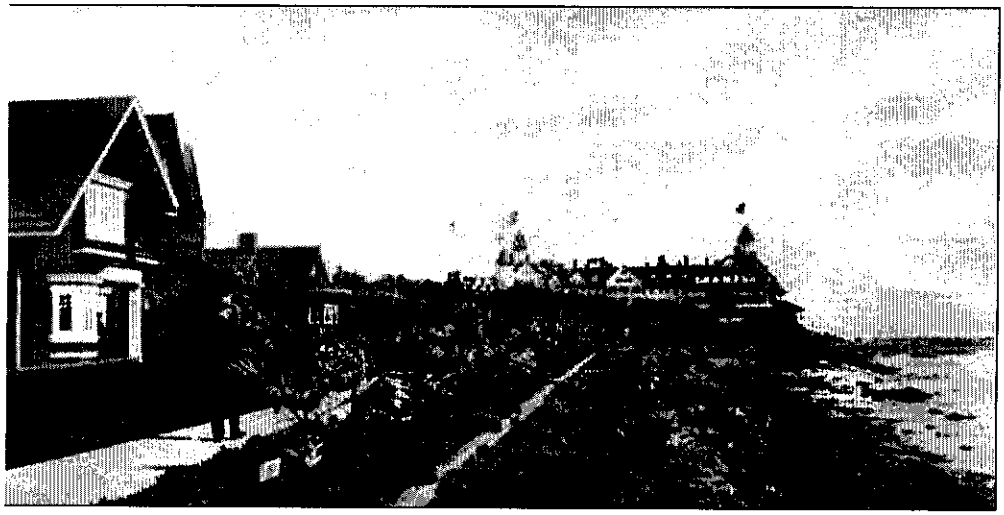


Figure 7 (right). The U.S. portion of the Silver Strand Littoral Cell from Zuniga Jetty to the U.S.-Mexico border (adapted from U.S. Army Corps of Engineers 1991).

Figure 8 (below). Coronado Beach with the Hotel del Coronado in the background.

Figure 9 (bottom). February 1905 view of Hotel del Coronado (Kuhn and Shepard 1984).



wave shadow in the lee of Point Loma (Inman and Masters 1991).

The San Diego River was a source of sediment for the cell, but in 1853 the federal government diverted its flow to Mission Bay because the river was silting the harbor in San Diego Bay (Kuhn and Shepard 1984). The Tijuana River then became the major source of sediment that traveled north to Imperial Beach and then along the Strand and also south toward the border. Prior to building of the Zuniga jetty, which was intended to stabilize the navigation entrance to San Diego Bay, sand flowing north would be deposited in the Zuniga shoals and be recycled through wave and currents to beaches along the Strand. Construction of the 7,500-ft-long Zuniga jetty started in 1893 and was completed in 1904. The jetty became a major littoral barrier, since it strengthened and extended the ebb-tide jet, causing the tidal delta to move to deeper water such that it became a sediment sink (Inman and Masters 1991).

Development of the Silver Strand as a tourist destination began in 1888 with construction of the world-famous Hotel del Coronado (Figures 7 and 8) on a poorly developed sand spit. A 1,400-ft curved jetty was constructed in 1900 for a boat anchorage (Flick 1993). Storms in 1905 caused severe erosion northwest of the hotel and 30,000 two-hundred-pound sandbags were placed to protect it (Figure 9). By March 1905, erosion extended over 100 ft on the northwest side of the hotel (Figure 10). The Beach Erosion Board (1941) concluded that the curved jetty interrupted the northwesterly transport of sand with beaches to the southeast of the jetty accreting slightly following its construction. The board attributed the severe erosion to the northwest to the jetty interrupting sand transport. In response to the erosion, between 1905 and 1908, a massive 5,200-foot-long seawall was built from the hotel to the northwest (Kuhn and Shepard 1984).

As the Silver Strand developed in the 20th century, water-storage dams constructed on the Tijuana River in 1910, 1926, and 1936 caused a substantial reduction in sediment delivered to the coast (Wiegel 1994). Inman and Masters (1991) estimated that approximately 150,000 cu. yd./yr of sand would reach beaches if not entrapped by these dams. This sand deficit has caused serious ero-

sion in the vicinity of Imperial Beach and into Mexico (Inman and Masters 1991) (Figure 11). To counter the erosion, the Navy in 1945 constructed a 600-ft revetment to protect a facility just north of Imperial Beach and Imperial Beach constructed a 1,000-ft-long stone revetment along part of the shore in 1957. A 400-ft groin was constructed in 1961 and a 750-ft groin in 1963, but these groins were not effective in reducing erosion (Wiegel 1994). In 1977, about 1.1 million cu. yd. of sand were added to Imperial Beach, but soon eroded. In 2012 about 450,000 cu. yd. of sand were added to Imperial Beach (NBC San Diego 2012) as erosion problems have persisted.

Until World War II, the Silver Strand was a thin, marginal sand spit that was frequently overtopped during storms and high tides so that Coronado Island was indeed virtually an island (Herron 1980). There was little development except the Hotel del Coronado, which was protected by a large groin and seawall.

Human made beaches

Starting during World War II, the Navy began development of San Diego Bay into a major U.S. Navy base. Almost 34 million cu. yd. of sediments were dredged from the bay from 1941 to 1988 to form navigation channels and in construction of naval facilities (Wiegel 1994). The sediments were deposited on the Coronado and Silver Strand Beaches (Table 2) as a disposal expedient. After the 1946 disposal, beaches from the Zuniga jetty to Silver Strand State Beach widened by 300 to 1,000 ft (Herron 1980).

The extent of beach widening due to disposal of dredged material on beaches can be seen from Figures 12 and 13. Figure 12 shows the Hotel del Coronado in 1926 with the 1,400 ft-long curving groin. There was not a beach northwest of the groin (bottom left in the figure) with water up to the revetment. The beach to the southeast was perhaps 100-150 ft wide. Figure 13 shows the Hotel del Coronado in 2009. The beach northwest (to the left in the figure) of the curving groin extends to its tip. The 5,200-ft revetment that was built between 1905 and 1908 is covered with sand and fronted by a very wide beach. Figure 14 shows the wide beach at the Silver Strand State Beach. About 85% of the dredged material disposed on Coronado and Silver Strand Beaches was placed 65-70 years

Figure 10 (above). March 1905 view looking northwest from the Hotel Del Coronado (Kuhn and Shepard 1984).

Figure 11 (upper right). Severe erosion in Mexico believed to be due to the cutoff of sediment from the Tijuana River (Kuhn and Shepard 1984).

Figure 12 (lower right). Hotel del Coronado in 1926 showing revetment without a fronting beach (courtesy San Diego Historical Society).

Figure 13 (below). A 2009 aerial view of the Hotel del Coronado, showing wide beach northeast of curved groin and extending to its end and southeast beach about half the length of the groin.

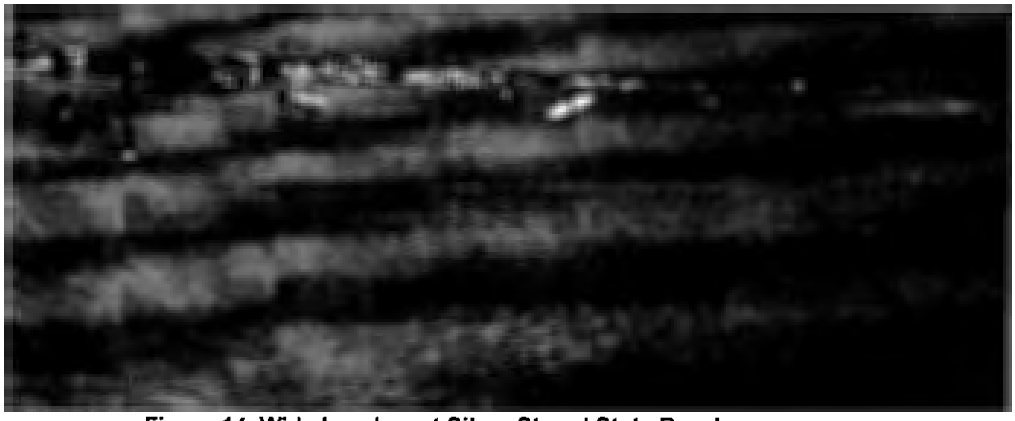


Figure 14. Wide beaches at Silver Strand State Beach.

Table 2. Sand placement on Coronado and Silver Strand beaches

Date	Placement location	Quantity (millions of cu. yd.)
1941	Coronado Beach	2.2
1946	Coronado Beach to Silver Strand State Beach	26.0
1976	Coronado Beach to Silver Strand State Beach	3.5
1977	Coronado Beach to Silver Strand State Beach	1.1
1988	Silver Strand Beach	1.1

Source: Weigel 1994.

ago, but beaches still remain very wide and stable and are a remarkable recreation resource in San Diego.

Economic benefits

San Diego shares with the Santa Monica Bay area the tourism advantage of California being the number one tourist destination in the U.S.; moreover, San Diego was California's leading tourist destination in 2012 (*San Diego Business Journal* 2012). Tourism is San Diego's third largest industry and its leading industry in job growth the past two years (San Diego Chamber of Commerce 2012). San Diego annually hosts 31 million visitors who produce an economic impact of $17 billion (San Diego 2012). *U.S. News and World Report* (U.S. News Travel 2012) ranks San Diego as the fourth best U.S. travel destination and says that "the beach is the marquee attraction."

Lessons learned

As was the case for Santa Monica Bay beaches, Coronado and Silver Strand Beaches were sediment-starved beaches that became wide and stable beaches due to sand placed on them as a disposal expedient. They have remained wide for 65-70 years while updrift beaches at Imperial Beach, which were not nourished, have continuing significant erosion problems. Nourished beaches not only can remain wide for long periods of time, but are inviting enough for Coronado Beach to be named America's Best Beach in 2012. Also like Santa Monica Bay beaches, it is clear that the reduction in sediment transport to the coast either through river diversions or dams has had a significant impact on beaches. But for the need to dispose of large quantities of sand resulting from construction projects and dredging, the iconic beaches of southern California would be narrow, sediment-starved beaches. Nourishing beaches helps to offset human activities that have reduced the quantity of sand delivered to coasts by rivers.

NEW JERSEY BEACH NOURISHMENTS

Introduction

The state of New Jersey has 127 mi of shoreline on the Atlantic Ocean (Figure 15). Caldwell (1966) performed an analysis of sediment transport along this coast using shoreline survey data available from 1838 to 1953. He found a nodal point in the vicinity of Mantoloking (southern edge of Reach 4 in Figure 15) with longshore sediment transport to the south for locations south of Mantoloking and to the north for locations to the north (Figure 16). Ashley *et al.* (1986) also determined a nodal point near this location. The nodal point is not fixed, moving along the nodal zone of zero net transport shown in Figure 16. Caldwell (1966) estimated a transport of 500,000 cu. yd./yr to the north along the entire New Jersey coast. He estimated there was no net transport to the south at Sandy Hook (Reach 2); therefore the net transport was 500,000 cu. yd./yr to the north at Sandy Hook. At the ocean entrance to Cape May Harbor near the extreme south of the coastline (Reach 14), he estimated that net transport was 200,000 cu. yd./yr to the south. With a northern transport of 500,000 cu. yd./yr, this gave a transport component of 700,000 cu. yd./yr to the south.

Barrier islands make up about 80% of the open ocean coast of New Jersey with headlands making up the remaining 20%. Most of Monmouth County (Figure 16) is composed of headlands, which are characterized by narrow beaches at the base of eroding bluffs. These eroding bluffs along with sand on beach faces make up the sediment supply, since rivers provide almost no sand to the coast (New Jersey 1981). Prior to structures that were built to counter shoreline erosion, property records from the 17th century in Monmouth County show that there was up to 2,000 ft of shoreline retreat of the bluffs since about 1650 (Coastal Research Center 2012a). As the coast in Monmouth County developed in the last half of the 19th century, the bluffs were armored with vertical walls and, later in the 20th century, with rock revetments. This armoring cut off sand supply to the littoral system, leading to narrow beaches (Coastal Research Center 2012a). South of Monmouth County, inlets affect net sand transport. Six of the 11 inlets are confined between rock jetties, two have one jetty or armored shorelines that fix the inlet locations, and three have no structures. These inlets and structures have produced shoreline erosion at many locations along the southern coast by interrupting the littoral flow of sand.

From 1915 to 1921, three hurricanes and four tropical storms battered New Jersey. Millions of dollars were spent on uncoordinated shore protection as shoreline erosion problems worsened (New Jersey 2013b). In 1922, the state of New Jersey established an Engineering Advisory Board on Coastal Erosion to investigate beach erosion in the state. These investigations led in 1926 to

formation of a Committee on Shoreline Investigation under the auspices of the National Research Council that made recommendations to New Jersey Gov. A. Harry Moore. Subsequently in 1926, Gov. Moore invited representatives of coastal states of the Atlantic and Great Lakes shoreline to meet in Asbury Park, New Jersey, about beach problems. That meeting was attended by 85 delegates, who decided that a national organization should be formed, leading to the formation of the American Shore and Beach Preservation Association with J. Spencer Smith from New Jersey as its first president from 1926 to 1953 (ASBPA2013).

Erosion problems continued along the New Jersey coast, and in 1971 approximately 82% of the shoreline of New Jersey was classified as having critical shore erosion, another 9% as non-critical shore erosion, and only 9% as being noneroding or stable (Psuty *et al.* 1996). After a couple of years of study, in 1981 New Jersey published the New Jersey Shore Protection Master Plan (New Jersey 1981). In the 1980s, New Jersey authorized creation of a shore protection fund based on revenues collected from a realty transfer fee and other sources with an annual appropriation of $25 million to cost-share projects with the federal and local governments (New Jersey 2013c).

Beach nourishment

Starting in 1989, the Corps of Engineers began beach nourishment projects cost-shared with the state of New Jersey and local governments. Figure 17 shows that about 43 million cu. yd. of sand were placed on New Jersey beaches from 1989 to the middle of 2012 by the Philadelphia District of the Corps. Figure 17 does not include about 25 million cu. yd. placed from Sandy Hook to Manasquan Inlet (Reaches 2-4 of Figure 15) by the New York District. In addition, New Jersey and local communities have placed about 13 million cu. yd. on New Jersey beaches. Total nourishment has been about 81 million cu. yd. at a cost of $602 million. This sand was placed on about 54 mi of the 97 mi of developed shoreline of the total shoreline length of 127 miles (Coastal Research Center 2012b).

A major reason that much of the New Jersey coast is in the status of approved but not constructed is the inability of local governments to obtain easements. In New Jersey, the beachfront owner generally has title to the high-tide mark. Easements are typically needed to build the high dunes necessary to prevent storm flooding. There are many small towns along the New Jersey coast, and they have little leverage to obtain easements. For example, in Harvey Cedars (on Long Beach Island near the northern border of coastal Reach 7 in Figure 15) a court ordered the town of 340 people to pay one beachfront homeowner $375,000 because the out-of-town owner said the new 22-foot-high protective dune ruined

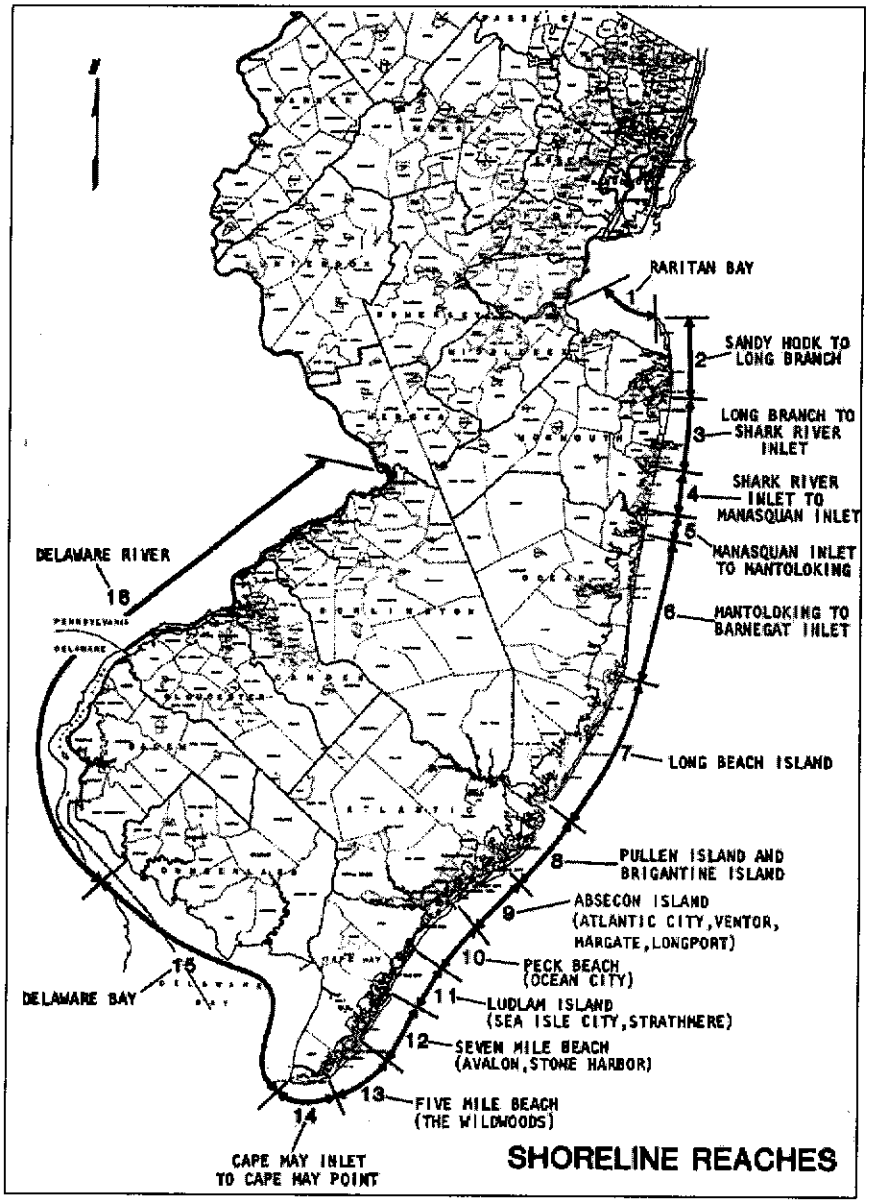


Figure 15 (above). The New Jersey shore coastline divided into shoreline reaches (New Jersey 1981).

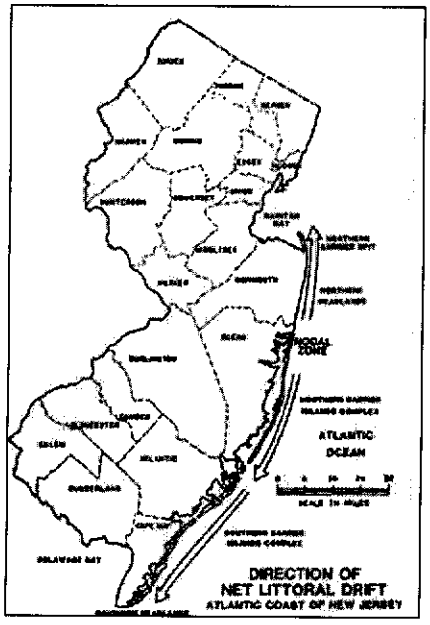


Figure 16 (left). Net littoral drift directions with nodal zone (New Jersey 1981).

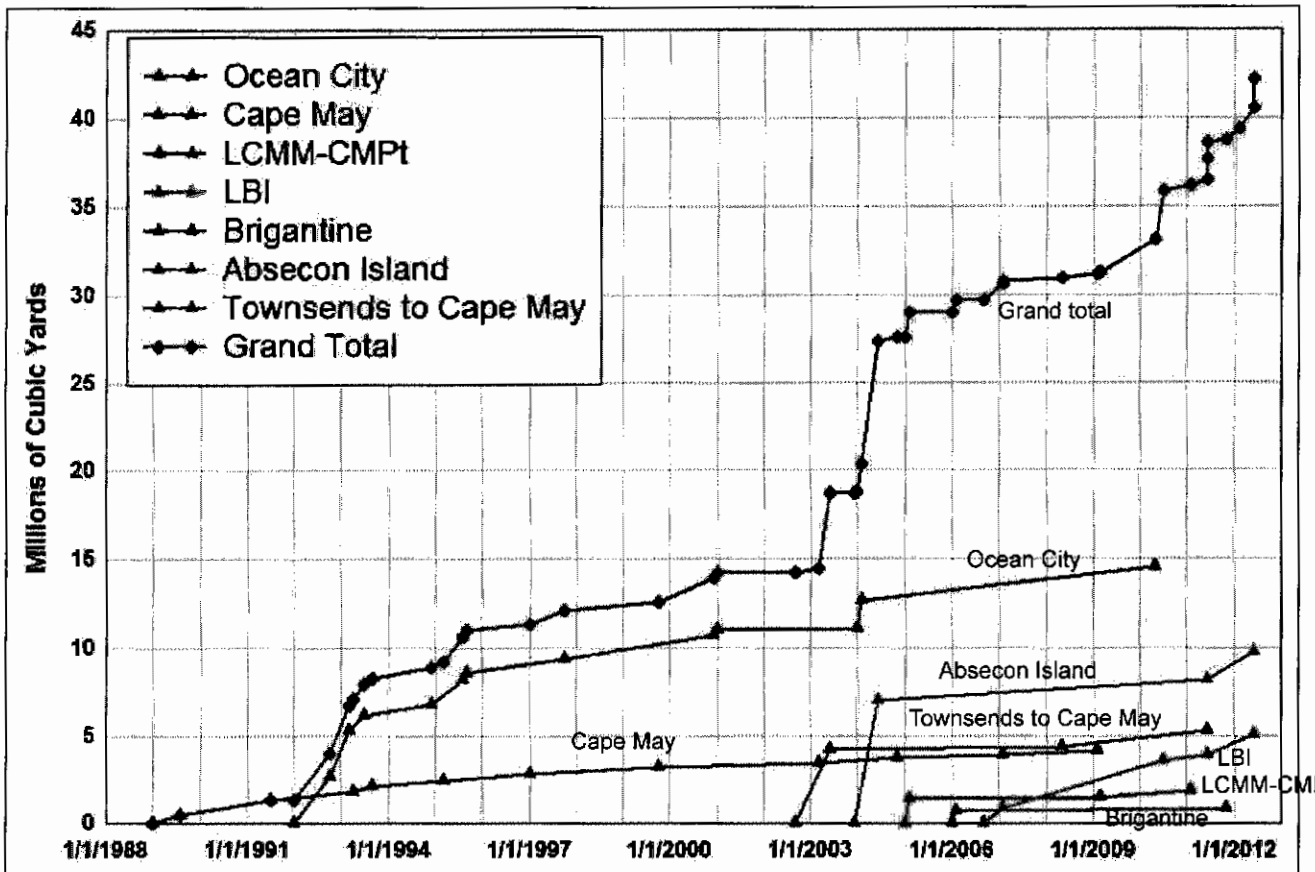


Figure 17. Millions of cu. yds of sand placed by the Corps of Engineers, Philadelphia District, from 1988 to 2012 in cost-sharing beach nourishment projects in New Jersey (U.S. Army Corps of Engineers 2012b).

his view of the ocean, thus decreasing the value of his property. Similar payments would cost the Long Beach Township $45 million for easements. Seaside Heights (middle of Reach 6), rejected high dunes because it was believed the dunes would hurt tourism if visitors could not see the beach unobstructed from the boardwalk (Asbury Park Press 2012). In the 1980s and 1990s, the state of New Jersey tried to create a state coastal commission with powers to plan and engineer shore protection for the entire coastline, but there was local opposition based on the belief that such a commission would regulate growth and usurp local control.

Sandy Hook to Manasquan Inlet (Reaches 2-4) covers 21 miles of the New Jersey shoreline and was the largest beach nourishment project ever undertaken by the Corps of Engineers with an initial nourishment of about 25 million cu. yd. (U.S. Army Corps of Engineers 2012c). Beaches along the project area were often severely eroded with no beach at high tide. There were some gaps in the project where no sand was placed on the beaches (Loch Arbor, Allenhurst, Deal, and Elberon — about the middle or Reach 3) because these communities would or could not provide the necessary real estate easements from owners. Opponents claimed that the nourishment would last 3-5 years at most (Coastal Research Center 2012c). Dery Bennett, at the time president of the American Lit-

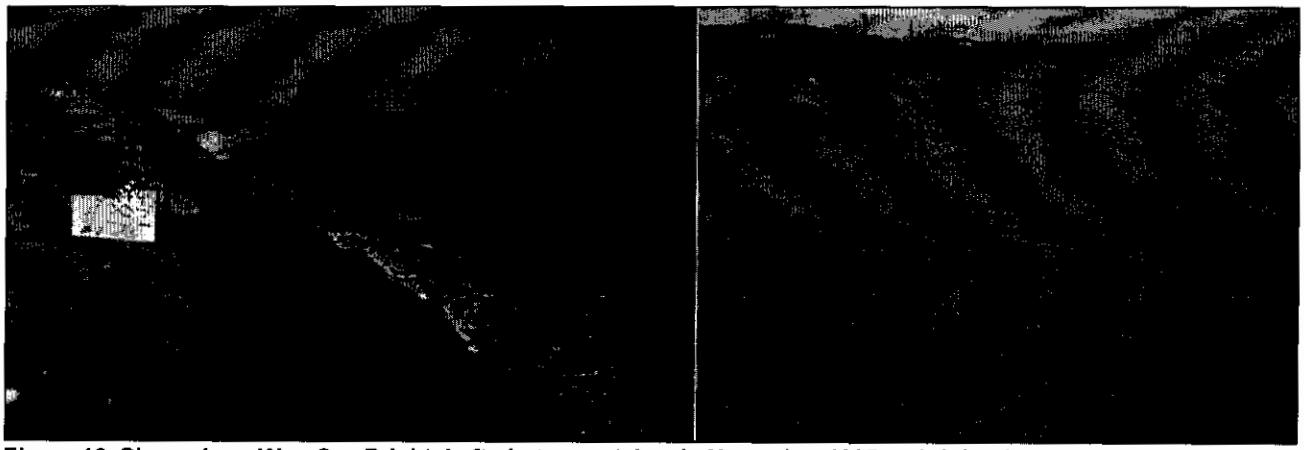


Figure 18. Shrewsbury Way, Sea Bright. Left photo was taken in November 1995 and right photo in November 2011 (Coastal Research Center 2012c).

toral Society, predicted the beach at Sea Bright (about middle of Reach 2) would wash back into the ocean within a year (*Washington Post* 1999). Figure 18 shows there was no beach at Shrewsbury Way, Sea Bright (about middle of Reach 2), in 1995, but in 2011 there was a wide beach. Figure 19 shows profiles in 1995 (just before nourishment in 1996) and 2011 with the beach in 2011 being over 400 ft wide (Coastal Research Center 2012c).

The Coastal Research Center (2012c) noted that in contrast to dire predictions that the nourishment would quickly wash out to sea: "The surveys support a far different result with sites like McCabe Avenue in Bradley Beach (103% of placed volume) (Reach 3) and Brighton Avenue in Spring Lake (135% of placed volume) (Reach 4) 12 years after the project without any further maintenance. Many sites, especially, between Asbury Park and Manasquan Inlet (Reaches 3 and 4) have trends in sand volume over 100% of the sand volume initially placed." As a result, Figure 16 in Coastal Research Center (2012c) shows that the average gain in shoreline width for the 25-year period from 1986 through 2011 was about 160 ft for open ocean beaches within the project. In contrast, the beaches of Loch Arbor, Allenhurst, Deal, and Elberon Ocean, which were not part of the project, have narrower beaches than in 1986. Ocean, Atlantic, and Cape May Counties (Figure 16) have similar results of wider beaches since 1986 in areas that were nourished. The entire 127 mi of ocean beach, only 54 mi of which has been nourished, increased in width by an average of about 100 ft from 1986 through 2011 (Coastal Research Center 2012b).

Storm damage reduction

The Corps of Engineers shore protection projects in New Jersey are justified on storm damage reduction benefits. Hurricane Sandy was a good test of the effectiveness of beach nourishment, including building of protective dunes, in reducing storm damage. Sandy's eye came ashore just southeast of Atlantic City.

New Jersey Gov. Chris Christie said: "If you look at the towns that have had engineered beaches, up and down the state, those are the towns whose damage was minimal. Other towns that didn't, the damage was much greater. I think that's a lesson for us as we move forward." (*New Jersey Star-Ledger* 2012a). U.S.

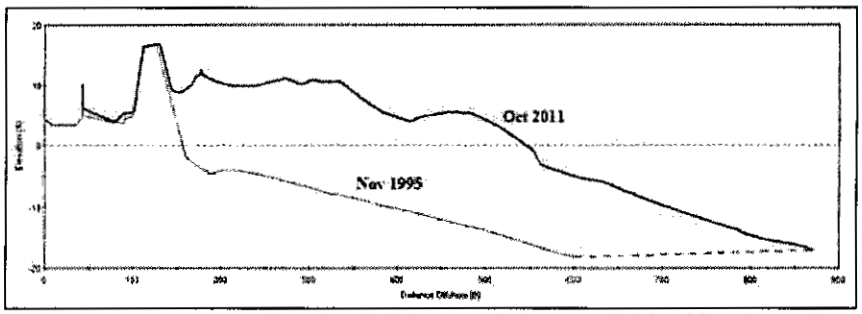


Figure 19. Shrewsbury Way, Sea Bright. Beach is over 400 ft wider than prior to nourishment (Coastal Research Center 2012c).

Figure 20. Brant Beach, which was protected by beach nourishment. Left photograph taken 10 September 2012, pre-Sandy, and right 1 November 2012, post-Sandy. The park bench is the same and remained in its original position (Coastal Research Center 2012d).

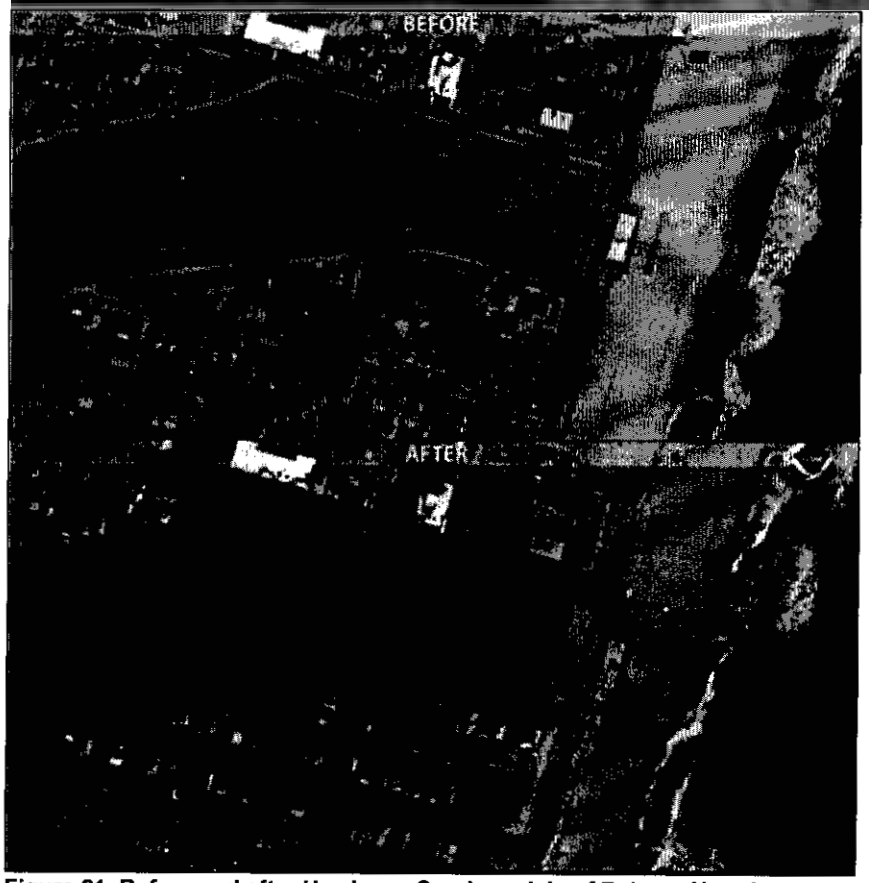


Figure 21. Before and after Hurricane Sandy aerials of Belmar, New Jersey (courtesy Google and NOAA).

Figure 22. Before and after Hurricane Sandy aerials of Ortley Beach, New Jersey (Courtesy Google and NOAA).

Sen. Robert Menendez of New Jersey, referring to Corps of Engineers project areas versus areas without nourished beaches, said: "The Army Corps beaches we had saw very little consequence to property and lives. Where we did not, we saw terrible consequences" (*New Jersey Star-Ledger* 2013).

There were many other anecdotal observations that beach nourishment projects greatly reduced storm damage. However, there also were observations by experts. A leading expert was Dr. Stewart Farrell, director of Stockton College's Coastal Research Center, who has been making measurements of New Jersey shoreline position for 25 years. Dr. Farrell reported: "Places with recently beefed-up beaches saw comparatively little damage. It really, really works. Where there was a federal beach fill in place, there was no major damage — no homes destroyed, no sand piles in the streets. Where there was no beach fill, water broke through the dunes." (Associated Press, 2012). An analysis of damage on Long Beach Island (LBI) noted: "It became perfectly clear that the ACOE (Army Corps of Engineers) shore protection design was sufficient to preclude structural damage along the extent of the LBI coastal shoreline where it had been completed." (Coastal Research Center 2012d).

The *New Jersey Star-Ledger* (2012b) reported that at locations on LBI where there was no beach nourishment, such as Holgate on the southern tip of LBI, "... the destruction was complete. Older homes were ripped from foundations and tossed about as the ocean met the bay. 'Devastating,' said Matt Reitinger, a 26-year-old Brant Beach resident who biked and walked 6 miles to see the damage in Holgate. 'It's a complete war zone down here.'" Reitinger's home at Brant Beach was protected by a recent beach nourishment and was not damaged. Figure 20 shows before and after Hurricane Sandy pictures of Brant Beach. Coastal Research Center (2012d) reported: "Brant Beach was the most recent segment of LBI to receive the Army Corps beach replenishment project completed in early 2012. This site showed similar results as seen in Harvey Cedars and Surf City where the dune and beach took the impact with losses to the beach width and elevation and erosion to the seaward dune slope. No overwash or wave damage was observed." "In Harvey Cedars, no homes were lost, even though the 1962 storm destroyed half of the municipality." (*New Jersey Star-Ledger* 2012c). Harvey Cedars was protected by a beach nourishment project before Hurricane Sandy, but not before the 1962 storm.

Further north, at Belmar, New Jersey, which was protected by a Corps of Engineers beach nourishment project, there was little damage (Figure 21). There was heavy damage about 15 miles to the south, at Ortley Beach, New Jersey (Figures 22 and 23), which did not have a beach nourishment project. Figure 24 shows before and after photographs of Shrewsbury Way, Sea Bright, the same location seen in Figures 18 and 19. There was little damage with the beach losing about 75 feet of its 400-ft width during Hurricane Sandy, but the sand appears to be just offshore and is expected to largely return. The average loss of beach in New Jersey during Hurricane Sandy was only 30-40 ft, and much of this may return. Nourished beaches were typically hundreds of feet wide, so most of the sand remains, protecting against future storms and attracting tourists (Associated Press 2012).

Economic benefits

Tourism is a major industry in New Jersey with 80 million tourists spending $40 billion in 2012. About 1 in 10 jobs in New Jersey supports the travel and tourism industry. Tourism generates $4.5 billion in New Jersey state and local taxes and $5.1 billion in federal taxes. In the absence of state and local taxes, each New Jersey household would need to pay $1,380 to maintain governmental revenues. About 68% of visitors were from out of state and another 9% were international tourists. Therefore, international tourists spent about $3.4 billion in New Jersey in 2011 (New Jersey 2012, New Jersey 2013a).

Beaches are significant tourist attractions. Figure 25 shows a heavily used New Jersey beach. Over 70% of tourist spending is in the coastal counties shown in Figure 16 (New Jersey 2012). Cape May County is a typical example of the importance of beach tourism. Of the 19 million visitors to Cape May County annually, 89% of visitors come to enjoy the beach. Beach tourism produces 48% of economic activity in Cape May County and generates $460 million in federal taxes (Cape May County 2012). Klein *et*

al. (2004) show that New Jersey beach tourists spend $40 annually for each $1 invested in beach nourishment by the federal, state, and local governments.

Lessons learned

Wide beaches and high dunes *significantly* reduce damage from storms including hurricanes. Hurricane Sandy caused $36.8 billion in damage in New Jersey, mostly in the coastal areas of Monmouth and Ocean Counties, destroying 30,000 homes and businesses (Philly.com 2012). However, those areas protected by beach nourishment sustained much less damage. A prime example is Long Beach Township, New Jersey (Reach 7). Long Beach Township Mayorl, Joseph Mancini said that, of the estimated $750 million in damages to the township, three-quarters of it was from hurricane surge. He said had a beach nourishment project been in place, which had been on hold for more than a decade because of problems obtaining easements, damage would have been reduced by about $500 million (*New Jersey Star-Ledger* 2012e). One section of the township, Brant Beach, had been nourished and sustained minimal damage (Figure 20).

Not only are there costs to rebuild houses and infrastructure, there will be long periods without tourist income in badly damaged areas, whereas areas protected by nourished beaches rapidly opened for business. For example, despite the eye of Hurricane Sandy coming ashore just to the southeast of Atlantic City, Atlantic City was protected against significant storm damage by its nourished beaches, and casinos were up and running in 4-5 days (*USA Today* 2013). Cape May County has been advertising that its nourished beaches and supporting infrastructure are open for business (Philly.com 2012). Beach nourishment protected Ocean City, New Jersey, from significant damage, and city leaders called a media event on 18 December on the Ocean City Boardwalk, which had received "very little damage," to showcase that Ocean City is "recovered, restored and ready for your visit" (*Ocean City Gazette* 2012).

The reduction in Hurricane Sandy damage due to beach nourishment projects being in place can be estimated using damage figures. Long Beach Township Mayor Joseph Mancini estimated that had there been a beach nourishment project at the township, the township would have sustained only about a third of the damages it did. Assuming the same reduction in damages at all shoreline locations that had beach nourishment and with about half the developed shoreline protected by beach nourishment, shorelines without beach nourishment sustained about three times the loss as those protected by beach nourishment. Therefore of the $36.8 billion in damages, roughly $27.6 billion was at locations without beach nourishment and $9.2 billion was at locations with beach nourishment protection. Had the nourishment not been in place, the damage would have been $27.6 billion - $9.2 billion = $18.4 billion greater. This does not include loss of a portion of tourist spending of $40 billion annually, including $22 billion in the four coastal counties (New Jersey 2013a). Coastal locations such as Atlantic City that were protected by beach nourishment were back in operation in days or a few weeks. However, the half of the coast without beach nourishment was heavily damaged and some portion of the $11 billion spent by tourists at these coastal locations may not be spent in 2013. Moreover, with beaches typically hundreds of feet wide prior to Hurricane Sandy and average beach erosion during Sandy of only 30-40 ft, most of the sand placed on beaches remains to continue to protect against future storms and attract tourists.

The primary reason that beaches were not nourished prior to Hurricane Sandy, even though projects were authorized, was the need for easements to build dunes. It is clear that some have learned a hard lesson from Hurricane Sandy. The *New Jersey Star-Ledger* (2012e) reported: "Long Beach Township Mayor Joseph Mancini said he has no choice but to get tough with residents who he contends are partially responsible for the devastation wrought by Hurricane Sandy. Mancini says he's enforcing a 2-year-old revised ordinance that makes these 'holdouts' responsible for maintenance of

Figure 23 (above). Destruction at Ortley Beach, (*New Jersey Star-Ledger* 2012d).

Figure 24 (below). Shrewsbury Way, Sea Bright. Same beach as Figures 18 and 19. Left is before Hurricane Sandy on 28 March 2012, and right is after Hurricane Sandy on 26 November 2012 (Coastal Research Center 2012e).

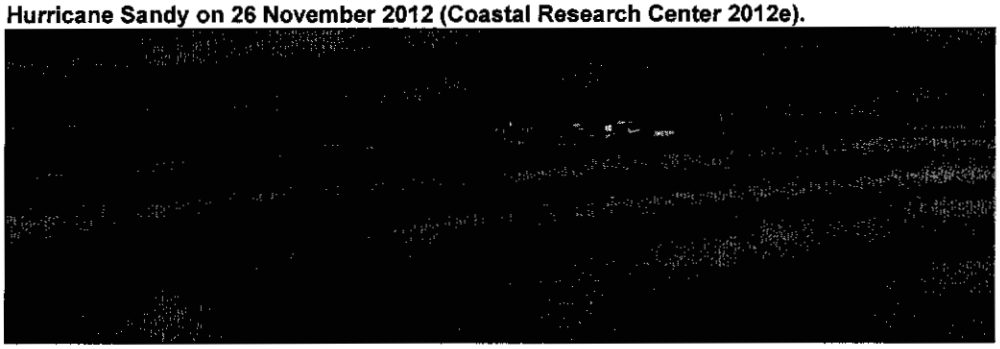


Figure 25. A busy day at Jenkinson's Beach, New Jersey, July 2009.

their dunes, which protect all residents. So for those oceanfront homeowners who haven't signed easements to allow for beach nourishment projects on their property, they will have to pay tens of thousands of dollars to have an engineer design and build the dunes with the township's approval before they can get a permit to rebuild their homes. 'We're playing hardball, yeah, absolutely,' Mancini said. 'We have the ordinance. We've never enforced it to date. But, obviously, we have to now,' he said."

FLORIDA'S BEACH PROGRAM

Introduction

Florida's beaches, with their warm clean waters and generally mild waves are recognized as a national and international recreational asset. These beaches serve as an economic engine, drawing many visitors to the state, thus contributing substantially to the tourist industry. Commencing in the 1970s, in response to concerns over inappropriate coastal development, the Florida Legislature developed provisions to ensure that the beach resources would be maintained and available for future generations. In addition to construction regulations, these provisions included the recognition of the value of beach nourishment through monitoring and state cost participation. The earliest large nourishment projects commenced in the mid-1970s with the construction of the Jupiter Island, Delray Beach, and Miami Beach projects, two of which are reviewed separately in this paper in greater detail. The overall success of the state's 62 beach nourishment projects is underscored by the facts that first, many of the beachgoers don't realize that the beaches are nourished and, secondly, all of the beaches that have been selected for nourishment have been renourished when considered appropriate, resulting in beaches that are wider than when the state awareness occurred about 35 yrs ago.

Beach nourishment performance

Fortunately, the state of Florida has developed a unique database tracking the condition of the beaches, including shoreline positions extending back some 140 yrs and more limited profile data. Absalonsen and Dean (2010, 2011) have analyzed this extensive shoreline position data set that is organized on a county-by-county basis (there are 24 coastal counties). Further detail describing the data is available in Absalonsen and Dean (2011) and onlione at http://nsgl.gso.uri.edu/flsgp/flsgpm10001.pdf.

The analysis determined the average shoreline change rates for three different periods: (1) prior to large scale beach nourishment (about 1970); (2) since beach nourishment; and (3) all of the data. The results for the east and west coasts (each about 360 mi) are discussed following.

The methods applied by Absalonsen and Dean do not allow direct quantification of the sediment *volumes* remaining due to nourishment. However, as of 2010, the average shorelines gained approximately 44 and 27 ft due to the nourishments on the east and west coasts, respectively. During the second (nourishment) period, the Program for the Study of Developed Shorelines (http://beachnourishment.wcu.edu/) indicates that 132.0 and 91.4 million cu. yd. of beach nourishment were placed on the east and west coast shorelines, respectively. Calculations were carried out to estimate volume changes based on shoreline changes. These resulted in the approximate percentages of nourishment sediment volume remaining on the beaches: East coast 55% and west coast 40%. The shoreline position data base has also been analyzed to examine patterns of beach erosion. Inlets which have been improved for navigation are responsible for approximately 80-85% of erosion on the east coast of Florida (Dean *et al.* 1988) with lesser effects on the west coast. Prior to 1986 when legislation was passed requiring improved sand management practices at inlets, much of the sand dredged for navigational channel maintenance was placed seaward of the depth zone at which waves could transport the sand back into the active system.

Many "before" and "after" photographs exist providing qualitative testimony of the performance of Florida's beach nourishment program. In addition to those presented elsewhere in this report for Delray and Miami Beaches, four sets are presented below. Figure 26 presents the approximate locations of the Florida beach nourishment projects highlighted in this paper. The first set is for Jacksonville/Atlantic Beaches, Florida, where the deepened navigational entrance at St. Johns River has interrupted the net southerly sediment transport. The erosion conditions in the mid-1960s and 1970s were severe as shown in Figure 27. Figure 28 presents three photographs at the same location with the last in March 2010. To date, more than 13 million cu. yd. have been placed as nourishment south of the St. Johns River entrance. The estimated net longshore sediment transport in the area is southward at approximately 500,000 cu. yd./yr (Dean and O'Brien 1987). Thus the nourishment is equivalent to approximately 26 years and is considerably less that the impact of the entrance since the mid-1970s based on this net transport.

Figure 29 presents before and after nourishment photographs at Fort My-

ers Beach in Lee County, Florida, and Figure 30 shows similar photographs in Lee County for Captiva Island, Florida. Finally, Figure 31 presents before and after nourishment photographs in Brevard County. It is clear that prior to nourishment, the suitability of these beaches for recreation and turtle nesting activity was severely limited.

Environmental benefits of beach nourishment in Florida

Florida's beaches also provide valuable sea turtle nesting habitat as will be discussed further in the section describing the Delray Beach nourishment project. Along the Florida beaches, loggerhead turtles are the most dominant species followed by greens followed by leatherbacks — Loggerheads are on the threatened list in the U.S. and greens and leatherbacks on the endangered list. Beginning in 1989, the Florida Fish and Wildlife Research Institute started a program of monitoring so-called "core index beaches" for sea turtle nesting. These index beaches comprise approximately 200 mi of the nesting beaches of Florida and include approximately 69% of known loggerhead nests, 74% of green nests, and 34% of leatherback nests (http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/). Figures 32, 33, and 34 show the annual numbers of nests for each of the three species. Loggerhead nests have varied between about 30,000 and 60,000 nests per year. A total of 60,000 nests (loggerheads) over 200 mi represents an average of 300 nests per mi, or a nest every 18 ft. The number of nests has been reasonably consistent except for a reduced number during the decade 2000 through 2009. Witherington *et al.* (2009) have examined possible causes of this decline and determined that fisheries including long lining are the most probable cause followed by food resource decline and disease. Green turtles exhibit an interesting biennial pattern of nest numbers. Overall, it is clear that during the period of record (1989-2012), the numbers of all three species have not been adversely affected by beach nourishment. During the 23-yr period represented by the monitoring, the numbers of green and leatherback nests have increased by factors of approximately 7 and 10, respectively and the numbers of loggerhead nests has remained reasonably constant.

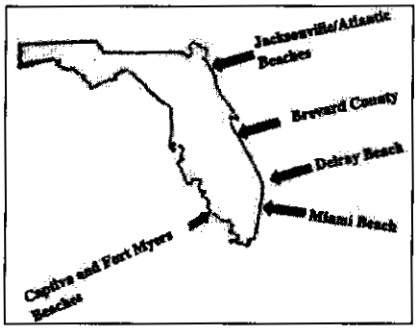


Figure 26. Locations of Florida beach nourishment projects highlighted.

Economic benefits

The economics of beaches and individual beach nourishment projects in Florida are impressive and have been studied in considerable detail. Although these individual studies are too numerous to discuss here, the reader is referred to Murley *et al.* (2003, 2005) for additional information. Murley *et al.* (2005) found that 38% of Florida tourists were beach-oriented tourists in 2003, the latest year that statistics were available. Assuming

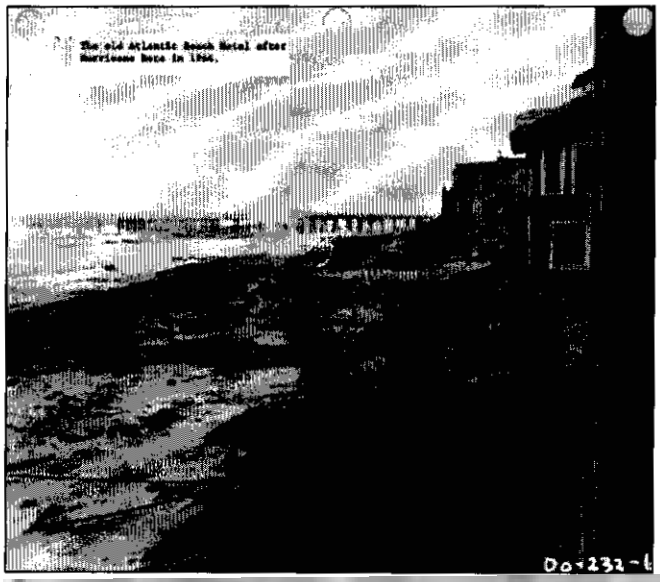
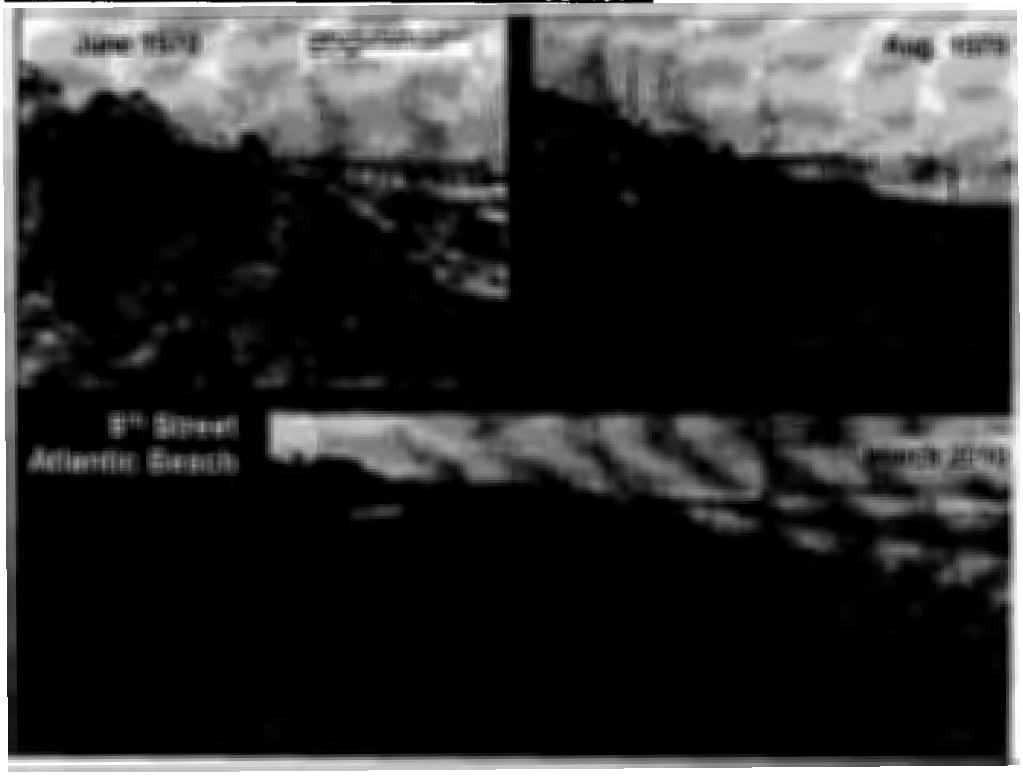


Figure 27 (left). Damage to Atlantic Beach after Hurricane Dora in 1964 (from archives, Jacksonville District, Corps of Engineers).

Figure 28 (below). Conditions at a location along Atlantic Beach (north of Jacksonville Beach) for three different times (from Howard *et al.* 2011).



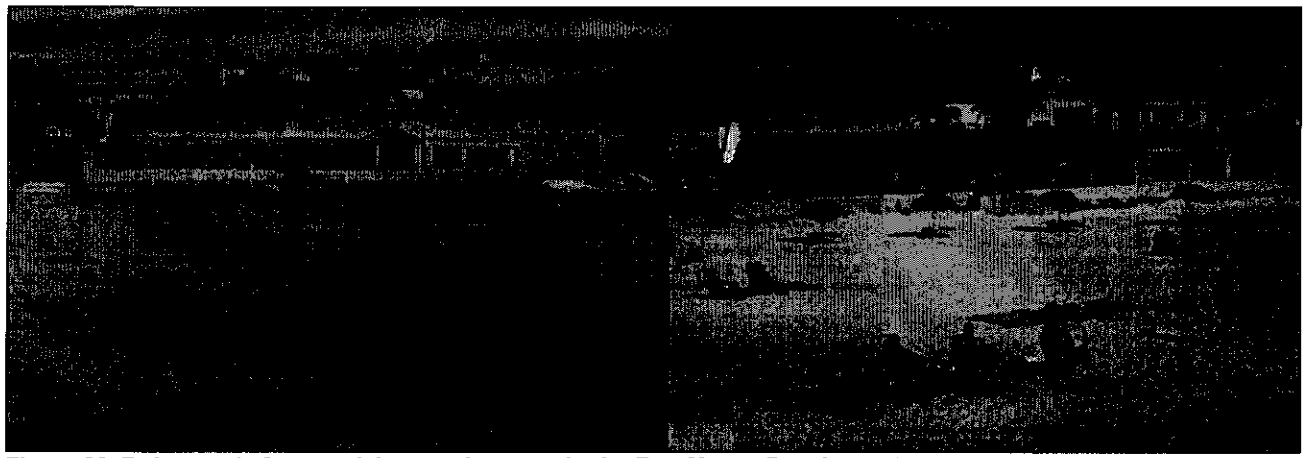


Figure 29. Before and after nourishment photographs for Fort Myers. Beach nourishment completed in late 2011 (courtesy of Steve Boutelle, Lee County).

this percentage is true in 2011 and using tourism statistics from VisitFlorida (2012), in 2011 more than 33 million beach tourists visited Florida, spent more than $25 billion, paid more than $1.5 billion in sales taxes, and supported 392,000 jobs. Since Florida appropriated $16 million for beach nourishment in 2011(*Tampa Bay Times* 2011), for each $1 appropriated for beach nourishment, it received about $1560 in beach tourist spending and $94 in sales taxes. The state maintains 160 parks, and the top five state parks visited in 2010 were beach parks. William Stronge, chair emeritus in economics, Florida Atlantic University, noted that "Florida beaches, the biggest attraction to out-of-state tourists, are playing a critical role in helping the state pull out of the most severe recession since the 1930s" (Florida Shore and Beach Preservation Association 2011).

Lessons learned

Several components of Florida's comprehensive beach management program are essential. These include solidly established recognition of the services provided by the beaches, which can include recreation, economic, environmental, and storm damage reduction; and realizing that different areas will provide various degrees of the individual services. Dissemination of this information to legislators and the general population to ensure their financial and other support is critical. This dissemination must be conducted in a near-continuous mode as legislators change and have other pressing problems and the general public can tend to consider the beach resource as a "given" which does not need maintenance. Monitoring nourished and non-nourished beaches will establish the need for nourishment and the performance of nourishment projects, including the various service components listed above. Developing an understanding of the non-nourished beach system including erosion causes and rates will aid in planning future nourishment needs and in identifying appropriate corrective actions. Developing and maintaining a running history of the beaches will provide rationale to legislators for significant beach-related decisions, quantification of the benefits of the program, and education at all levels of the general public.

DELRAY BEACH, FLORIDA

Nourishment project

The city of Delray Beach is located on the southeast coast of Florida approximately 40 mi north of Miami Beach (Figure 26). In 1899 the Gleason family, which owned the oceanfront, dedicated it to the public. In the 1920s, the natural dunes were leveled as the coast became developed (Delray Beach 2012a). Currently 51% of the beach frontage consists of public parks.

In the late 1960s the shoreline had eroded and was quite narrow resulting in frequent damage to a coastal highway (Figure 35), which also served as a hurricane evacuation route. In response to this erosion, the city constructed both stone revetments and an interlocking concrete revetment. The interlocking revetment was damaged by waves on several occasions (Figure 36), resulting in a decision to construct a beach nourishment project,

Figure 30. Before and after nourishment photographs for Captiva Island (courtesy of John Bralove).

an approach which at that time, had not been tested thoroughly in Florida. Based on Figure 36, it is evident that at that time the recreational attraction of this beach was limited, as was its suitability for sea turtle nesting habitat.

The first city of Delray Beach nourishment project was constructed in July of 1973 along 2.7 mi of shoreline (Figure 37). The sand was dredged from offshore and was considerably finer than the native sand. The immediate post-construction surveys showed an average mean high water beach widening of 260 ft but the beach equilibrated to about half that width within the first few years. The 1973 project placed approximately 1.6 million cu. yd. of material, of which 0.5 million cu. yd. had eroded by 1977. In 1974, dune vegetation was planted to augment the beach nourishment project and to assist in reducing the losses due to wind blowing fine sand across the coastal road and covering the adjacent lawns. Figure 38 shows wide dunes covering the interlocking concrete revetment after nourishment.

Delray Beach acts as a "feeder beach" — that is, sand placed on this beach spreads out and flows to neighboring beaches, thereby nourishing them. Beachler and Mann (1996) analyzed monitoring surveys from 1974 to 1992 at Delray Beach and determined that of the 4.6 million cu. yd. placed up to that time, 2.0 million cu. yd. had been "lost" from the project limits and that significant quantities of sand had accumulated both north and south of the project limits. Analyses concluded that 85% of the volume lost from the project area could be accounted for by deposition north and south of the project area. The annual storm damage reduction and recreational benefits to the city of Delray Beach and adjacent communities were $10.2 million, resulting in an annual benefit/cost ratio of 10.4.

As of 2012, a total of more than 6.25 million cu. yd. of sand has been placed on Delray Beach over a period of 39 years as a result of five beach nourishments (1973, 1978, 1984, 1992, and 2002) with more than half of this amount remaining within the project area in 2009. A relatively small storm damage repair was also constructed in 2005 (250,000 cu. yd.) following a series of hurricanes that impacted Florida during the 2004-2005 hurricane seasons. The Delray Beach Fifth Periodic Beach Renourishment Project was initiated in February 2013. That project will place approximately 1,208,000 cu. yd. of fill on the beach along a distance of about 1.9 mi. Figure 39 presents a 2011 Google aerial of the central area of the Delray Beach project — the beach width in this area is approximately 300 ft.

The annual monitoring of Delray Beach project and its simple setting of nourishment on a long straight beach provides a basis for testing various predictive models. Figure 40 presents the history of measured volume changes

Figure 31. Before and after nourishment photographs for Brevard County (before photo courtesy of Olsen Associates Inc.; after photo courtesy of Paula Berntson, Brevard County Natural Resources Management Office).

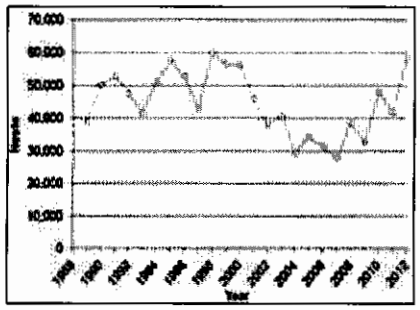


Figure 32 (left top). Number of loggerhead turtle nests on Florida Core Index Beaches (Florida Fish and Wildlife Conservation Commission 2012).

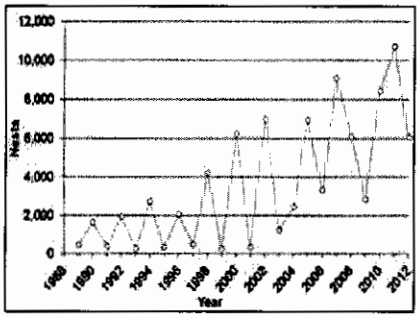


Figure 33 (left middle). Number of green turtle nests on Florida Core Index Beaches (Florida Fish and Wildlife Conservation Commission 2012).

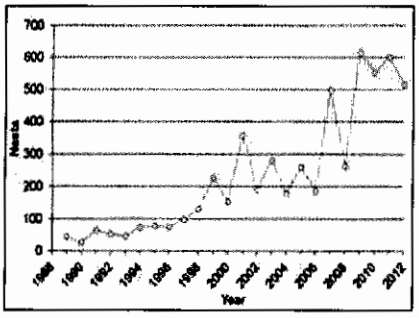


Figure 34 (left bottom). Number of leatherback turtle nests on Florida Core Index Beaches (Florida Fish and Wildlife Conservation Commission 2012).

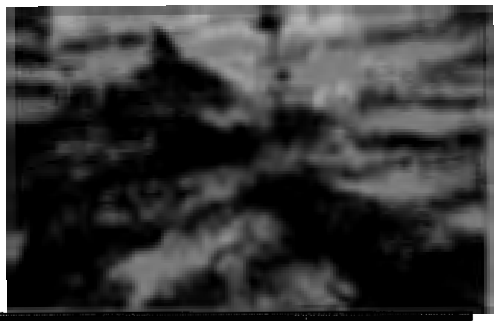


Figure 35. Emergency dumping of riprap to protect a coastal highway at Delray Beach threatened by erosion during storms (courtesy of Coastal Planning and Engineering Inc.).

Figure 36. Damaged interlocking concrete revetment. Photograph from the early 1970s (courtesy of Robert G. Dean).

Figure 37 (above). Delray Beach before and after beach nourishment in 1973 (courtesy of Coastal Planning and Engineering, Inc.).

Figure 38 (below). Delray Beach revetment after beach nourishment (Federal Highway Administration 2012).

within the project area and also presents a comparison of the measured and calculated volume changes remaining within the project area. The calculations are based on the method of Pelnard-Considère (1956), and results are presented for a longshore diffusivity, G (proportional to wave height to the 2.5 power), with a value of 0.06 ft^2/s. It is seen that at times the calculated volumes remaining are greater than the measurements and at other times less. This is due to the calculations based on a single "representative" wave height whereas in nature, some years are more "stormy" than others (the actual G values vary with time). Comparisons such as this provide an effective basis for calculating performance of future projects. The time between renourishments has increased from 5 years to 10 years (except for the relatively small hurricane repair in 2005). Additionally, as is evident in Figure 39, the additional sand volume within the project area has increased from 1.6 million cu. yd. in 1973 to 3.8 million cu. yd. in 2009. The increase in nourishment interval with increasing time can be explained by the reduction of spreading losses as the earlier projects in effect produce a longer project and thus slow sand transport from the project area.

In addition to the increase in beach-width benefits noted above, there were substantial benefits to the nesting sea turtles. Monitoring has shown that on an average basis, there are approximately 200 nests annually on this nourished beach (versus essentially zero during the early 1970s when the beach was as seen in Figures 35 and 36). Nourishment events usually suppress the sea turtle nesting density for several years followed by a return to normal levels as shown in Figure 41.

Economic benefits

Tourism is Florida's largest industry, and tourism at Delray Beach is a small part of the industry. Delray Beach along with a neighboring city beach receive 1.5 million visitors per year with about 42% of the visitors from out of state or international visitors (Delray Beach 2012b, Murley *et al.* 2003). In 1995 Delray Beach completed an analysis of the economic impacts of the beach nourishment project addressing enhanced property values, and resident and tourist spending. It found that the project increased values in Delray Beach and surrounding communities by $228.8 mil-

lion (a 15%-20% in increase in property values, Beachler and Mann 1996) and produced an additional $152.8 million in annual expenditures throughout the state as a result of the increased property values. The project produced $4.2 million in annual ad valorem taxes and $45.4 million in annual tourist spending. The state of Florida received an additional $1.3 million in state revenues from tourist spending with 5,444 jobs created annually throughout the state and a payroll of $144.3 million (Delray Beach 2012c).

Delray Beach was selected as one of the 2002 American Coastal Coalition Top Restored Beaches Awards. The awards committee selecting Delray Beach cited the long-term success and economic benefits that have resulted from the city's beach nourishment and maintenance program. Delray Beach was named in 2012 by USA and Rand McNally as the "Most Fun Small Town" in America (Figure 42) (PalmBeachTourismNews.Com 2012), an indication of the importance of beaches to tourism and the quality of life. It is one of the 10 Florida locations nominated for the 2013 *USAToday* "Best Beach Town in Florida" Award (*USA Today* 2012).

Lessons learned

Dean (2002) showed that lateral spreading of sand is a function of beach nourishment length with the greater the nourishment length the slower the lateral loss of sand. The lateral sand motion benefits adjacent beaches, but causes a loss in benefits at the location of the original nourishment. There are often small adjacent towns on coastlines. If these towns do not join together, it reduces the incentive for one of them to nourish its beaches and have some of the benefits flow to adjacent towns that did not share in the cost. However, as the sand spreads laterally, in effect, the beach fill lengthens, and thus lateral losses slow. This is seen for Delray Beach where the time between renourishments has increased from 5 years to 10 years and there has been an increase in the sand volume within the project area from 1.6 million cu. yd. in 1973 to 3.8 million cu. yd. in 2009.

MIAMI BEACH

Introduction

The barrier island on which Miami Beach is located began as shallow reefs on which mangrove trees grew and trapped sediments and over time formed low

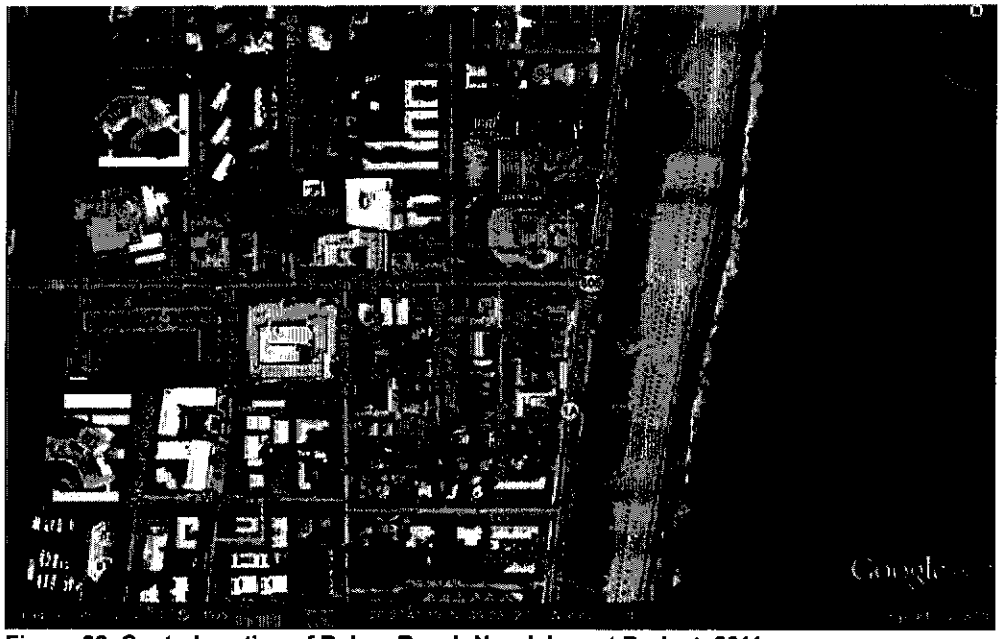


Figure 39. Central portion of Delray Beach Nourishment Project, 2011. Compare with same approximate location in Figure 36 (courtesy of Google Earth).

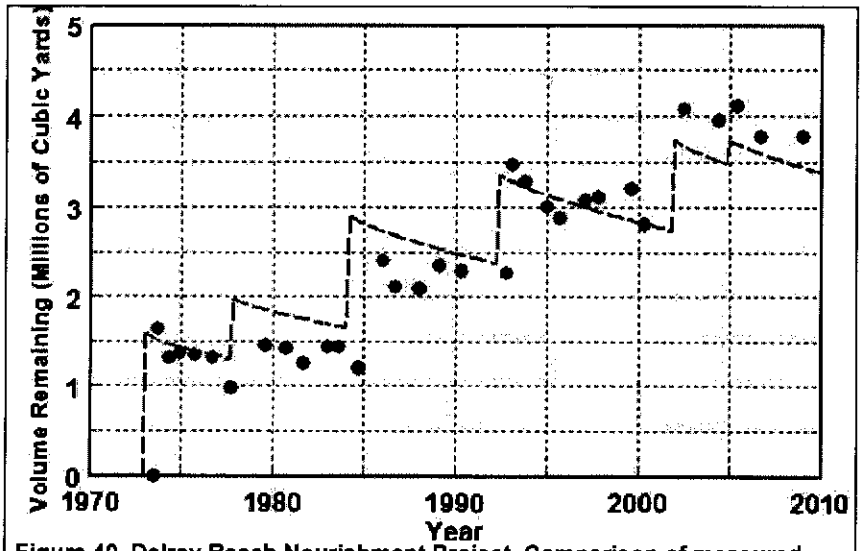


Figure 40. Delray Beach Nourishment Project. Comparison of measured (dots) and calculated (dashed Line) volume remaining within the Project area. Longshore diffusivity, G = 0.06 ft²/sec, and background erosion of 1 ft/yr considered.

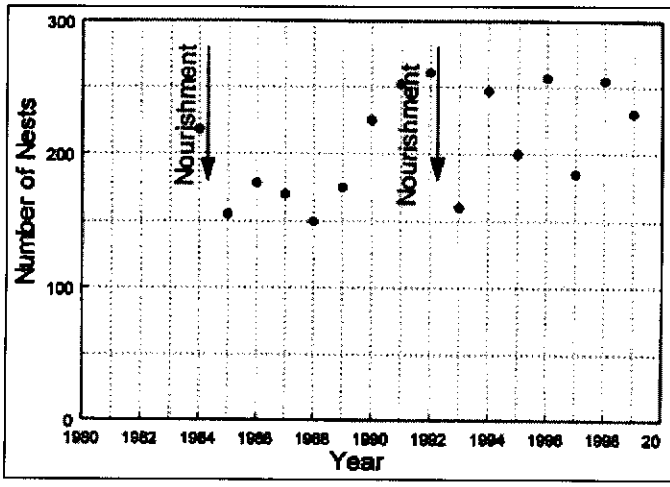


Figure 41. Sea turtle nesting within Delray Beach, Florida, beach nourishment project (plot based on data from John Fletemeyer, personal communication).

islands (Wiegel 1992). It was acquired by John Collins and Thomas Pancoast in 1913, and they began clearing the mangrove forest (Figure 43) and building up parts of the land using dredges. In 1913 they built a wooden bridge from Miami to Miami Beach, providing good access. Hotels were built, and during the Roaring Twenties Miami Beach became a tourist resort and prospered with the construction of resort hotels (Figure 44) (Miami Beach Historical Association 2012). The Miami Beach peninsula became an island in April 1925 when Baker's Haulover Inlet was opened (Figure 45).

Miami Beach was hit in 1926 by the most severe hurricane since records had been kept. Water swept over the island with sand transported up to 1,000 ft inland, covering city streets up to 3 ft. This destruction, collapse of a land boom in Florida, and arrival of the Depression put a temporary end to Miami Beach's great prosperity. However, in the 1930s, Miami Beach continued to attract tourists with mostly small hotels and rooming houses built for seasonal rental in the style of "Art Deco." These buildings still make up the famous historic district in Miami Beach.

Cutting mangrove trees that covered the island, dredging, and building the north jetty at Government Cut and south jetty at Baker's Haulover Inlet (Figure 45) created sandy beaches, which were the major tourist attraction of Miami Beach (Wiegel 1992). As mentioned earlier, the state of Florida has a database of shoreline position at monuments in 24 Florida counties with sandy beaches. One shoreline position monument is at a location about 2.4 miles south of Baker's Haulover Inlet. Absalonsen and Dean (2011) show data starting in 1867 of shoreline position at the monument. From 1867 to 1920 the shoreline position moved seaward about 160 ft, creating attractive, sandy beaches. However, the 1926 hurricane reduced shoreline width by about 100 ft. This led to construction over decades of almost 50,000 ft of seawalls along the island, with almost half of the locations having little to no beach in front of the seawalls (Wiegel 1992). Beach width began recovering after the 1926 hurricane, and by the early 1960s the beach width at the monument was about 25 ft wider than it was pre-hurricane. However, with the growing popularity of swimming pools at resort hotels

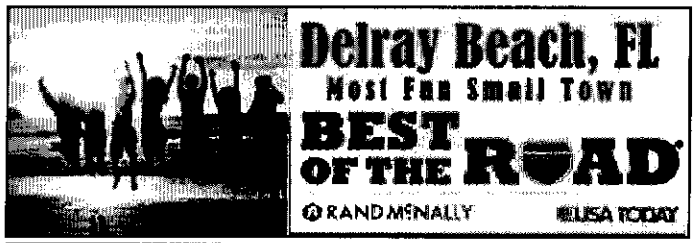
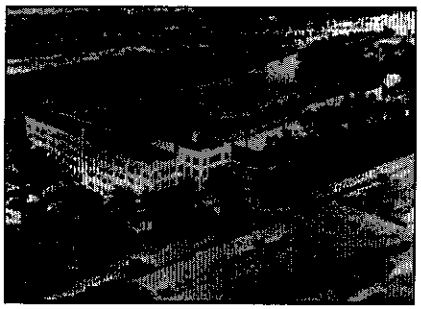


Figure 42. Delray Beach — "Most Fun Small Town in America."

Figure 43. Mangrove tree clearing at Miami Beach (courtesy Florida State Archives).

Figure 44. Wofford Breakers Hotel, about mid-island, Miami Beach, 1924 (courtesy Florida State Archives).



and the widening beaches, hotel owners received permission after World War II to construct new bulkheads as much as 75 ft seaward of existing ones, in many instances seaward of the existing Mean High Water (MHW) line (Wiegel 1992). Figure 46 shows the Deauville and Carillon Hotels, located less than a mile south of the monument with bulkheads seaward of MHW.

From the early 1960s to early 1970s, the shoreline width at the monument decreased about 50 ft, and beaches at many locations were completely gone. During this time, attendance at Miami Beach hotels plummeted. Tourists lost interest in going to beach resorts at Miami Beach that were without beaches. By 1977, *Time* magazine (1977) said: "So rapidly has the seven-mile-long island degenerated that it can be fairly described as a seedy backwater of debt-ridden hotels." The world-famous Fontainebleau Hotel, which had been featured in movies and TV series, declared bankruptcy in 1977. In 1977 newly-elected Miami Beach Mayor Neisen Kasdin said: "Business was so bad in Miami Beach I was happy just to see prostitutes." (*New York Times* 2009).

Beach nourishment

To restore Miami Beach from its blight, the city decided the beach had to be nourished. Working with the Corps of Engineers, they developed the Dade County, Florida, Beach Erosion Control and Hurricane Protection Project, to place 13.9 million cu. yd. of sand along 1.2 miles of coastline at Haulover Beach Park north of Baker's Haulover Inlet and 9.3 miles of coastline from the inlet to Government Cut including the cities of Bal Harbour, Surfside, and Miami Beach. The Corps estimated annual benefits and costs of as much as $18 million and $2.78 million respectively, and a benefit/cost ratio as high as 6.5. The federal government's share of the annual cost of $2.78 million was $1.6 million. Importantly, $16.4 million of the annual benefits were recreation benefits with the remainder of benefits totaling only $0.9 million for prevention of damage to existing erosion control structures, $0.5 million for hurricane protection, and $0.2 million for enhancement of property values (Wiegel 1992). Hurricane protection benefits were low because the island is low-lying (elevations of 5-10 ft above Mean Low Water — MLW) and the project did not stop hurricane flooding from Biscayne Bay, which is landward of the island. Current government policies restrict the Corps from counting recreation benefits that account for 50% or more of the benefits, so the project could not be built today.

The project was constructed in five phases starting in May 1977 and completed in January 1982 at a cost of $51 million (Wiegel 1992). The fill was mostly calcium carbonate sand dredged from nearby offshore deposits and pumped by pipeline to the beach. Figure 47 shows before- and after-nourishment aerial photographs of a section of Mi-

ami Beach. The curved building is the Fontainebleau Hotel. Figure 48 shows that there has been little change in beach width at the location of the Fontainebleau Hotel in recent years from 1995 to 2011.

The Corps of Engineers estimated the Miami Beach project could be maintained with average annual renourishment of 211,000 cu. yd. (about 1.5% of the initial volume placed). The Corps' General Design Memorandum refers to a University of Florida estimate of longshore transport of 187,000 cu. yd./yr to the north, 422,000 cu. yd./yr to the south, and a net transport of 235,000 cu. yd./yr to the south (Wiegel 1992). Eight years after completion, the renourishment rate was only about 90,000 cu. yd./yr (Wiegel 1992). From 2007 to 2012, the renourishment rate has been about 130,000 cu. yd./yr (Coastal Systems International 2012; Miami Beach 2012a), or an annual rate less than 1% of the original fill volume. Both the north jetty at Government Cut and south jetty at Baker's Haulover Inlet have been "sand tightened" a couple of times to reduce sediment transmission through them. Wiegel (1992) says that these structures help reduce sediment loss by creating an approximation to a pocket beach between Government Cut and Baker's Haulover Inlet.

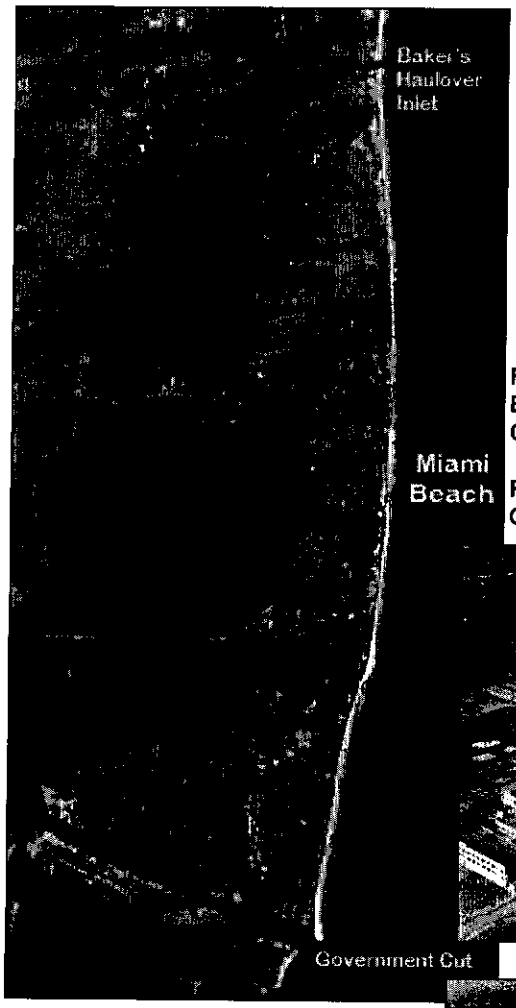
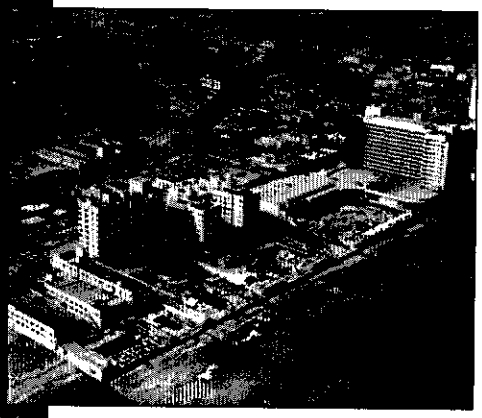


Figure 45. Miami Beach from Baker's Haulover Inlet to Government Cut.

Figure 46. Deauville and Carillon Hotels in 1957.



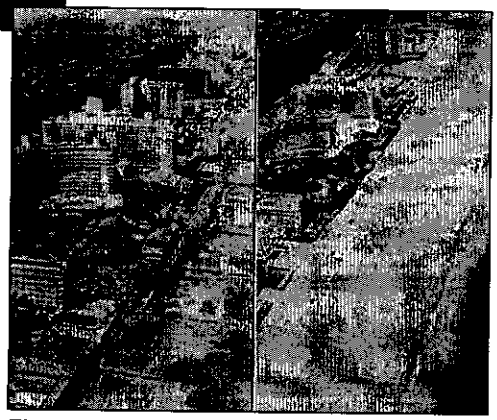


Figure 47. Miami Beach before and after beach nourishment.

Economic benefits

Beach nourishment completely rejuvenated Miami Beach. As a requirement for federal participation, the beaches had to be made easily accessible to the public with parking and beach access locations. Beach attendance, based on lifeguard counts and aerial surveys, increased dramatically from 8 million in 1978 to 21 million in 1983 (Wiegel 1992). Just after completion of the beach nourishment in 1983, Miami Beach had close to twice as many tourist visits as the current combined number of tourist visits to Yellowstone (3.3 million), the Grand Canyon (4.2 million), and Yosemite (4.0 million), making it one of the busiest beaches in the world (Figure 49) (National Park Service 2012). Klein and Osleeb (2010) determined that tourism earnings at Miami Beach increased 56% the year after completion of the beach nourishment project. This one-year increase in tourism income of $290 million was more five times the $51 million cost of the beach nourishment. Miami Beach was awarded a 2011 Best Restored Beach Award by American Shore and Beach Preservation Association for the performance of the beach nourishment and its positive economic impact (ASBPA 2011).

Tourists contributed $13 billion in 2011 to the Greater Miami economy with 44% of these tourists staying at Miami Beach, accounting for a proportionate $5.7 billion to the Miami Beach economy (Greater Miami and the Beaches 2012). International tourists make up 48% of all overnight visitors, and, since they spend more than domestic tourists, they contribute at least $2.9 billion to the Miami Beach economy (Greater Miami and the Beaches 2012). Therefore, international tourists alone make an annual contribution to the economy of Miami Beach that is over 50 times the cost of the $51 million Miami Beach nourishment project and over 1,000 times its annual cost of $2.78 million.

As noted earlier, if proposed today, the Dade County, Florida, Beach Erosion Control and Hurricane Protection Project could not have federal involvement because recreational benefits were the principal benefits and the Office of Management and Budget (OMB) requires the Corps of Engineers to use a National Economic Development (NED) criterion for evaluating projects. This criterion assumes "full employment of the nation's resources," meaning that new economic activity due to recreation within a beach community can only occur at the cost of economic activity elsewhere in the nation, so there is no net national economic gain due to beach nourishment (Robinson

Figure 48. Beach width in January 1995 and March 2011 at the Fountainbleau Hotel. Beach width from boardwalk to ocean is about 140 ft for both dates.

2002). That is, if there were no beaches at Miami Beach, tourists would go to other U.S. beaches, so there would be no net economic gain to the Nation. However, King and Symes (2003) show that for California beaches the NED assumption of no net gain for the nation due to increased use of California beaches is not valid. They show international tourists alone would spend $2.4 billion annually outside the U.S. if California beaches were not available and the federal government would receive $738 million less in annual tax income. The same is true for Miami Beach. For each $1 the federal government spends annually on the Miami Beach project ($1.6 million annual cost), the U.S. receives over $1,800 ($2.9 billion annually) in foreign exchange.

International tourists who presently recreate at Miami Beach have many alternatives. The 2012 Travelers Choice Awards for the top 25 beaches in the world (Miami Beach ranks ninth in the world and second among U.S. beaches) identified 10 of the 25 beaches in the Caribbean and Mexico including two in Cuba (TripAdvisor 2012). Over half the international tourists at Miami Beach are from South America and could easily go to these closer beaches of the Caribbean and Mexico (MiamiBeach411 2012). The $2.9 billion that these international tourists spend at Miami Beach are part of the rare trade surplus that the U.S. enjoys in tourism and would shrink considerably if the beaches of Miami Beach returned to their eroded state of the 1970s.

Lessons learned

The history of Miami Beach illustrates the need for construction setback lines. Because there were no setback lines, structures at Miami Beach were sometimes constructed seaward of MHW, eliminating beaches and leading to increasing numbers of groins and seawalls. Prior to the beach nourishment at Miami Beach, Florida passed legislation that established Coastal Construction Control Lines and 30-yr Erosion Projection Lines. All states should have similar construction setback lines to avoid the problem in which Miami Beach found itself in the 1970s, having little to no beach width and, as a result, a severely deteriorating economy.

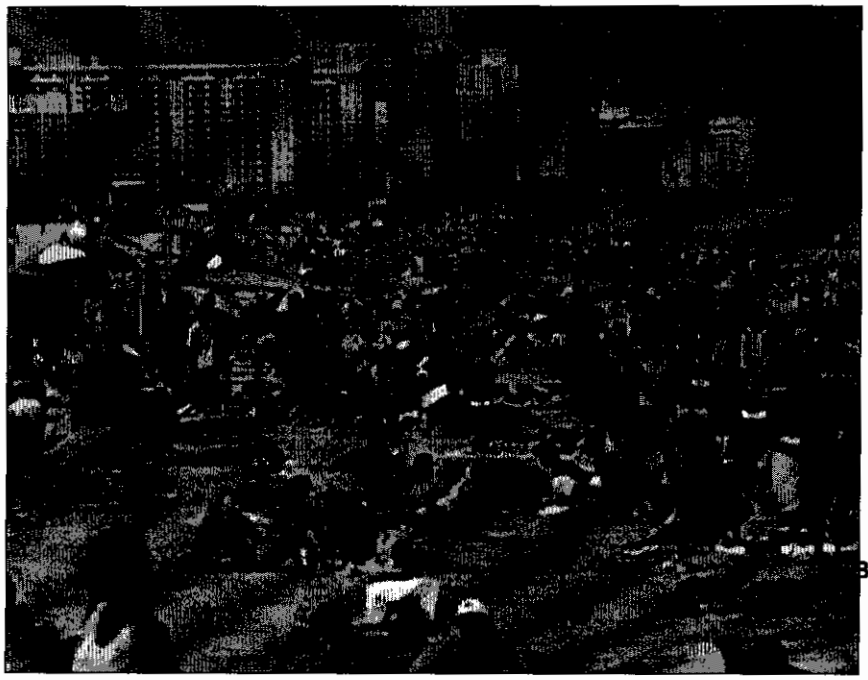


Figure 49. A busy Sunday 2012 at Miami Beach.

Sand loss for the project is reduced by sand-tightened terminal structures at Government Cut and Baker's Haulover Inlet that help compartmentalize the fill. Egense and Sonu (1987) studied beach nourishment projects and noted the degree of sediment loss from fill projects was well correlated with the lack of compartmentalization of the fills. They said that the Miami Beach fill from Government Cut to Baker's Haulover Inlet was completely compartmentalized with jetties at each end to prevent alongshore sediment loss. Having terminal structures for beach nourishment projects to prevent sediment from entering inlets increases fill longevity.

Because net transport is to the south, sand has accumulated at the north jetty of Government Cut and the project periodically "back-passes" sand by pumping it from this area to updrift beaches. Some communities back-pass by beach scraping in areas where sand has accreted and move the sand back to updrift beaches that may have eroded. This approach is an excellent way to recycle sand. In 2002, 202,000 cu. yd. were back-passed at Miami Beach and a study estimated that 60,000 cu. yd. could be back-passed annually without impacting the existing shoreline (Miami Beach 2007). The Corps of Engineers back-passed 107,000 cu. yd. in 2012 (Miami Beach 2012b). For compartmentalized beach nourishment projects, back passing is a good way to maintain project widths along the whole project without having to use other sand sources that are often in short supply.

When Galveston, Texas, was hit by a devastating hurricane in 1900, residents raised the populated areas of Galveston

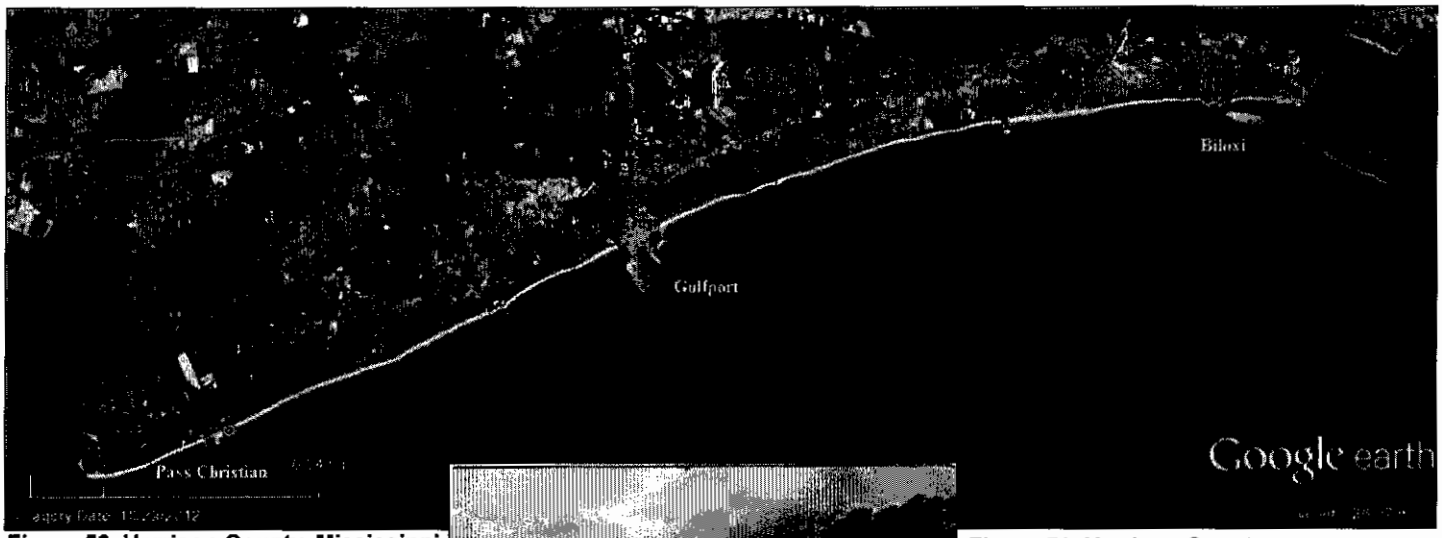


Figure 50. Harrison County, Mississippi.

Figure 51. Harrison County seawall with no fronting beach before beach nourishment (courtesy of the Mississippi Archives).

Island to protect against future hurricanes. Miami Beach was not raised following the 1926 hurricane and is generally only 5-10 ft in elevation (MLW). As a result, Miami Beach is threatened by future hurricanes. The dunes facing the Atlantic are higher than the maximum elevation of about 10-11 feet (MLW) attained by the 1926 hurricane (Wiegel 1992). However, there is no protection on the landward side facing Key Biscayne Bay, so there may be significant flooding from the bay during a hurricane. Moreover, a hurricane with greater surge than the 1926 hurricane could breach the dunes from the Atlantic side. Evacuation of the area prior to hurricane landfall is critical, with the entire island from Government Cut to Baker's Haulover Inlet in the high-danger Red Zone of the Miami and Dade County Emergency Evacuation Program.

Miami Beach is a compelling example of beach nourishment leading to economic recovery that benefits the nation with a remarkable return on investment not just to the local community but to the federal government.

HARRISON COUNTY, MISSISSIPPI, BEACH NOURISHMENT

Introduction

Harrison County, MS, stretches from Pass Christian to Biloxi, MS, a distance of 27 miles, as shown in Figure 50.

In the 1920s, Harrison County emerged as a significant tourism destination. After the Mississippi Legislature's passage of a 1924 act calling for the protection of public highways along the shore, a seawall was constructed from 1926 to 1928 along portions of the coastline. The seawall was designed to protect the coastal communities from storm surge. It is typically 8-11 feet above sea level, except for 13 miles where it is five feet above sea level. Resorts sprang up along the coast, but many closed during the Depression. Starting in the 1940s tourists began to come back to Harrison County, drawn to locations that still had beaches and entertainment (Sand Beach Master Plan 2008).

Beach nourishment

Congress enacted Public Law 727 in 1946 to assist in protecting coastal communities and to control erosion issues. This law aided and promoted the construction of artificial beaches in areas that contained seawalls. When the seawall was originally constructed from 1926 to 1928 the beach was typically only 80-100 ft wide, and over time it gradually eroded. By the 1940s, the original beach was largely gone along much of the coast, leaving a narrow mud-sand-shell-gravel tidal flat and an exposed, undercut, and damaged seawall (Mississippi State University 1978). In addition, a hurricane in 1947 severely damaged portions of the seawall. Reconstruction of the seawall began in 1950 as part of the Harrison County Shore Protection Project (Figure 51). Because the seawall had little to no fronting beach along much of its length, the plan included a beach fill to protect the seawall from being undermined by wave attack. In 1951 the project created the world's largest human-made beach to protect the seawall, stretching 26 miles, nearly the entire length of the Harrison County coastline. About 6 million cu. yd. of sand were pumped from about 1,500 ft offshore to build the beach. The beach was designed to have a berm elevation of 5 ft above mean sea level and a width of 300 ft (Watts 1958).

Watts (1958) analyzed the fill performance in 1958, seven years after its construction. He found that 5.93 million cu. yd. of the 5.985 million cu. yd. placed in 1951 was still in the active profile. The small difference was well within the accuracy of the profile measurements, so basically all of the sand remained in the active profile. Figure 52 shows evolution of the profile at a typical coast location, displaying the pre-fill profile and then little profile change over the seven years. Watts determined that about 100,000 cu. yd./yr had moved from the beach to the nearshore profile over the seven years.

The first renourishment was not conducted until 1972 to 1973, more than 20 years after the initial construction. This renourishment placed 1.923 million cu.

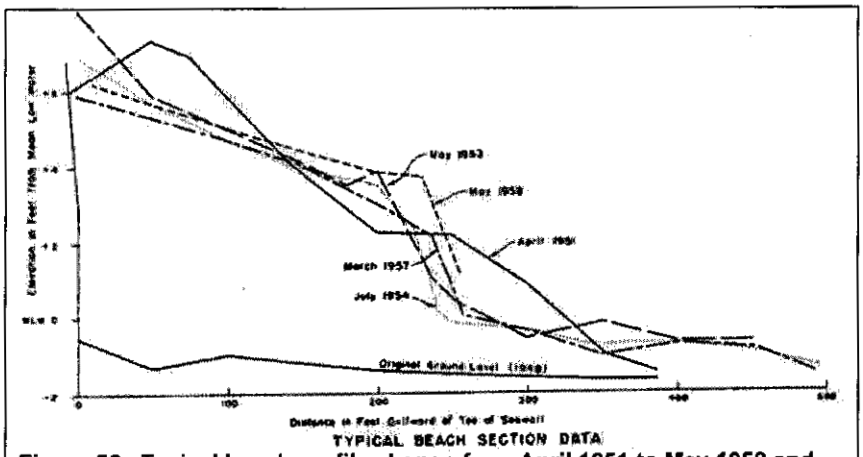


Figure 52. Typical beach profile change from April 1951 to May 1958 and the original ground level in 1948 (Watt 1958).

Figure 53. Left shows beach at Biloxi before Hurricane Katrina and right after. Beach width remained about the same.

yd. using a borrow area 2,100 ft offshore, producing an average beach width of 260 ft. It was estimated that the annual loss of sand from 1952 to 1972 was only 96,000 cu. yd., including erosion produced by Hurricane Camille in 1969. From 1972 to 1985 the estimated loss rate was only 85,000 cu. yd./yr. Thus annual losses from 1952 to 1985 were only approximately 1.5% of the initial volume. There were plans in 1985 to renourish the beaches with about 1 million cu. yd. of sand to extend the beach width to 300 ft, but the renourishment did not occur (Sand Beach Master Plan 1986).

Interestingly, it is estimated that much of the loss of sand is due to aeolian transport with an estimated annual loss of 0.5 cu. yd. per ft of beach or about 70,000 cu. yd./yr (Sand Beach Master Plan 1986). Sand blowing from the beach creates problems on Highway 90, the major coastal road. Currently plans are under study to lower a section of the beach to expose the upper four to six steps of the seawall presently covered by sand with the idea that the exposed concrete steps will catch some of the sand before it blows onto Highway 90 (WLOX 2012a).

The eye of Hurricane Katrina made landfall in 2005 at the western end of Harrison County (Figure 50). With the worst surge and waves on the right side of Katrina's eye, Harrison County was struck with a massive surge and waves. The Harrison County beach had not been renourished for over 20 years when Katrina struck. As was the case for Hurricane Camille, the beach stood up well to Katrina. Figure 53 shows a typical before and after picture of the fill near Biloxi, Mississippi, showing no discernible change in beach width.

The Harrison County beach fill has been in place for over 60 years from 1951 to 2013 with one renourishment of less than a third the original nourishment volume. During these years, it withstood two of the largest hurricanes in U.S. history, Hurricanes Camille and Katrina, with most of the fill remaining in place. Figure 54 shows a typical portion of the coastline of Harrison County southwest of Gulfport from 1989 to 2012. Even with Hurricane Katrina having pounded this coast in 2005, the beach width remains about the same. Figure 55 is a typical view of the wide beaches all along Harrison County.

As an aside, beach nourishment volumes listed in the "U.S. Beach Nourishment Experience" of Western Carolina University (WCU) at http://beachnourishment.wcu.edu/results.php?state=MS do not match the volumes presented in this paper, illustrating some of the problems with the website. The WCU website lists the Harrison County beach nourishment as involving almost 14 million cu. yd. in eight nourishments. However, Harrison County's Sand Beach Master Plan (2008) and other references clearly show that there were only two nourishments, one in 1951 and one in 1972-1973, with a total volume of about 7.9 million cu. yd.. Why is there a difference?

The WCU website shows a nourishment in 1985 of over 1 million cu. yd. at an "actual" cost of $2.8 million. Sand Beach Master Plan (2008) notes that there was a *plan* for this nourishment at an "estimated" cost of $2.8 million, but "... it was never undertaken." The WCU website shows nourishments of 1.5 million, 1.2 million, and 1.1 million cu. yd. in 1988, 2001, and 2007 respectively. The WCU site does not reference the sources of its information, but it is likely these events were dredged material disposal operations having nothing to do with the Harrison County beach fill, with

none of the material going on the fill. In particular, there has been a major effort to "restore" Deer Island, an uninhabited island east of Biloxi, Mississippi, and not a part of the Harrison County beach fill. For example, WLOX (2012b) describes the restoration of Deer Island, saying: "Dredge material from the State Port at Gulfport will be used to help restore Deer Island. Plans are underway to create another 50 acres of marshland near the eastern tip of the island." The WCU website typically counts volumes of dredged material, including fine sediments not suitable for beaches, which are disposed in the ocean, back-bay areas, or marshes, as beach nourishment, when the sediment never reaches a beach.

Economic benefits

Tourism is by far the largest industry in Harrison County, employing 23.2% of the people compared to only employing 7.5% statewide (VisitMississippi 2012). The dominance of tourism in the economy of Harrison County is seen when compared with the 30% tourism employment in the Bahamas, where tourism is one of the few industries (Yunis 2009). Tourists spent $1.45 billion in Harrison County in 2011 and generated $152 million in state and local taxes and fees attributed to tourism (26% of these revenues collected by Mississippi, although the county only has 6.4% of the population of Mississippi). Seventy-five percent of the hotel rooms along the three-county Mississippi Gulf Coast are in Harrison County (VisitMississippi 2012).

Harrison County says of its beach: "The wide sand beach is the most prominent and distinguishing feature of the shoreline, and the value of this beach, both for shore protection and recreational purposes, is unmistakably clear. The beach was created to stabilize the shoreline, but has also evolved into one of the county's major recreational and economic assets. The beach also serves as the Mississippi Gulf Coast's principal recreational and tourist attraction, generating major economic benefits both locally and regionally" (Sand Beach Master Plan 1986).

Lessons learned

The Harrison County beach fill is another example of good unintended consequences. The fill was placed to protect the base of the seawall from wave attack. It not only has done this, but it has covered the seawall, creating a wide appealing beach and stimulating tourism. Moreover, with only a single renourishment of less than a third the original fill volume, after over 60 years and two of the largest hurricanes in U.S. history, a wide attractive beach remarkably stretches along 26 miles of the coast of Harrison County.

Figure 54. Mississippi coastline southwest of Gulfport, MS, showing little change in beach width from 24 November 1989 (top) to 29 October 2012 (bottom) (courtesy of Google Earth).

CONCLUSIONS

Beaches are America's greatest tourist attraction. The Miami Beach experience demonstrates that when beaches erode to narrow slivers, tourists head to other destinations and economic blight follows. However, the economic recovery of Miami Beach also shows that nourishing beaches restores economic prosperity with a remarkable return on investment. King and Symes (2003) show that restoring beaches produces a net national economic gain, invalidating an assumption by OMB that new economic activity due to recreation at one beach community can only occur at the cost of economic activity elsewhere in the U.S. Houston (2013) shows that the federal government garners a majority of the new taxes generated by increased beach tourism, and these taxes dwarf the federal government's expenditures on beach nourishment. Therefore, recreation benefits should have an equal footing with other benefits when determining benefit/cost ratios to prioritize water resource projects.

Beach nourishment provides significant storm damage reduction benefits, as was seen vividly by the different levels of

Figure 55. After over 60 years and Hurricanes Camille and Katrina, Harrison County beaches remain wide and inviting.

destruction in coastal New Jersey during Hurricane Sandy. Homes, businesses, and infrastructure in coastal communities that were not protected by wide beaches and high dunes were severely damaged, whereas those protected by beach nourishment projects were minimally damaged. Moreover, Hurricane Sandy eroded only an average of 30-40 ft of coastline, and much of this sand is on the active profile and some will return. With nourished beaches in New Jersey typically 250 ft wide prior to Sandy, most of the sand remains to protect against future storms and draw tourists.

Beach erosion results from a sand deficit, which is often caused by humans. For example, Santa Monica Bay and the Coronado/Silver Strand beaches have been deprived of sand through river diversions or damming. Seawalls and revetments stopped bluff erosion in New Jersey, thereby cutting off the sand supply to beaches. Inlets, which have been improved for navigation, are responsible for approximately 80-85% of erosion on the east coast of Florida, and this undoubtedly is repeated on all coasts. Given the economic, recreational (Figure 56), aesthetic, and storm damage reduction value of beaches, the U.S. should work to restore sand to beaches. For example, sand dredged as a part of navigation projects should always be returned to the littoral system. To not do so should be considered inconsistent with sound environmental practice.

We have provided examples of beach nourishments that have provided remarkable benefits. Some of these nourishments have been providing these benefits for extraordinary periods of time — in some cases, up to 60-70 years. It would be valuable for future studies to determine why these and other beach nourishments have performed so well, so they can be repeated for future generations.

Finally, at some stage in their future, most coastal communities will need to make decisions regarding long-term responses to sea level rise and other erosional causes. This argues strongly for improved monitoring both of nourished projects and areas where nourishment has not been carried out. The most recent monitoring of Santa Monica Bay was about 22 years ago and it appears that the Harrison County project has never been formally monitored and reported. Contrast this with New Jersey, where frequent monitoring has been conducted for more than 25 years and enabled the quantification of storm damage reduction of nourished beaches during Hurricane Sandy; or Florida, where a database of shoreline positions is available for the past 140 years and has identified the impacts of inlets modified for navigation. Through monitoring, the availability of factual data will guide coastal communities in their selection of appropriate long-term pathways for the preservation of our nation's shorelines.

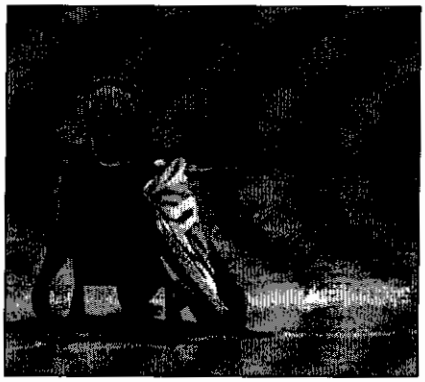


Figure 56. The good life.

ACKNOWLEDGEMENTS

Basically, this paper is an assembly and, where possible, an expansion of results available in publications describing the services and performances of beach nourishment projects. Thus, we are indebted to those who have initially ensured preservation of this valuable and extensive information in the available literature. We also acknowledge many valuable technical discussions with our colleagues regarding projects which they are much more familiar. Although these colleagues are too numerous to mention individually, Professor Robert Wiegel and Tom Campbell warrant special note. Lisa Armbruster provided before and after photographs of some Florida projects and economic data developed by the Florida Shore and Beach Preservation Association. Finally, we thank our respective host agencies for providing office and computer support services.

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long southernmost segment of the Encinitas shoreline is a low-lying barrier spit fronting the San Elijo tidal lagoon.

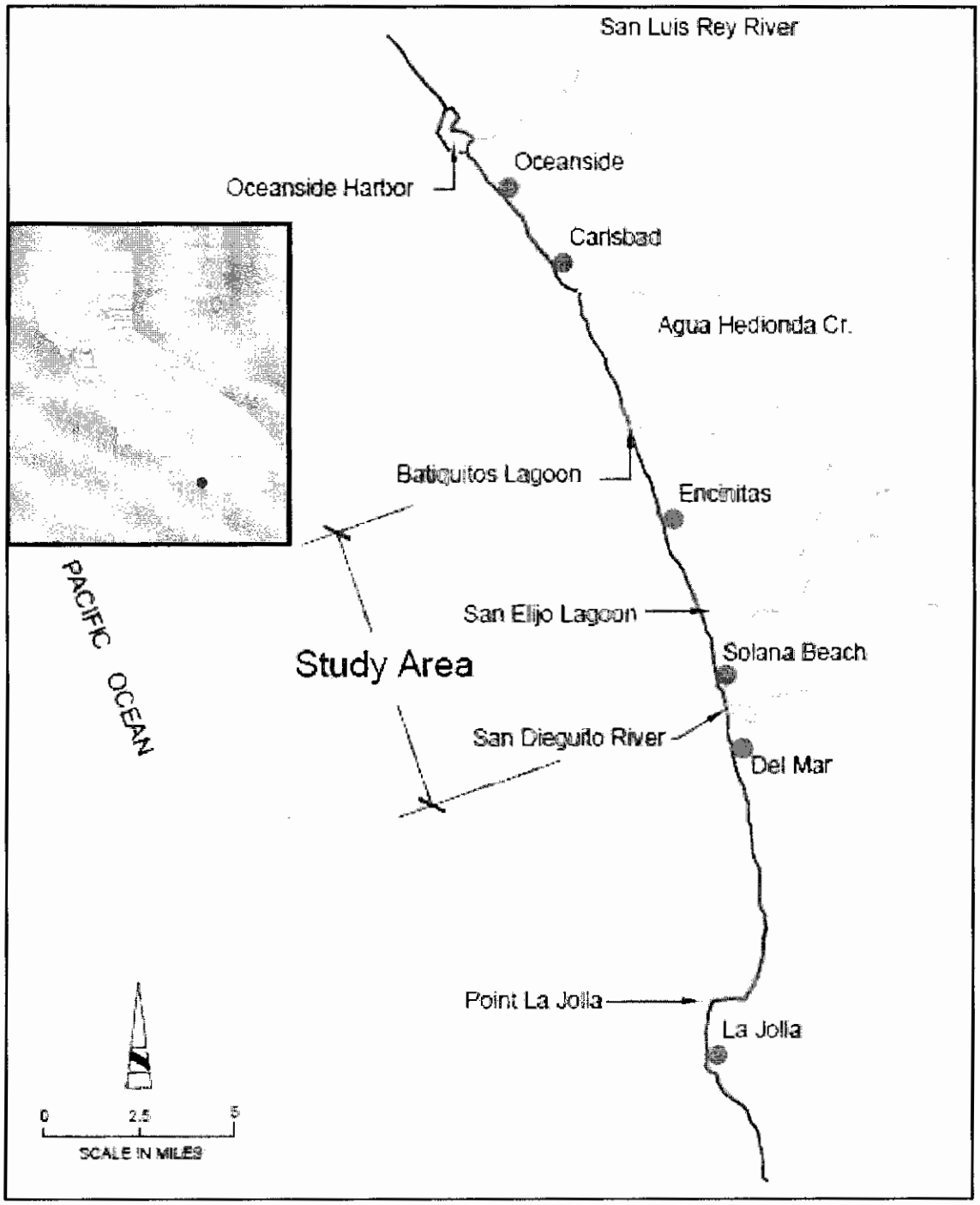

Figure 1.8-1 Location Map

EXHIBIT NO. 1
APPLICATION NO.
CD-0203-13

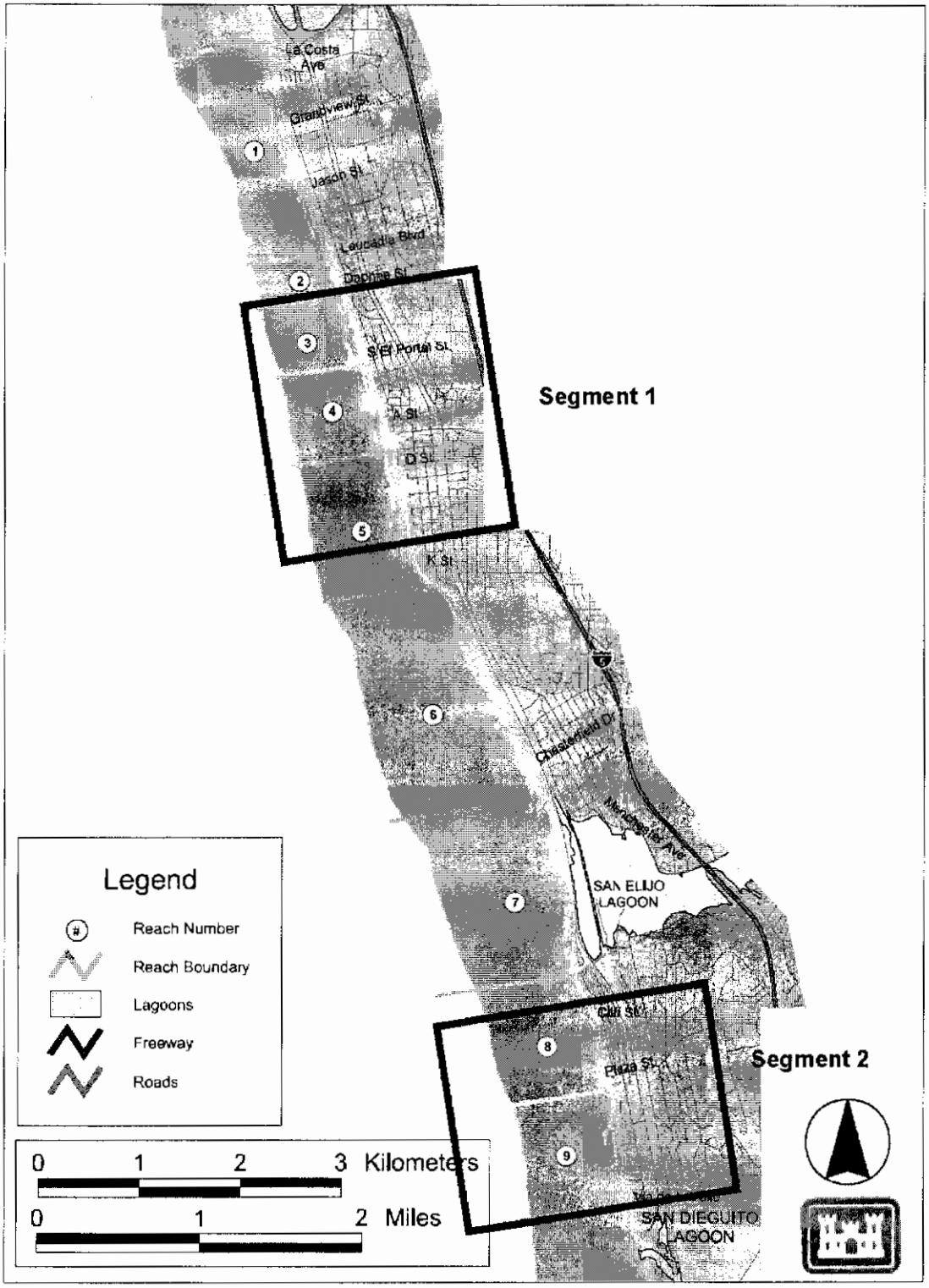

Figure ES-2 Segments 1 and 2

EXHIBIT NO. 2
APPLICATION NO.
CD-0203-13

Figure 4.5-1 Encinitas Receiver Site

CD-0203-13
Exhibit 3

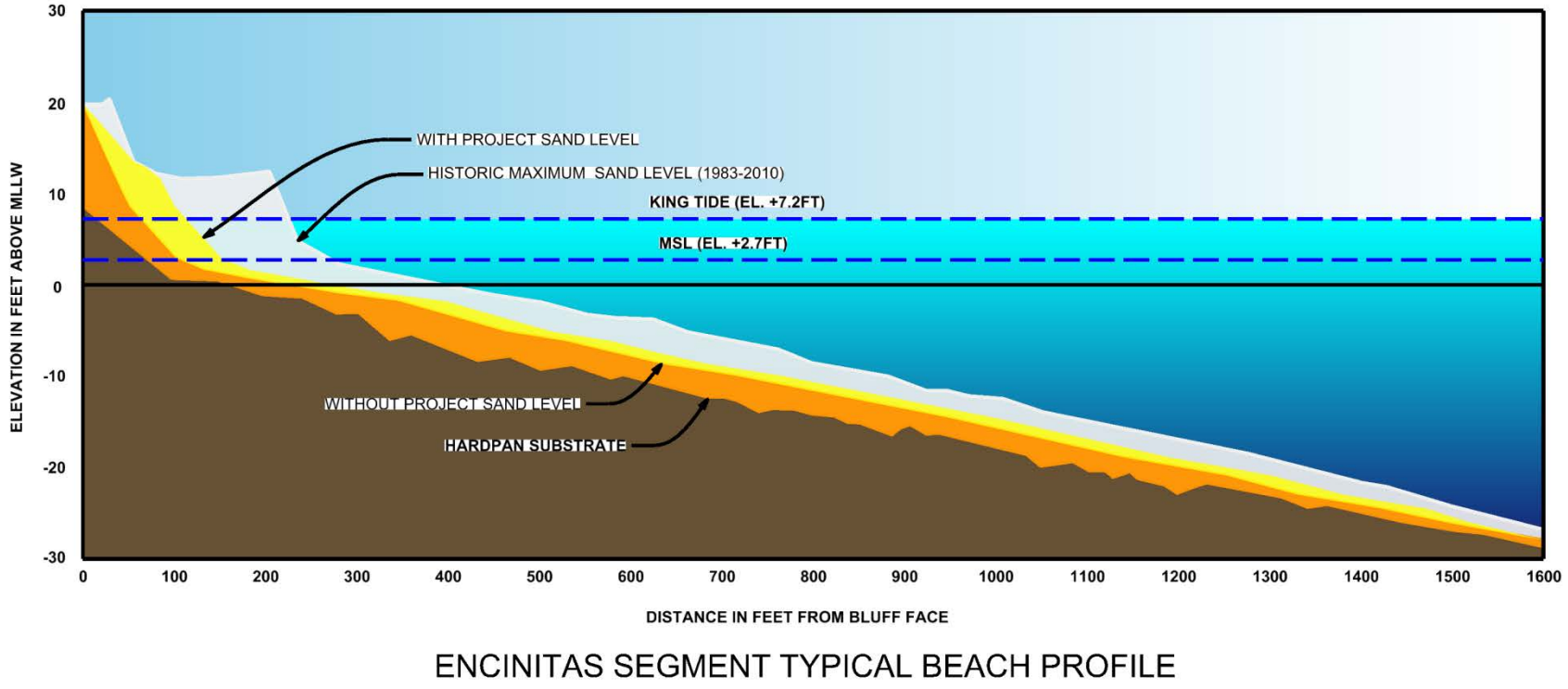

Figure 4.8-1 Encinitas (EN-1B) Segment Typical Beach (50' MSL) Profile Plan

CD-0203-13
Exhibit 4

Figure 4.5-2 Solana Beach Receiver Site

CD-0203-13
Exhibit 5

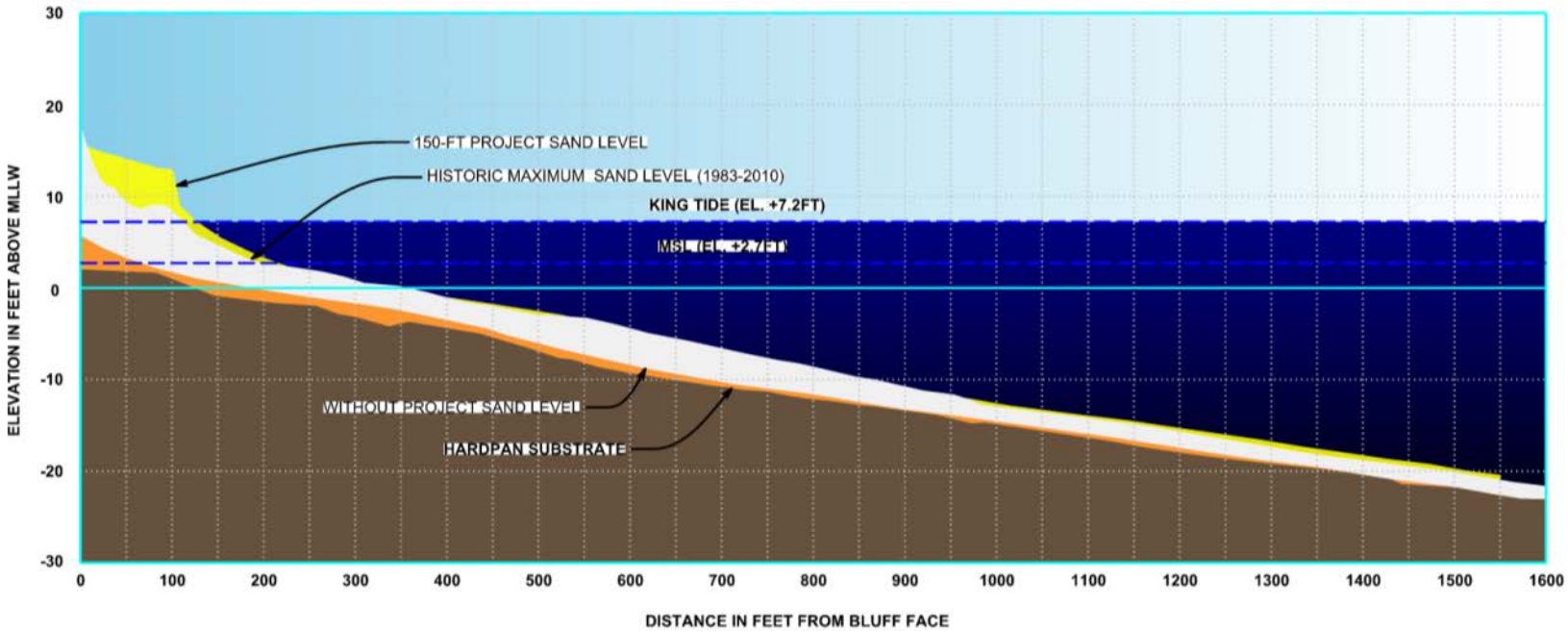

Figure 4.8-2 Solana Beach (SB-1B) Segment Typical Beach Profile (150' MSL) Plan

CD-0203-13
Exhibit 6

1 **Table ES-1 Final Alternatives 1**

Encinitas (EN)		Alternative EN – 1A: Beach Nourishment (100 ft; 5-yr cycle)	Alternative EN – 1B: Beach Nourishment (50 ft; 5-yr cycle)		Alternative EN – 2A: Hybrid (100 ft; 10-yr cycle)	Alternative EN – 2B: Hybrid (50 ft; 5-yr cycle)	Alternative EN – 3: No Action
Initial Placement Volume (cy)	High SLR	730,000	390,000		800,000	390,000	Assumes that the continued practice of emergency permitting for seawalls along the segment would continue.
	Low SLR	680,000	340,000		700,000	340,000	
Re-Nourishment Cycle	High SLR	5-yr	5-yr		10-yr	5-yr	
	Low SLR	5-yr	5-yr		10-yr	5-yr	
Added Beach MSL Width	High SLR	100 ft	50 ft		100 ft	50 ft	
	Low SLR	100 ft	50 ft		100 ft	50 ft	
Solana Beach (SB)		**Alternative SB – 1A: Beach Nourishment (200 ft; 10-yr cycle)**	**Alternative SB – 1B: Beach Nourishment (100 ft; 10-yr cycle)**	**Alternative SB – 1C: Beach Nourishment (50 ft; 10-yr cycle)**	**Alternative SB – 2A: Hybrid (150 ft; 10-yr cycle)**	**Alternative SB-2B: Hybrid (100 ft; 10-yr cycle)**	**Alternative SB-3: No Action**
Initial Placement Volume (cy)	High SLR	1,620,000	790,000	540,000	790,000	540,000	Assumes that the continued practice of emergency permitting for seawalls along the segment would continue.
	Low SLR	960,000	700,000	440,000	700,000	440,000	
Re-Nourishment Cycle	High SLR	14-yr	10-yr	10-yr	10-yr	10-yr	
	Low LSR	13-yr	10-yr	10-yr	10-yr	10-yr	
Added Beach MSL Width	High SLR	300 ft	150 ft	100 ft	150 ft	100 ft	
	Low SLR	200 ft	150 ft	100 ft	150 ft	100 ft	

W12a

COUNCILMEMBER SHERRI S. LIGHTNER

FIRST DISTRICT

CITY OF SAN DIEGO

July 9, 2013

Ms. Mary Shallenberger
Commission Chair
California Coastal Commission
P.O. Box 354
Clements, CA 95227-0354

Re: CD-003-13 Consistency Determination by US Army Corps of Engineer (July 10, 2013: Item 12a)

Dear Ms. Shallenberger,

I represent the communities of Torrey Pines, Carmel Valley, and University City, all of which are adjacent to the Los Peñasquitos Lagoon. I have serious concerns regarding the 50-year Coastal Storm Drain Damage Reduction and Beach Nourishment project proposed by the U.S. Army Corps of Engineers for the City of Solana Beach and the City of Encinitas.

The Los Peñasquitos Lagoon and lagoon inlet are located directly south of the proposed project areas, and sand and sediment along this coastline tend to follow in a southerly migration route due to wave directions and a prevailing long-shore current.

Sand build-up that occurs at the mouth of the Los Peñasquitos Lagoon prevents tidal flow and allows for stagnant fresh water to be a breeding ground for mosquitoes. As the mosquitoes within the Los Peñasquitos Lagoon have been known to carry the West Nile Virus and Equine Encephalitis, this becomes a public health and safety concern. When the lagoon inlet was blocked from tidal flow for well over a month earlier this year, my office received an overwhelming amount of concern from affected constituents. As a result, there were two independent efforts to remove over 40,000 cubic yards of sand via bulldozers and excavators in May 2013 and June 2013, with an additional third effort anticipated for later this year. There is strong evidence linking the large amount of sand removed (a 40% increase to the past four years) to sand replenishment efforts that occurred in November 2012 along the same Solana Beach/Encinitas coastline.

At a minimum, ongoing monitoring efforts of neighboring beaches and lagoons should be included with this proposed project. Additionally, mitigation financing and planning for these adjacent beaches and lagoons should be incorporated into this proposal prior to approval.

I appreciate your attention to this matter. Please let me know if my office or I can be of assistance.

Sincerely,

Sherri S. Lightner
Councilmember, District One
City of San Diego

EXHIBIT NO. 8
APPLICATION NO.
CD-0203-13
P. 1 of 11

202 C STREET • SAN DIEGO, CALIFORNIA 92101
(619) 236-6611 • FAX (619) 238-6999 • EMAIL: SHERRILIGHTNER@SANDIEGO.GOV

July 8, 2013

Mary Shallenberger
Commission Chair
California Coastal Commission
P.O. Box 354
Clements, CA 95227-0354

RE: U.S. Army Corps of Engineers 50-Year Coastal Storm Damage Reduction and Beach Nourishment (Consistency Determination No. CD-003-13)

Dear Ms. Shallenberger,

On behalf of the Los Peñasquitos Lagoon Foundation (LPLF), I would like to express deep concern over the 50-year Coastal Storm Damage Reduction and Beach Nourishment project proposed by the U.S. Army Corps of Engineers for the City of Solana Beach and City of Encinitas. The project poses a significant threat to the health of Los Peñasquitos Lagoon (LPL) by cutting off tidal mixing due to increased sediment input into the Lagoon's ocean inlet and elevated beach profiles caused by the north-to-south movement of sand that occurs naturally within the Oceanside Littoral Cell. Recent beach nourishment efforts conducted in 2012 by SANDAG resulted in a massive amount of sand deposited within the inlet at LPL and along Torrey Pines State Beach. As a result, the Lagoon experienced multiple, extended inlet closures that greatly impacted salt marsh vegetation that include 26 sensitive plant species, resulted in deaths of aquatic species, severely degraded water quality, impaired nesting and foraging of listed bird species, and exposed nearby community and park visitors to mosquitos that can transmit West Nile Virus and Equine Encephalitis to human populations. The Army Corp's project currently under review by the Commission will place volumes of sand in an order of magnitude greater than SANDAG efforts within the same locations. LPLF feels that the proposed project is flawed on several fronts that include:

1. The project ignores down-shore impacts to coastal lagoons south of the project area.

2. The Army Corps use of National Economic Development (NED) to justify the economic value of the project is not comprehensive in assessing potential costs associated with project impacts.

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3. The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon.

Designated as a Marsh Natural Preserve and a Critical Coastal Area (CCA #77) by the State, Los Peñasquitos Lagoou (LPL) is afforded the highest level of protection, as it is one of few remaining salt marshes in the southern California. Currently listed as a 303-d Impaired Waterbody under the Clean Water Act due to sediment, Los Peñasquitos Lagoon contains Environmeutally Sensitive Habitat Areas (ESHA) that support species endemic to salt marsh lagoons that include three listed birds (Light-Footed Clapper Rail, Western Snowy Plover and Beldings Savannah Sparrow) and 26 sensitive plant species. The Lagoon also serves as an important refuge for migratory birds following the Pacific Flyway and is the closest coastal lagoon to the only Areas of Special Biological Significance (ASBS) located within San Diego County (La Jolla State Marine Conservation Area and the San Diego-Scripps State Marine Conservation Area).

The Project Ignores Down-Shore Impacts To Coastal Lagoons South Of The Project Area.

Termed the Oceanside Littoral Cell, sediment within the nearshore area in North County San Diego follows a southerly migration due to prevailing long-shore current and wave direction that pushes sand from Oceanside to the submarine canyons located south of Los Peñasquitos Lagoon. Based on this scientific fact, it is hard to understand why the Army Corps feasibility study concluded that sediment placed on the beaches of Encinitas and Solana Beach would remain within their proposed project area and not affect Los Peñasquitos Lagoon. While it was expressed within the report that the models indicated no impacts beyond the project area, the report also stated "inherent uncertainties associated with estimating impacts based on model predictions." Clearly there is a large degree of uncertainty as to the overall impacts to Los Peñasquitos Lagoon, which is not listed as one of the coastal lagoons to he monitored under the proposed project.

The project, as proposed, would place up to 1,640,000 cubic yards (cy) of sand on beaches between Encinitas and Solana Beach with additional sand (between 280,000 cy to 420,000 cy) placed in subsequent years. This represents an increase by two orders of magnitude of sand volume placed on north county beaches during annual maintenance activities (e.g. lagoon inlet maiutenance) and an order of magnitude increase beyond the 321,000 cubic yards of sand placed by SANDAG in November 2012 within Army Corps' proposed project area. Several lines of evidence have linked beach nourishment efforts conducted by SANDAG to increased sand deposition within the Los Peñasquitos Lagoon inlet and elevated beach profiles along Torrey Pines State Beach. The

massive amount of sand within the Lagoon inlet required two separate efforts between May 2013 and June 2013 to mechanically remove ocean-borne sediments to restore connectivity with the ocean and allow impounded waters to drain. Estimated volume of sand removed from LPL during these two maintenance efforts was 40,000 cy and it is anticipated that a third maintenance effort will be needed before the Fall of 2013 since approximately 20,000 cy of sand still occlude the inlet area. This represents a 41% increase in the amount of sand removed annually from the Lagoon inlet between 2008-2012. Grain size analysis performed at the LPL inlet in May 2013 indicated a greater proportion of coarse to moderately coarse material within the Lagoon than in previous years, which matches the material type used by SANDAG for beach nourishment in November 2012. Furthermore, beach elevations at Torrey Pines State Beach north of the LPL inlet were approximately 3-5 feet higher than in the previous 10 years. Elevated beach profiles reduce tidal mixing within lagoon channels since the Lagoon is cut off from ocean waters for most of the tidal cycle. Furthermore, shoaling processes move sand off the beach and back into the lagoon inlet, further reducing and often negating tidal mixing within Los Peñasquitos Lagoon. Photos taken at Los Peñasquitos Lagoon in May 2013 and June 2013, as well as beach profile elevations using LIDAR are provided in Exhibit A to demonstrated elevated beach profiles (please note that the inlet had been excavated prior to the 5/24/2013 date in the LIDAR profile, but quickly closed again requiring a second maintenance effort in June 2013).

The Army Corps use of National Economic Development (NED) to justify the economic value of the project is not comprehensive in assessing potential costs associated with project impacts.

The Army Corps use of the National Economic Development (NED) to justify the selected project alternative ignores costs associated with multiple efforts to excavate lagoon inlets and the value of human life, since it could result in human cases of brain encephalitis caused by the vector-borne West Nile Virus and Equine Encephalitis. Current costs associated with inlet maintenance at Los Peñasquitos Lagoon averages $120,000 per effort. Funding for this effort is extremely hard to procure as it is often seen as a reoccurring maintenance effort by most, if not all, potential funding sources. Should the Army Corps project proceed as currently depicted, this cost could easily triple at the very least, given what has occurred as a result of SANDAG's beach nourishment efforts in 2012. This would place an undue economic burden on LPLF and California State Parks to maintain the inlet at LPL that range from $360,000 to $500,000 per year over the duration of 50 years. This would incur a cost of $18,000,000 to $25,000,000. Were these costs included in the determination of NED?

LPL is currently a known location of mosquito breeding habitat in San Diego County for *Culex tarsalis,* the species known to transmit West Nile Virus (WNV) and Equine Encephalitis in southern California. *C. tarsalis* is a freshwater mosquito that currently breeds in LPL due to the presence of perennial freshwater inputs from the urbanized watershed. Documented cases of WNV have occurred in both wild and sentinel avian populations, as well as within human populations located near the Lagoon. Open space, urban, and commercial areas that contain sensitive receptors (elderly and young children) surround the Lagoon, presenting a higher risk of complications associated with West Nile Virus infection in human populations. The County of San Diego's Department of Environmental Health has attempted to control populations and breeding habitat of *C. tarsalis* within the Lagoon through methods that include aerial spraying of larvicide over 70 acres in 2011. However, these efforts have not proved successful in reducing overall populations of mosquitos. During prolonged inlet closures, populations of *C. tarsalis* can rapidly increase to the point that local residents cannot leave their houses in the morning and early evening hours. WNV and Equine Encephalitis can lead to brain encephalitis in humans that can leave permanent neurological damage and, in some cases, result in fatalities. In 2010 the Environmental Protection Agency placed the value of human life at $9.1 million per individual. Was this cost included in the determination of NED?

The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon.

LPLF urges the Coastal Commission to augment the conditions proposed for monitoring and mitigation for the project to meet Federal Consistency requirements since the current conditions suggested by the Commission will not protect Los Peñasquitos Lagoon (LPL) and the public. Given the assumption that no impacts with occur outside of the project area, Army Corps fails to identify potential impacts to the LPL or establish a method to mitigate these impacts. Furthermore, monitoring data collected by SANDAG under their Regional Beach Sand Project II (RBSP II) is insufficient in assessing potential impacts to LPL since established survey transects at Torrey Pines State Beach for RBSP II are located south of the Lagoon inlet and will not provide useful data in assessing the project's potential impacts with regard to shoaling at the inlet and deposition within LPL. Based on these points, LPLF requests that the Coastal Commission add, at the very least, the following additional conditions to the project for Consistency Determination No. CD-003-13:

1. Army Corps will work with LPLF and California State Parks to establish and implement a monitoring program at Los Peñasquitos Lagoon and Torrey Pines State Beach to characterize baseline conditions

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and identify potential impacts to the Lagoon inlet from beach nourishment efforts conducted in Solana Beach and Encinitas.

   a. Funding for the monitoring program will be provided by Army Corps and conducted in coordination with LPLF and the Scripps Institute of Oceanography.

   b. Monitoring will be conducted on a monthly basis and following events of large surf and/or storm surges.

2. Mitigation funding will be set aside to pay for inlet maintenance at Los Peñasquitos Lagoon and made available as needed, since inlet closures beyond 2 weeks can be catastrophic for Lagoon resources and expose local residents and park visitors to West Nile Virus and Equine Encephalitis.

   a. Funding will be provided to LPLF for inlet maintenance efforts that include heavy equipment with operators, elevation surveys, permit compliance and reporting.

   b. Funding will be provided to LPLF to maintain inlet maintenance permits through the duration of the 50-year project.

   c. Funding will be set aside prior to beach nourishment activities to guarantee its availability.

Since its creation in 1983, the LPLF has worked closely with the Coastal Commission and other resource agencies to protect and preserve this valuable coastal resource. The Foundation implores the Coastal Commission to continue its dedication to protect Los Peñasquitos Lagoon and work with LPLF and the Army Corps to assure that beach nourishment efforts do not impact this State Marsh Preserve and Critical Coastal Area. Please contact me directly for more information and future coordination - (760) 271-0574 or by email at: mikehastings1066@gmail.com.

Regards,

Mike Hastings, Executive Director

Los Peñasquitos Lagoon Foundation

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Cc:

Sherri Lightner, Councilmember for District One, City of San Diego

Bob Filner, Mayor, City of San Diego

Dave Roberts, Supervisor for District 3, County of San Diego

Clay Phillips, San Diego Coast District Superintendent, California State Parks

Lee McEachern, San Diego District, Coastal Commission

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

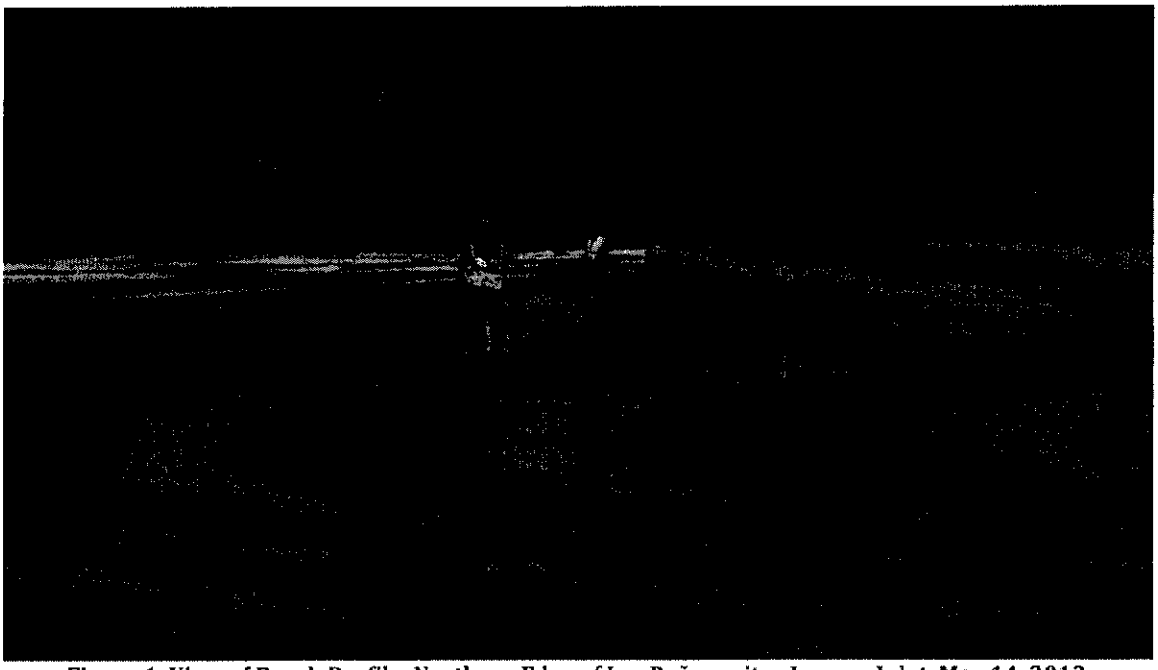

Figure 1. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 14, 2013.

Figure 2. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 14, 2013.

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

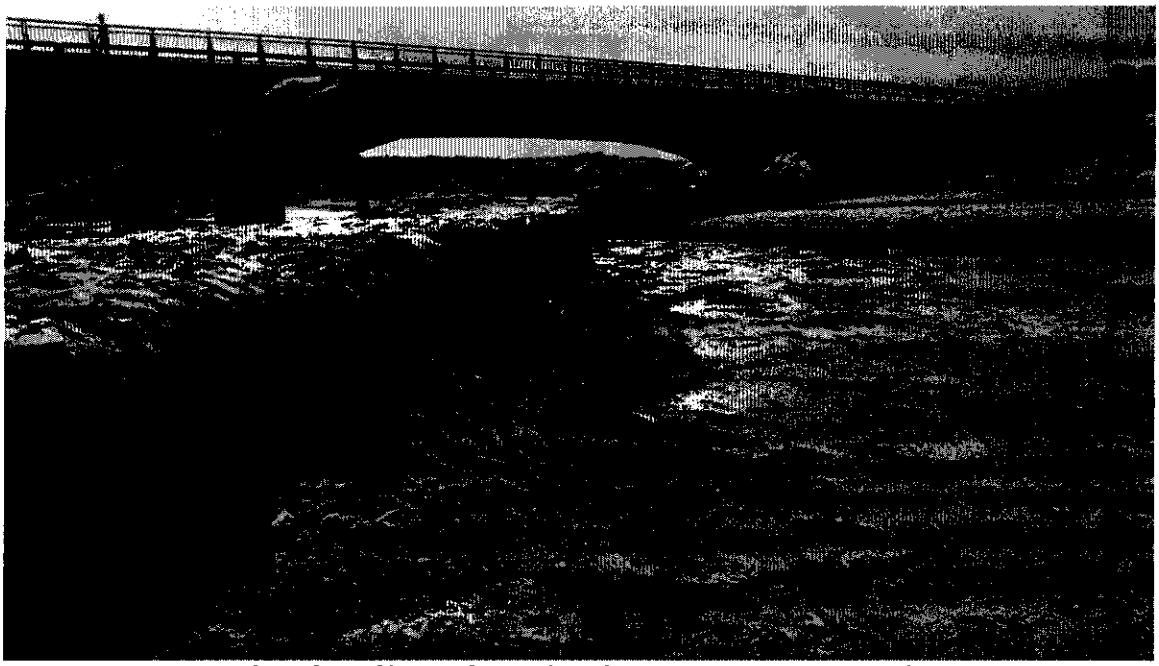

Figure 3. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 15, 2013

Figure 4. View of Beach Profile, Southern Edge of Los Peñasquitos Lagoon Inlet. June 12, 2013. Approximately 3-6 feet of additional sand above the lagoon inlet waterline.

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

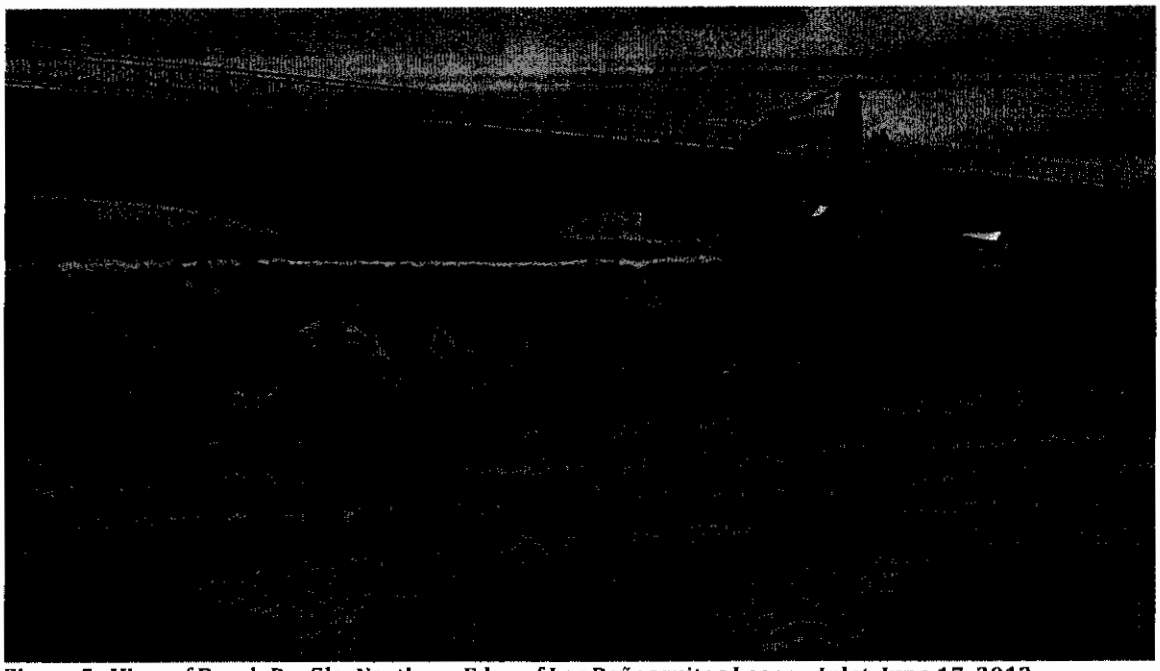

Figure 5. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. June 17, 2013. The inlet area had already been excavated multiple times prior to this photo.

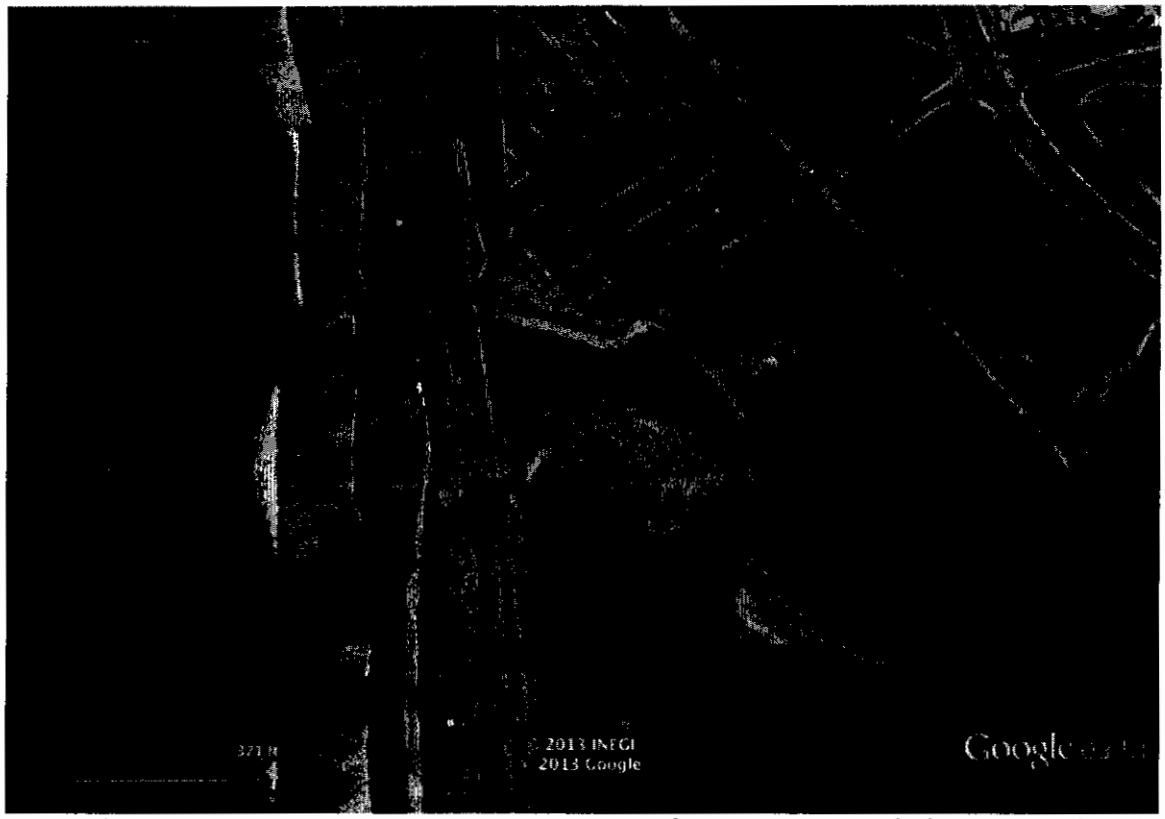

Figure 6. Overview of Los Peñasquitos Lagoon Inlet. November 12, 2012. Note the large, exposed sand spit within the Lagoon that occludes the inlet and restricts tidal mixing.

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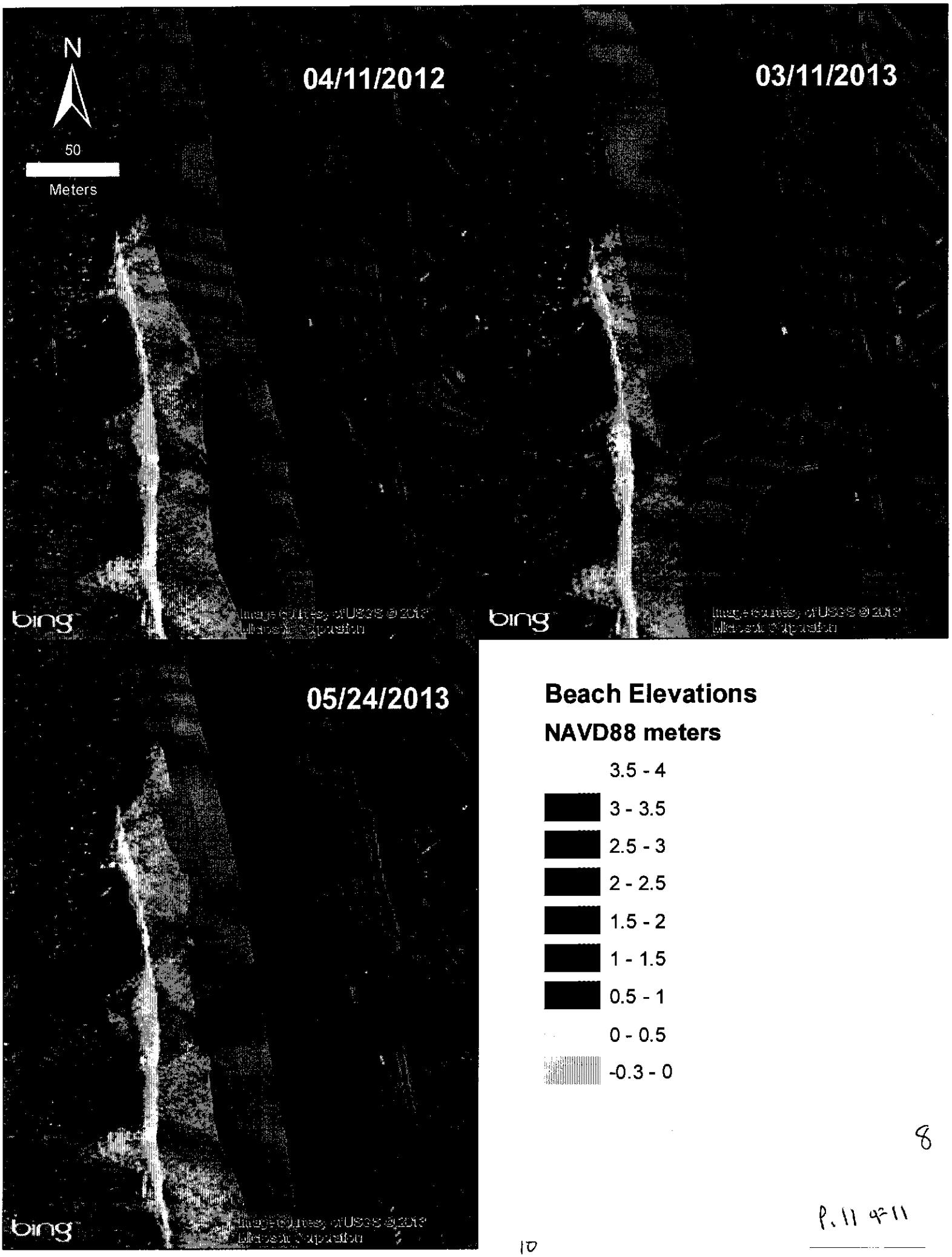
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-0.3 - 0

8

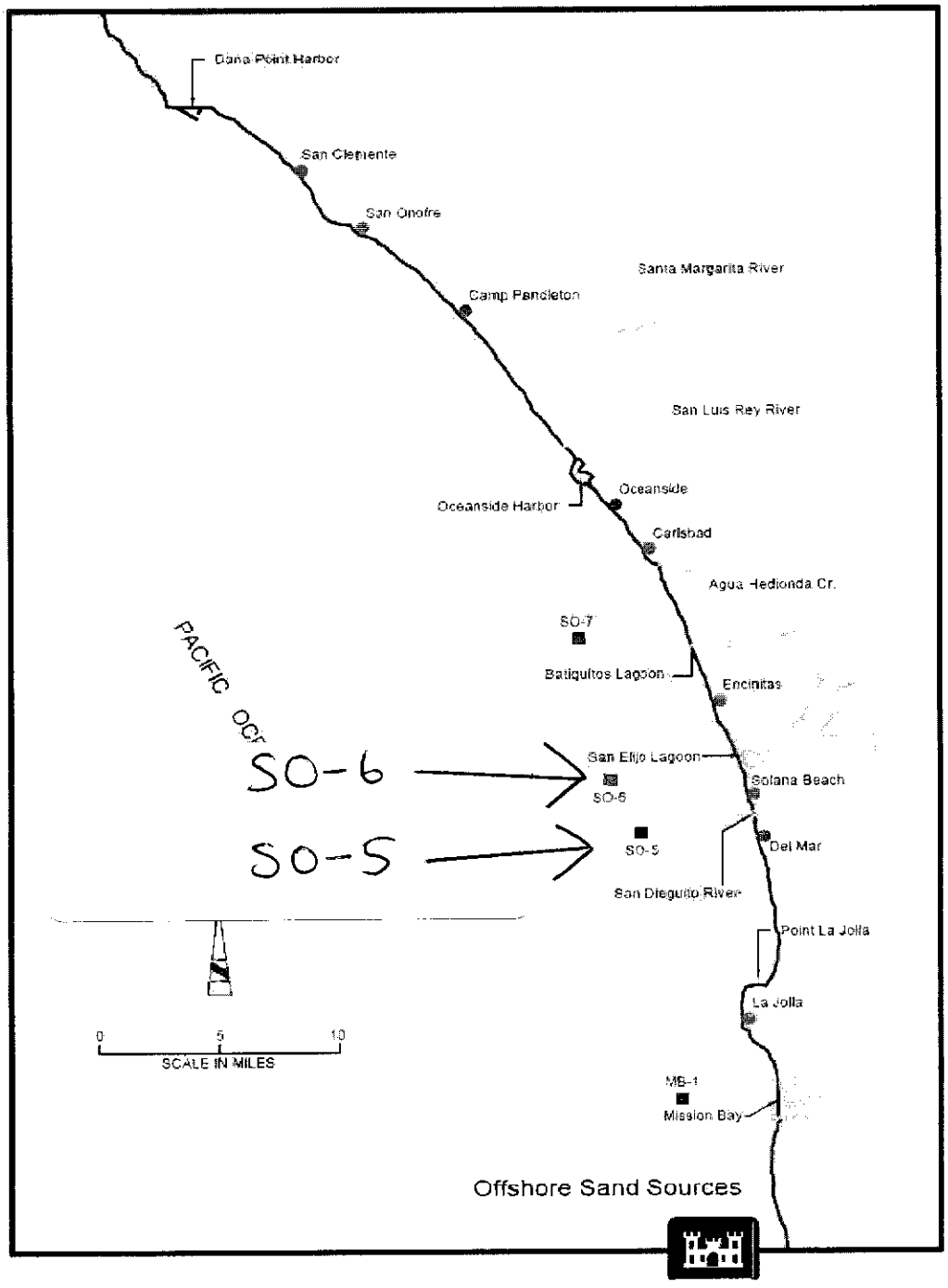

Figure 3.1-4 Regional Offshore Borrow Sites (not to scale)

EXHIBIT NO. 9
APPLICATION NO.
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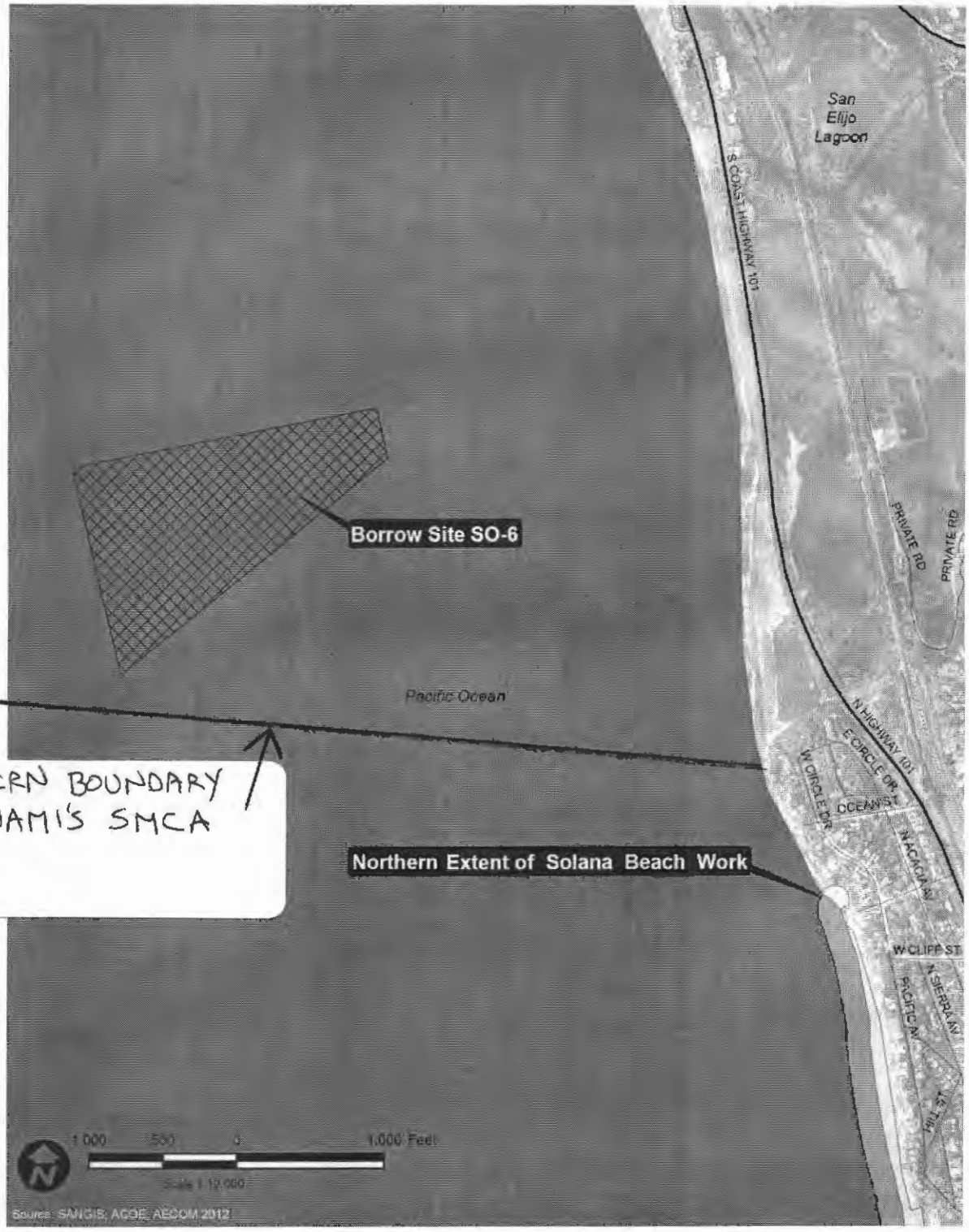

SOUTHERN BOUNDARY OF SWAMI'S SMCA

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Figure 3.3-1 SO-6 Borrow Site Footprint (SANDAG 2000a)

EX. 9
P. 2 of 4

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Figure 3.3-2 SO-5 Borrow Site Footprint (SANDAG 2000a)

EX-9
P-3 of 4

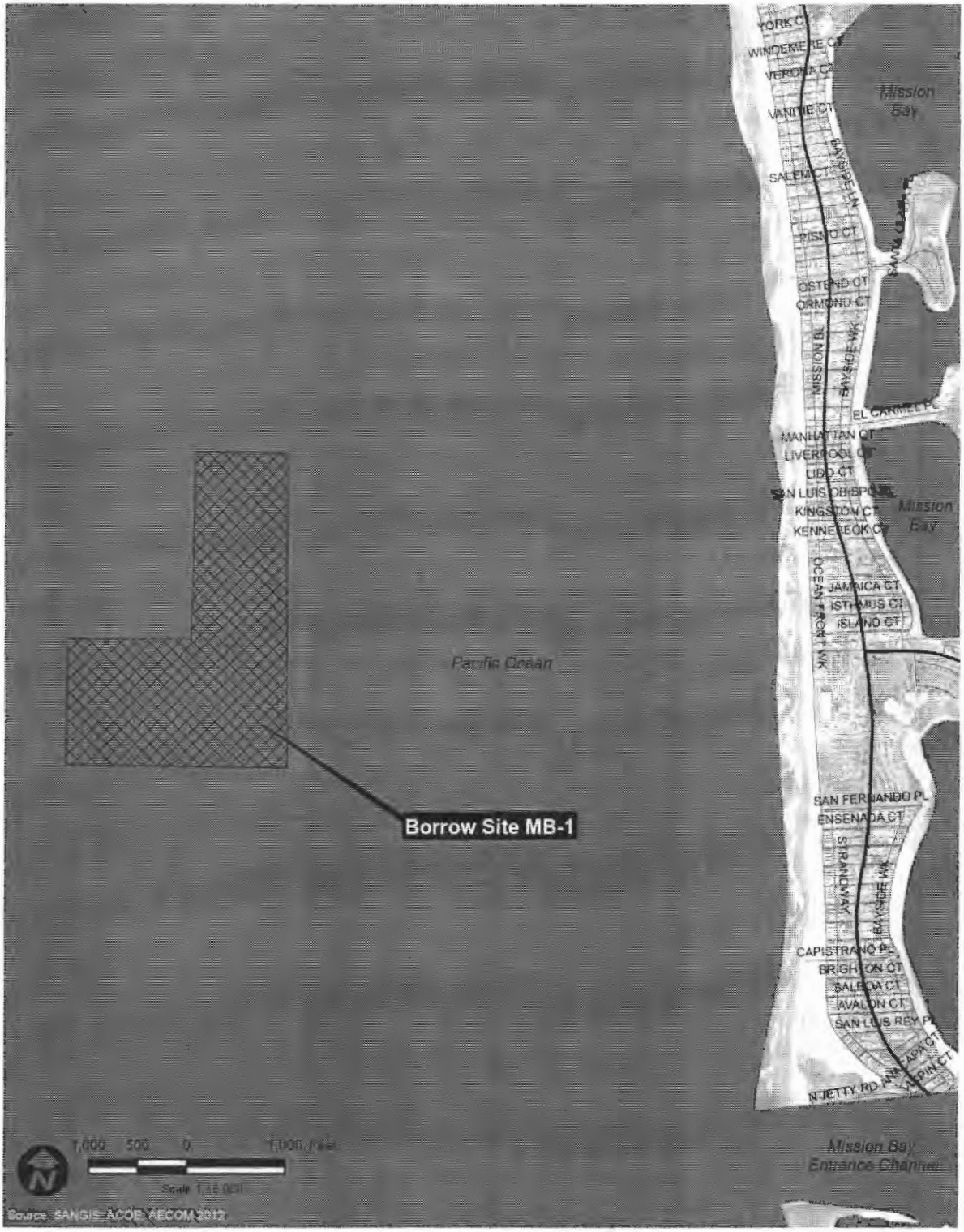

Figure 3.3-3 MB-1 Borrow Site Footprint (SANDAG 2000a)

EX-9
P_4 of 4

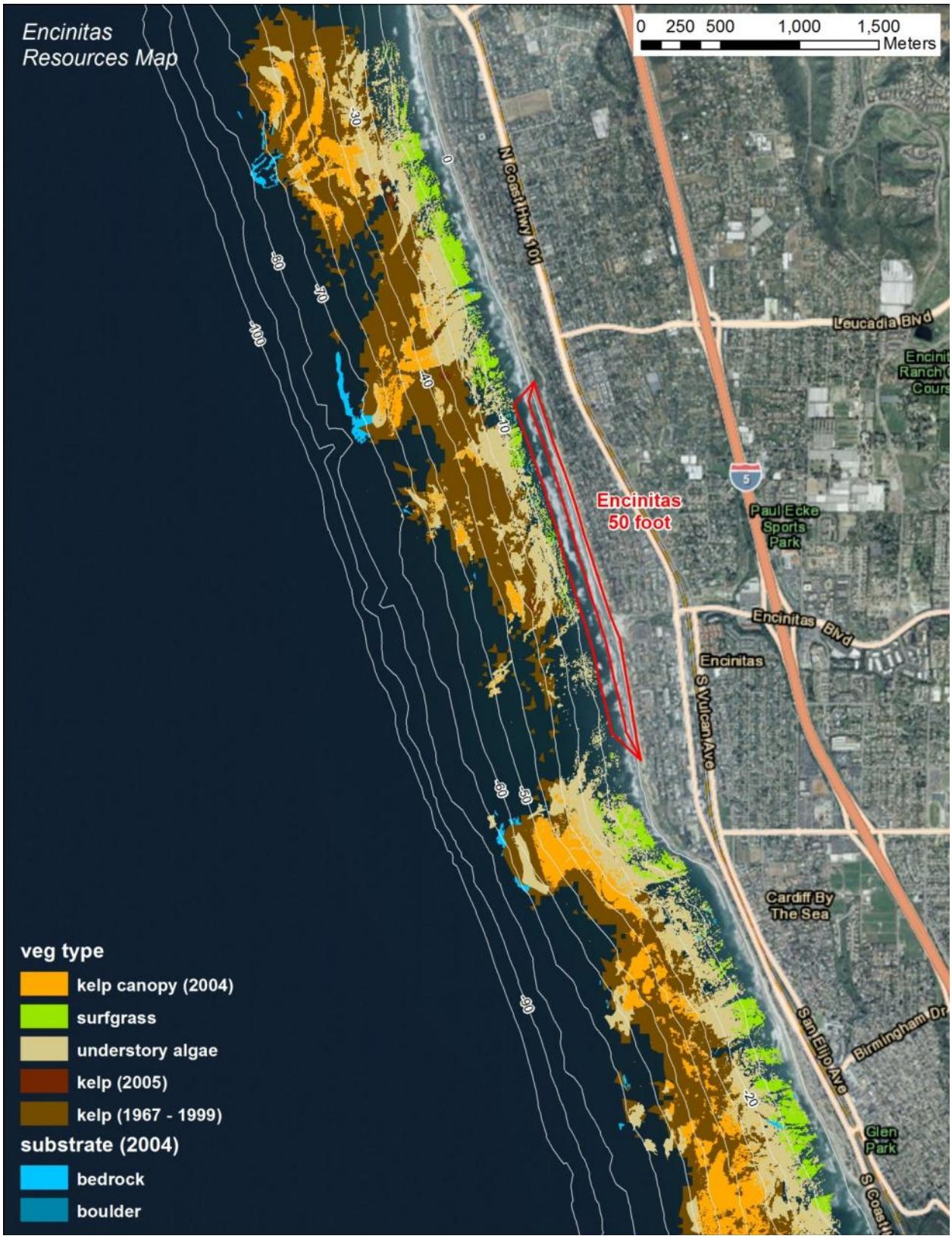

Figure 5.4-4 Encinitas receiver site under Alternatives EN-1B and EN-2B

CD-0203-13
Exhibit 10

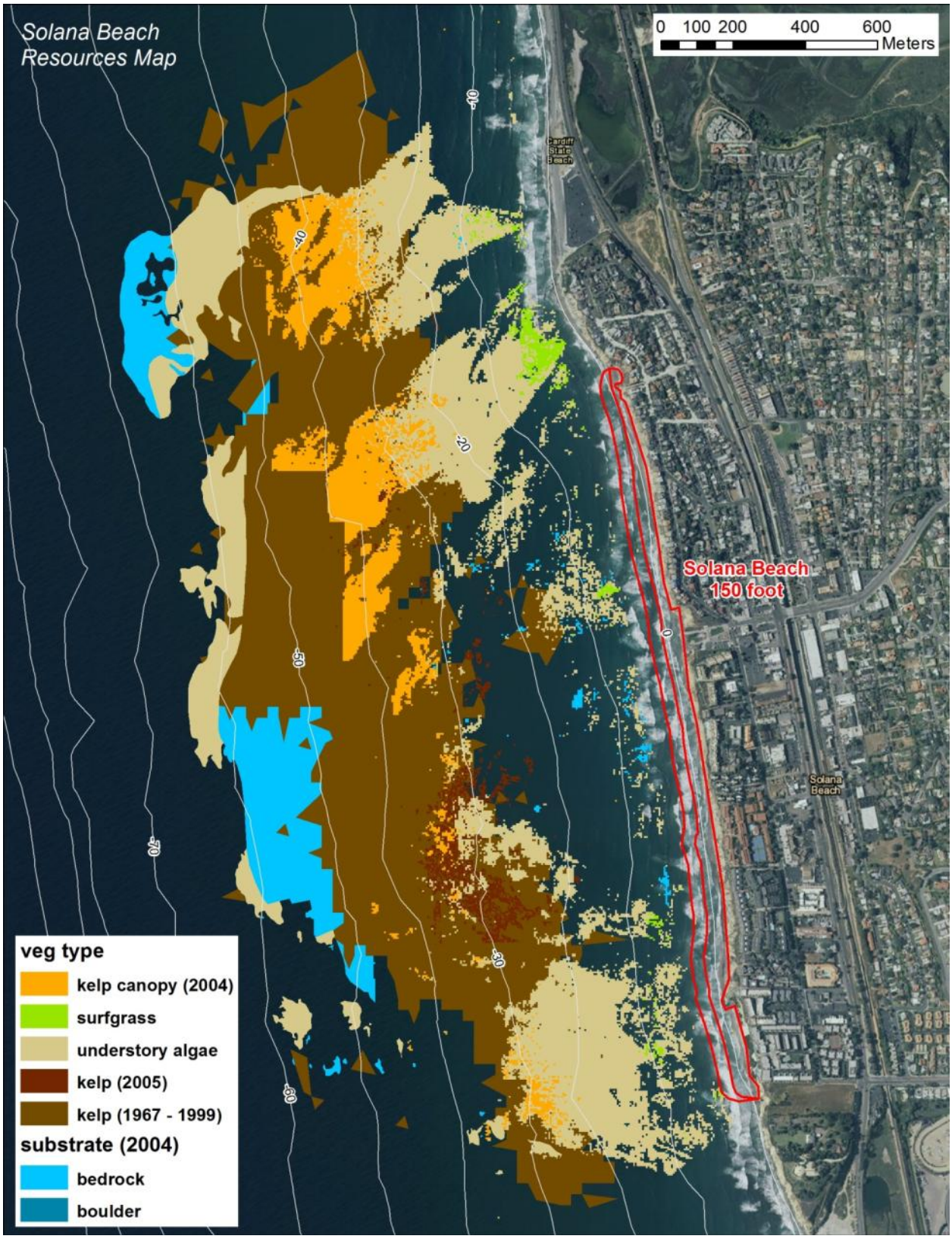

Figure 5.4-7 Solana Beach receiver site under Alternative SB-1B and SB-2A

CD-0203-13
Exhibit 11

Figure 4.2-2 Swami's State Marine Conservation Area (SMCA)

CD-0203-13
Exhibit 12

EXHIBIT 4

Swami's State Marine Conservation Area

14 CCR § 632
Cal. Admin. Code tit. 14, § 632
Barclays Official California Code of Regulations Currentness
Title 14. Natural Resources
Division 1. Fish and Game Commission-Department of Fish and Game
Subdivision 2. Game and Furbearers
Chapter 11. Ecological Reserves (Refs & Annos)
➡§ 632. Marine Protected Areas (MPAs), Marine Managed Areas (MMAs), and Special Closures.

(b) Areas and Special Regulations for Use. Pursuant to the commission's authority in Fish and Game Code Section 2860 to regulate commercial and recreational fishing and any other taking of marine species in MPAs, Fish and Game Code Sections 10500(f), 10500(g), 10502.5, 10502.6, 10502.7, 10502.8, 10655, 10655.5, 10656, 10657, 10657.5, 10658, 10660, 10661, 10664, 10666, 10667, 10711, 10801, 10900, 10901, 10902, 10903, 10904, 10905, 10906, 10907, 10908, 10909, 10910, 10911, 10912, 10913, and 10932 are made inoperative as they apply to Subsection 632(b). All geographic coordinates listed use the North American Datum 1983 (NAD83) reference datum: (138) Swami's State Marine Conservation Area.

(A) This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed except where noted:
33° 02.900' N. lat. 117° 17.927' W. long.; and
33° 02.900' N. lat. 117° 21.743' W. long.;
thence southward along the three nautical mile offshore boundary to
33° 00.000' N. lat. 117° 20.398' W. long.; and
33° 00.000' N. lat. 117° 16.698' W. long.;
thence northward along the mean high tide line onshore boundary to
33° 00.962' N. lat. 117° 16.850' W. long.; and
33° 00.980' N. lat. 117°16.857' W. long.

(B) Take of all living marine resources is prohibited except:

1. Recreational take by hook and line from shore is allowed.
2. The recreational take of pelagic finfish [subsection 632(a)(3)], including Pacific bonito, and white seabass by spearfishing [Section 1.76] is allowed.
3. Take pursuant to activities authorized under subsection 632(b)(138)(C) is allowed.

(C) Beach nourishment and other sediment management activities and operation and maintenance of artificial structures inside the conservation area is allowed pursuant to any required federal, state and local permits, or as otherwise authorized by the department.

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SERVICES

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Phone Numbers:
(760) 635-7998
dennislees@cox.net
30 October 2013

Mr. Larry Simon
Federal Consistency Coordinator
Energy, Ocean Resources and Federal Consistency Division
California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105

Agenda Item No. Th11a
CD-0203013 (U.S. Army Corps of Engineers, San Diego Co
Dennis Lees, in opposition to the project

Dear Mr. Simon:

I wish to address four types of issues regarding the Encinitas-Solana Beach Coastal Storm Damage Reduction Project, a 50-year program proposed by the U. S. Army Corps of Engineers. My first concern is the ecological inaccuracy of the treatment of the potential short- and long-term environmental impacts to nearshore habitats in the USACE EIS/EIR, and the failure of the analysis to address cumulative effects in nearshore sediments. Second, I am concerned about the unrecognized potential long-term water-, sediment- and air-quality impacts in the areas proposed as borrow sites. My third concern is that the proposed program does nothing to address the problems posed to the various topographic features (bluffs and the San Elijo Lagoon strand) by increased frequency and intensity of storm activity and rising sea level due to global warming.

Finally, I am concerned that, based on conclusions there would be no impacts and no lost resources, the USACE determined that mitigation was not required. The consequence of that was to exaggerate the benefit in the Cost: Benefits Analysis. Even in the absence of these costs elements, the level of benefit is marginal. If these elements were included, the CBA would be negative.

Regarding the first issues, impacts of development activities in most ecosystems in the world are described or predicted in terms of observed or potential effects on large, long-lived organisms (the "trees") that characterize the biological assemblages forming them. Moreover, projected recovery trajectories are typically based on the population structure and longevity of the "trees" of the assemblage under consideration.

However, a different approach has been applied to faunal assemblages living in and on

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APPLICATION NO.
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soft sediments, including in the analysis in the EIS/EIR, where assemblages are described mainly on the basis of small, short-lived organisms (the "weeds") that numerically dominate sediment samples collected to characterize soft-bottom ecosystems. Consequently, long-term effects of many activities affecting these assemblages are severely underestimated. Moreover, predicted recovery trajectories in these studies are based on the ability of ephemeral organisms to recolonize disturbed habitats quickly, leading to foreshortened predictions for recovery.

Early infaunal ecologists applied approaches similar to those developed by plant ecologists, basing their estimates of ecosystem or fisheries value of assemblages living in and on soft sediments, or impacts of insults to these systems, on large, long-lived members of the assemblages. The current myopic approach for assessing value or impacts was developed largely in response to requirements in the National Environmental Policy Act of 1969 for dischargers to assess and monitor all effluents discharged into the ocean. In many cases, it appears this approach has resulted in flawed evaluations and substantial underestimates of the effects of many anthropogenic activities.

The environmental analysis for this project determined, based on the "weeds", that the dredging program would not cause significant impacts to the infaunal assemblages living in the area and that loss of resources would not be significant. In an effort to demonstrate my argument regarding flaws of this approach (i.e., basing descriptions, decisions, and estimates of recovery durations on the "weeds" in the infauna rather than on the "trees") and the failure of those analyses to adequately assess potential impacts to the proposed borrow sites, my wife and I spent about an hour in February 2013 collecting shell materials from the surface of sand that was deposited at Moonlight Beach in Encinitas during the recent 2012 winter beach nourishment program. My purposes were to: 1) collect and identify the clam and snail shells that were included in the sand that was dredged from a nearby borrow site (probably SO-6); and 2) compare this list of molluscan species with the molluscan species listed as most commonly observed in sand samples collected offshore from Oceanside to Imperial Beach (Table 3.4-3 in the Final EIS for the San Diego Regional Beach Sand Project; KEA, 2000. The San Diego regional beach sand project final environmental impact report/environmental assessment. Prepared for San Diego Association of Governments and U. S. Dep't. of the Navy, SWDIV NAVFAC Engineering Command. June 2000.) That list, depicting the species that are common in grab or core samples from sandy nearshore habitats between Oceanside and Imperial Beach, was a primary data source used in assessing or predicting potential impacts and required recovery time for proposed dredging activities in the borrow sites. The objective of this quick survey was to gage how accurately the approach taken in previous beach replenishment programs measures potential long-term impacts and recovery times. I wanted to see how closely the clams and snails dominating the shell material in the dredged material reflected the data used to conclude "No Significant Impacts' and "No Ecological Value".

The molluscan species represented by shells in the dredged sand at Moonlight Beach are shown in the included photograph (Figure 2) and listed in Table 1. In all, nineteen

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species of clams and six snail that typically reside in nearshore sand habitats similar to the borrow sites were collected and identified based on a variety of shell characteristics. All of the shells collected represent large, long-lived species, i.e., they are analogous to "trees" in terrestrial ecosystems. The sizes of the shell fragments shown in the attached photograph provide a basis for estimating the sizes of the various species. It is notable that most of the shells have been broken during their passage though the dredge and pipeline while being transported to the beach.

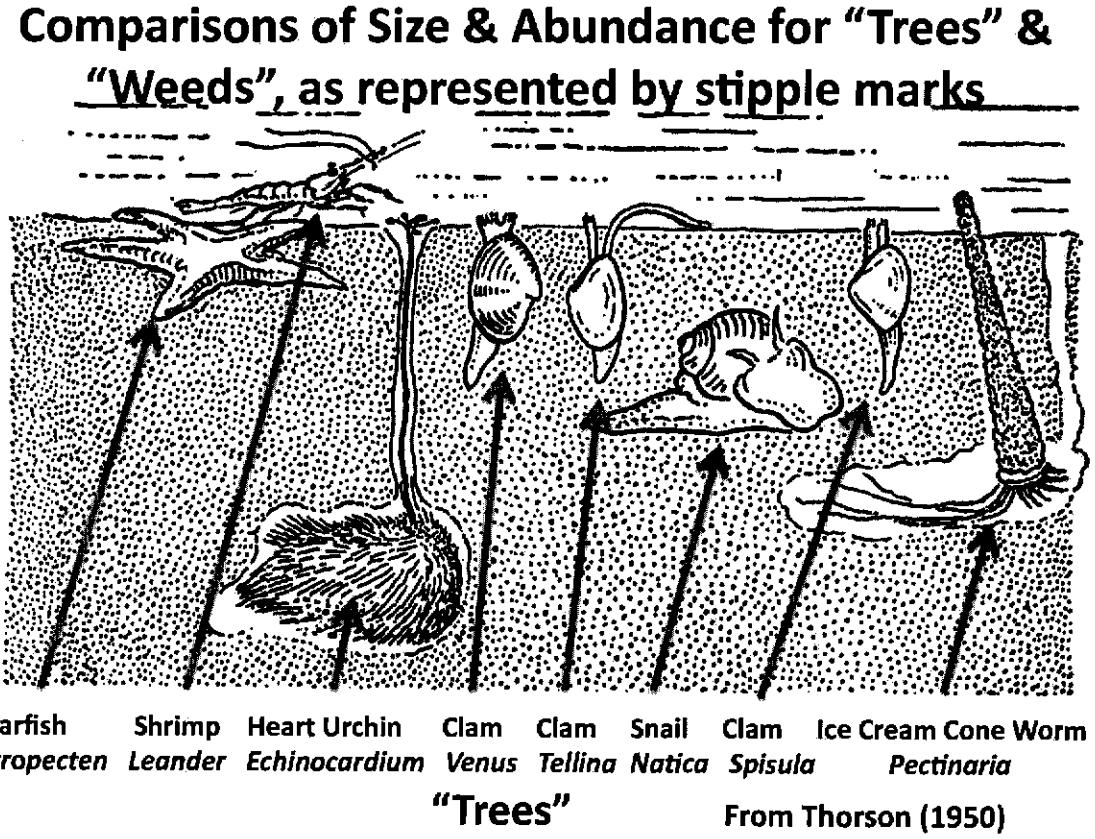

Figure 1. Comparative depiction of the relative size and abundance of "weeds", as represented by the stipple marks in the figure, and the "trees" in an infaunal assemblage.

Only nine molluscs species total are listed in Table 2 (3.4-3) and only one of those is similar to those found in the dredged sand at Moonlight Beach. Thus, it is clear that the species used in previous studies to measure long-term impacts and recovery durations have been completely inappropriate and inadequate. Many of the species for which shells were collected and abundant in the dredged material live over 10 years and only recruit to the ecosystem infrequently. Some, like Pismo clams, the most numerous shell collected in this brief study, live up to 50 years. For these species, even if conditions are suitable, recovery of a stable, balanced age structure will require several decades. In contrast, most of the species listed in Table 2 (3.4-3) live only about 1-2 years.

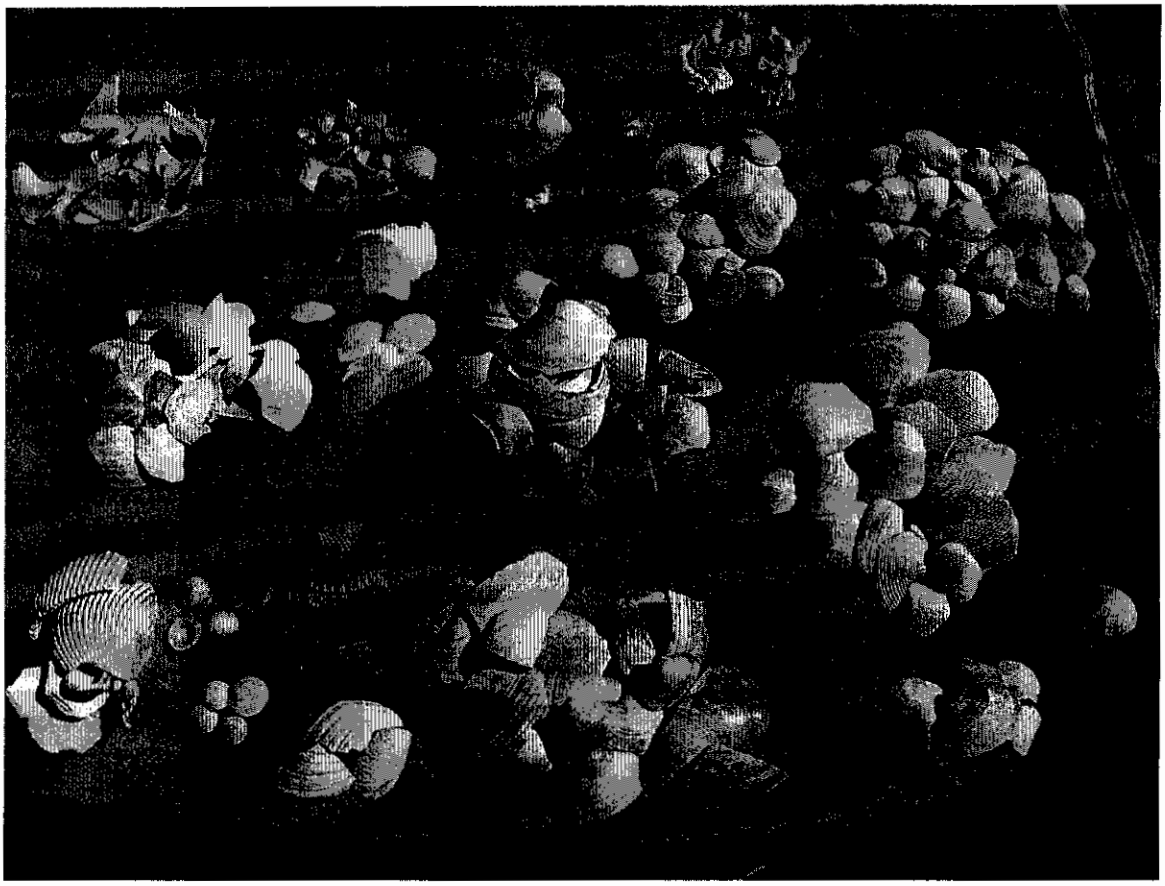

Figure 2. Clam and snail shells gleaned in about 1.5 hours in February 2013 from sand deposited on Moonlight Beach last winter. Each pile represents a separate species. Pismo clam shells are bottom center. 1-foot long ruler can be used for scale.

What this comparisons clearly shows is that the species collected in previous surveys and used to assess the ecological value and recovery periods for the potential borrow sites is inappropriate and inadequate. It is clear from this brief survey of the dredged material deposited on Moonlight Beach that large numbers of long-live species (analogous to "trees") were "harvested" by the dredging process but were not surveyed by the types of surveys that have been conducted previously to assess the ecological impacts of the dredging and beach nourishment programs. In particular, several species of large clams (e.g., Pismo, surfclams, and butterclams) were common in the shell debris. This is an unfortunate idiosyncrasy of the type of sampling that was adopted by agencies and consultants in the early 1970s, when implementation of the National Environmental Protection Act resulted in a great demand for sampling these habitats to evaluate potential contaminant issues around offshore discharges around the nation. These ecosystems in soft sediments are the only ones I'm aware of where we make our decisions and projections for recovery based on the "weeds" rather than the "trees". It is a very flawed approach to evaluating impacts and managing ecosystems.

Table 1. Shell fragments of clam and snail taxa collected in February 2013 from sand placed on Moonlight Beach. The sand was dredged from a local borrow site in October-November 2012.

BIVALVES

Pectinidae	**Lucinidae**	**Cardiidae**
Argopecten ventricosus – Pacific Calico scallop	*Here excavate* – Pit lucine	*Trachycardium quadragenarum* – spiny pricklecockle
	Lucinisca nuttalli – Nuttall lucine	
Veneridae		**Mactridae**
Amiantis callosa – White venus	**Tellinidae**	*Mactromeris ?catilliformis* – Dish surfclam
Chione californiensis – California venus	*Leporimetis obesa* – California fat-tellin	*?Simomactra* sp. – surfclam
Chione undatella – Frilled venus	*Macoma nasuta* – Bent-nose macoma	*Tresus* sp. – Gaper
Leukoma staminea – Pacific littleneck	*Macoma ?secta* – White-sand macoma	
Saxidomus nuttalli – California butterclam	*Tellina ?idae* – Ida tellin	**Semelidae**
Tivela stultorum – Pismo clam	*Tellina bodegensis* – Bodega tellin	*Semele decisa* – Clipped semele

SNAILS

Polinices lewisii – Lewis's moon-shell	*Neverita reclusiana* – Recluz's moon-shell	*Nassarius fossatus* – Great Western nassa
Bursa californica California frog-shell	*?Ophiodermella* sp. - turrid snail	*Megasurcula carpenteriana* – Carpenter's turrid

As would be expected when the depth dredge cut exceeds 3 feet, shell condition indicated that the largest proportion of the "harvested" clams and snails had not been freshly killed. Nevertheless, their presence in the sediments indicates they occur locally. Moreover, the presence of periostracum on the exterior surface and the shiny interior surfaces on many of the shells indicated that an appreciable proportion had been killed by the recent dredging project.

A final point: it is important to recognize that this collection of shells represents only a hint of the magnitude of the injury that the "trees" in the infaunal assemblages in the borrow sites experienced as a consequence of the beach nourishment project. The largest

[We haven't inherited the earth, we have just borrowed it from our children!]

Table 2. List of infaunal "weed" taxa collected in grab samples and used to determine that dredging program would cause no impacts or result in lost resources.

Table 3.4-3
Summary of the Most Commonly Collected Infaunal Invertebrate Species Occurring Offshore from Oceanside to Imperial Beach (at water depths of 59 to 177 feet)

Scientific Name	Common Name	SO-9 Station 2286	SO-7 Encina R1	SO-6 Station 2293	MB-1 Station 1791	SS-1 Station 1944
Polychaetes		45-55'	60-95'	60-80'	68-75'	
Dipatra sp.	Onuphid	P	X		X	
Dispio uncinata	Spionid	X		P	X	
Euclymeninae sp. A	Maldanid	P	P			P
Mediomastus spp.	Capitellid		P			
Melinna oculata	Ampharetid	P	X	X		
Metasychis disparidentatus	Maldanid	P				
Monticellina sp.	Cirratulid	X	X			P
Lumbrineris sp.	Lumbrinerid	X	X	X	X	
Myriochele sp. M	Oweniid		P		X	
Mooreonuphis sp.	Onuphid	X	X	X		
Paraprionospio pinnata	Spionid	P	P			P
Petalodymene pacifica	Maldanid	P				
Pista disjuncta	Terebellid	P	X			
Prionospio sp. A	Spionid		P			
Owenia sp.	Oweniid		X	X	P	P
Onuphis sp.	Onuphid	X	X	X	X	X
Sigalion spinosa	Sigalionid		X		X	X
Spiophanes bombyx	Spionid			X	P	X
Spiophanes missionensis	Spionid	P	P	X	X	X
Streblosoma sp.	Terebellid	P	X			
Sthenelanella uniformis	Sigalionid	X	P			
Crustaceans						
Ampelisca brevisimulata	Amphipod	X	P			
Ampelisca cristata	Amphipod	P	X		X	X
Cerapus tubularis	Amphipod			X		
Euphilomedes carcharondonta	Ostracod		P			
Leptochelia dubia	Tanaid		X		P	
Pinnixa sp.	Crab		X		X	P
Rhepoxynius sp.	Amphipod	X	X	X	P	X
Photis sp.	Amphipod	X	X		X	X

"We haven't inherited the earth, we have just borrowed it from our children!"

Table 3.4-3. Continued

Scientific Name	Common Name	SO-9 Station 2286 Oceanside	SO-7 Encina R1 Carlsbad	SO-6 Station 2293 Cardiff	MB-1 Station 1791 Mission Beach	SS-1 Station 1944 Imperial Beach
Synchelidium shoemakeri	Amphipod				✗	
Tiburonella viscana	Amphipod			P	P	
Echinoderms						
Amphiodia urtica	Brittlestar		P	✗		
Dendraster excentricus	Sand dollar			✗	P	
Leptosynapta sp.	Cucumber		✗	✗	P	✗
Molluscs						
Acteocina harpa	Snail					✗
Caecum crebrinctum	Snail			P	P	
Halistylus pupoides	Snail			P	P	
Macoma yoldiformis	Tellinid clam	✗	✗		✗	✗
Olivella baetica	Purple olive snail					✗
Solen sicarius	Solen clam	✗				
Solamen columbiana	Clam				P	
Tellina sp.	Tellinid clam	✗	P			P
Turbonilla sp.	Snail		✗	✗		✗
Other Phyla						
Glottidia albida	Brachiopoda	✗				
Branchiostoma californiense	Sand lancelet			✗	✗	
Lineidae	Nemertea	✗	✗	✗	✗	✗
Tubulanus polymorphus	Nemertea		✗			✗
Phoronis sp.	Phoronida		✗	✗	✗	✗
Molgulidae sp. A	Tunicate			P		
Total Number of Individuals		256	491	171	164	133
Total Number of Species		62	118	29	51	43

P = Most abundant taxa ✗ = Identified as present

Sources: MEC and SCCWRP, refer to Appendix C.

We haven't inherited the earth, we have just borrowed it from our children!!

proportion of the "trees" in this ecosystem, probably ≈90%, do not have shells that would survive dredging and transport through the pipelines to the beach. They would arrive on the beach as unrecognizable minced meat. Thus, no evidence of that loss would be observed by examining the recently "nourished" beach.

Based on this comparison, it is clear this list does not truly represent the resources available in the sediments in the borrow sites. I acknowledge that the areas that would be dredged are proportionately small. However, because of their locations directly off the lagoons and between kelp beds, they receive much more organic input (seagrasses, kelp, detritus from the streams, etc.) than other areas more remote to such inputs. Consequently, they likely support greater quantities of the "critters" that fish, lobsters, etc., feed upon and so they are disproportionately more valuable to the fisheries. Appropriate studies have not been conducted to determine potential locations for borrow sites that would cause the least loss of good forage habitat. Borrow sites were selected solely on the basis of sediment characteristics. The Corps did not compare ecological value among the various borrow sites to ensure that dredging will cause the least injury to biological resources. Moreover, appropriate studies have not been conducted to assess the value of lost resources. "Weeds", by definition, recovery quickly, within a few years. "Trees", on the other hand, take decades to recover. In Prince William Sound, for example, based on research that I conducted 13 years after the cleanup, we estimated it would take between 50 and 100 years for the clam assemblages in the washed sediments to recover. Animals like Pismo clams can live up to 50 years. Furthermore, my quick-and-dirty reconnaissance to Moonlight Beach in February showed that the borrow site used for replenishing that beach (I assume SO-6) had supported substantial quantities of long-lived clams, which are just one component of the diverse and productive variety of "trees". That area is now devoid of "trees".

Another issue related to use of "weeds" in this analysis is the failure to assess cumulative effects. The proposed project would be the third dredging program in the region since 2001. It appears that the locations of borrow sites excavated for these programs has been somewhat different for each time. Because the biologists conducting these analyses were responding to studies that looked only at the "weeds" and these recover in a very short time, they did not see a need to evaluate cumulative effects. However, with this issue of the "trees" and "weeds" in mind, and the protracted periods required by the "trees" for recovery, I am also concerned that cumulative impacts of two or three different sets of borrow sites has not evaluated. We may, in fact, be talking about an area of impact that is three times larger than what was considered in the EIS/EIR. That, combined with protracted recovery periods, would probably be considered a significant impact, especially since the SO-5 and SO-6 borrow sites are in "prime" real estate in terms of forage areas for fisheries. Recovery of the "trees" takes decades.

The bottom line here is that the environmental analyses of the infaunal assemblages in the borrow sites is very flawed and misleading. It does not provide an accurate or adequate assessment of potential impacts and grossly underestimates lost resources.

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My second concern relates to the long-term impacts to the biota and water-, sediment- and air-quality, resulting from the design depth of the basins in the borrow sites, i.e., 20 feet below grade. It is highly likely that when the depth of these basins reached 10 feet below grade, they would become anoxic, i.e., dead zones, and would not support the normal fauna for a long period of time. Because these areas receive so much organic matter from the kelp beds and the lagoons, the basins would collect this material. Because they would be below grade, water circulation would be reduced, especially later in the program when the depth of the basins exceeded 10 feet. With reduced circulation, the accumulation of organic matter would begin to decompose, oxygen levels in the bottom water and sediments would decline and the bottom of the basins could become depressed or anoxic. At this point, decomposition would produce methane and hydrogen sulfide gas, which could create an air quality problem. It is well known that most sand movement along the coast occurs in the littoral drift zone. However, it appears that little research has been conducted on sand transport at depths outside that active zone, where borrow sites are located. Thus, it is very unclear how long it would take for those basins to refill to a level where they could support the normal fauna. Consequently, it is possible that the dredging program could create long-term dead zones within one-half mile of the beach, one inside the Swami's Marine Conservation Area. This would amplify the issue of protracted recovery trajectories discussed above. I agree that my projections regarding potential dead zones are not completely substantiated. That is because very few studies have been conducted to look at conditions in similar dredge basins. Where it has been done, in the Baltic Sea, they definitely observed very depressed concentrations of oxygen in the sediments and water at the bottom of the basins, and a very impoverished fauna.

Regarding the third issue, this program is a Band-Aid. The Corps has been running a similar program in New Jersey since the mid-'60s but with no benefit. The only benefit from that program came from dunes they constructed in front if several communities. These communities were spared considerably from the damage from Hurricane Sandy whereas the communities with only beach nourishment were ravaged.
The program does not solve any of the long-term, ongoing problems posed by bluff erosion, sand loss, or rising sea level. It does not protect the beaches of Encinitas from north of a point ≈1,000 feet south of Beacon's Beach. It does not protect Restaurant Row, Pacific Coast Highway, or the beaches adjacent to San Elijo Lagoon. And finally, it omits consideration and discussion of currently widely employed shoreline protection strategies that are being employed nation-wide, e.g., managed retreat, rolling easements, and beach dewatering;

Regarding my credibility, my environmental views are based on decades of observations and studies in sand and other soft substrates in California, Alaska, the Arabian Gulf, and the central Pacific. As I implied above, I have been working with and evaluating the "weeds" and "trees" in these systems, and how they are affected by anthropogenic activities, since 1971. Regarding my view on the potential effects of this type of program, if you review comment letters for the July hearing, you will see that the NMFS

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had many of the same concerns that I have been voicing. In addition, you will see similar comments in the response of some CCC staff to other major dredging projects.

Please understand, I am not opposed to small beach nourishment programs that place sand where it will attract tourists and benefit the tourist industry. I am willing to accept that there will be some environmental damage offshore. I understand that the revised project reduces the sand removal from the borrow sites by about half. However, the revised document does not address issues regarding the borrow sites. Moreover, I still object to locating the borrow sites in what are probably some of the most productive areas in North County in terms of forage items for fisheries and I object to dredging these locations to such great depths. Moreover, I wish the science that was presented to "defend" this program was better, and that the investigators had been more thoughtful and realistic in their analyses of potential problems and recovery times.

Regarding the proposed borrow-site monitoring program, it is paramount that these studies be carried out over the 50-year life of the program. It is likely that the problems that I am predicting for sediment and water quality will not develop until basin depths exceed ≈10 feet, after several dredging episodes. In addition to seafloor morphology, water quality, and benthic habitat quality, the program needs to include aspects of sediment quality that measure eH, pH, TOC, TKN, and sulfides. The benthic habitat quality element needs to incorporate methodology that provides adequate sampling of the "trees" (probably an anchor dredge) rather than just grab sampling, which samples mainly the "weeds".

Here are websites for some documents that evaluate the way other regions of the country are dealing with the issues the program is supposed to be addressing.

http://www.heraldtribune.com/article/20120219/ARTICLE/120219439/2416/NEWS?p=1&tc=pg
http://ngm.nationalgeographic.com/2013/09/rising-seas/folger-text
http://www.kpbs.org/news/2013/oct/07/nova-megastorm-aftermath/
http://www.nytimes.com/2013/08/25/us/where-sand-is-gold-the-coffers-are-running-dry-in-florida.html?pagewanted=1&_r=0&hp

Sincerely,

Littoral Ecological & Environmental Services

Dennis C. Lees
President

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"We haven't inherited the earth, we have just borrowed it from our children!"

Simon, Larry@Coastal

From: Garth Murphy <garthmy@gmail.com>
Sent: Sunday, July 28, 2013 6:06 PM
To: Simon, Larry@Coastal
Subject: Fwd: Undeliverable: CD-003-13 USACE, ENCINITAS AND SOLANA BEACH

---------- Forwarded message ----------
From: Garth Murphy <garthmy@gmail.com>
To: <larry@coastal.ca.gov>
Cc:
Date: Sun, 28 Jul 2013 19:02:01 -0600
Subject: CD-003-13 USACE, ENCINITAS AND SOLANA BEACH
Dear Mr Simon,

I just want to reiterate what I wrote in my letter to the CCC re the USACE plan and thank the CCC for rejecting this worthless, destructive and fraudulent USACE project.

Subsequently I discovered a 100 million dollar cost overrun built into the plan that is outlined in brief below. I had initially thought it to be about 20 to 22 million, which was closer to 10 percent of the total, but when I received better information on the implementation costs discovered the 100 million shock.

I am not sure if this is common with USACE proposals but it explains a lot of the lies and misrepresentations and inflexibility and refusal to change or share implementation, management or adopt adaptive management, or allow CCC oversight, which would of course interfere with the scam to skim 100 million from the project by getting the cities and state to pay 100% of the real costs which are only 78 million, not 178 million as stated in study plan.

Its a shocker to be sure.

FYI I worked for two years on the MLPAI as an RSG member representing surfers and North San Diego County. I was instrumental as a group leader in identifying, siting, justifying and negotiating the Swamis MPA and have 52 years walking and studying the beaches from Solana to Batequitos lagoon as a surfer and diver. My father got the first Phd. in marine ecology from Scripps UCSD in '59 and I have been a marine and general ecologist ever since. I walked the beaches recording bluff block falls in the 70's with Gerry Kuhn, who did the original research in north SD county.

My company is called Integrated Ecosystem Management and I specialize in using natural ecosystem organizational models to create efficient business, social and technical ecosystem combos that are integrated with the natural ecosystems they occupy and exploit. Everything connected, no disconnects, the integrated whole greater than the sum of its parts.

Beach sand placement and movement is one of my specialties. Unfortunately I was late to the USACE project as busy in Mexico reorganizing a marina failing for a lack of sport fish and poorly designed jetty system. The Encinitas project has no merits at all except successful funding. Solana Beach is better but they are coupled to the exigencies of the greater fraud possibilities in a single two city project.

Thanks for the good work, Garth Murphy

EXHIBIT NO. 13
APPLICATION NO. CD-0203-13
P. 11 of 18

CALIFORNIA COASTAL COMMISSION NEGATIVE CONSISTENCY DETERMINATION CD-OO3-13, USACE 50 YR. BEACH REPLENISHMENT PLAN EN-1A, SB-1A

ANALYSIS OF PROPOSED USACE PLAN EFFICACY IN ACCOMPLISHING ENCINITAS CITY LONG TERM BEACH SAND MANAGEMENT GOALS

Garth Murphy
Integrated Ecosystem Management
The economy of unified social, business, natural and technological ecosystems
649 South Vulcan Avenue
Encinitas, CA 92024
Phone 760 7538360

28 JULY 2013

The USACE Plan as presented does not address the complex of Encinitas City beach erosion and sand replenishment management needs or goals. It only addresses beach sand augmentation at the bluff toe of 1.5 miles of the City's 6 miles of sandy beaches, **excluding another 1.5 miles of bluff and beach**, from 1000 feet south of Beacon public access northward through Leucadia to Batequitos Lagoon, **and excluding all 3 miles of beach south of H Street, including restaurant row and the rest of the San Elijo estuary frontage sandbar which is an area with periodic nourishment needs that does not have the backing of a sandstone bluff and has a wide range of improvement options, including short groins and isthmus widening and or grade elevation.**

Under the Plan, the initial volume of sand to be deposited on the 1.5 miles of beach just north of Swamis Reef and within Swamis MPA, in a north to south sand flow literal, is unprecedented in the last 55 years, with unknown consequences, positive or negative, for the affected beach, for bluff retreat prevention or for impacts to the adjacent subtidal marine ecosystem.

The single borrow site for Encinitas is in the middle of the Swamis MPA. Alternate, less ecologically valuable sand borrow sites like the sand bars offshore of the mouth of Batequitos Lagoon were not evaluated or considered. (See response of Dennis Lees for dredge site evaluation faults.)

The five hundreds of pages of scientific papers and research published in the USACE Plan are basically sound. But many studies are incomplete and important study elements are missing, ignoring the fact that the bluffs and offshore reefs are not homogeneous and require different strategies in the different sections of our coastline.

What is critically unsound is the unfounded USACE recommendation drawn from the volumes of reports - **that a large sand pile placed every five years along a small portion of the bluffs in the middle of 6 miles of Encinitas beaches will resolve City beach and bluff erosion, public access, recreation and safety issues for the next 50 years, and do so without significant negative impacts to the nearshore marine environment and specifically the Swamis MPA.**

This is blatant cupidity considering the history of the study area's highly destructive but largely episodic 10 to 20 year extreme weather event effects on the beaches and bluff erosion.

The proposed initial cost of creating the Plan and proposed constructions, work timetable, sand placement engineering, payment sharing structure, liability and management sharing responsibilities, leave the Cities in a costly legal, financial and management bind, without accomplishing any of their long term beach erosion goals.

The Plan, as is, is unacceptable. The overall inadequacy of the Plan to address Encinitas' suite of beach and bluff erosion problems and goals in an efficient, cost/beneficial manner, makes the Plan a losing proposition for City of Encinitas residents and US taxpayers, who will share the exorbitant bill.

The cost of the proposed project is fraudulently inflated by about 100 million dollars, when compared to the price per cubic meter of sand placed on the beach in the similar 2012 SANDAG beach sand replenishment project, which deposited 1.4 million cubic meters of beach sand throughout the county for 22.5 million dollars, about 16 total dollars a cubic meter, using the same contractor named in the USACE plan.

The current New Jersey prices for Hurricane Sandy sand replenishment with similar equipment and beach/borrow site situation is slightly cheaper at 14.38 dollars a cubic meter. We can consider these to be current industry standards.

The USACE plan would deposit a total of 4,880,000 cubic meters of sand, which at 16 dollars a yard equals 78 million dollars for which they are charging the cities 178 million, an overcharge of 100 million dollars: 108 million dollars to Encinitas for 3.2 million cubic feet and 70 million to Solana for 1.68 million cubic feet of sand. (I use the quoted figures of 10 deposits of 280,000 cu.yd. for Encinitas, every five years for 50 years, with the initial deposit adding 400,000 cubic yards for 680,000 cu.yd.; and four equal deposits of 420,000 cu.yd., every 13 years for 50 years, in Solana Beach.)

Encinitas is not Mazari-Sharif, Afghanistan, Solana Beach is not, Iraq, where 87 indictments for a total wastage of 8 billion dollars of federal funds sent 22 colonels and over a hundred civilian contractors to jail. 8 billion divided by 87 is about 100 million, so a fraud of this scale in USACE projects is not unusual. It is a form of institutionalized graft that our representatives in government love.

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Remember the 350 dollar apiece DOD paper plates? Do they think Californians are too wine, sun and pot addled to notice a fraud this large? (This project was initiated by Brian Bilbray and inherited by Daryl Issa, our current congressman.)

The only reasonable response, if this is to be considered a finished plan, is the no action option, accompanied by a stern letter to DOD, local federal prosecutors and the State Attorney General alerting them to this conspiracy to defraud the cities, state of California and the federal treasury.

To the City managers and Council members who supported this plan, fraudulent both scientifically and in terms of use of Federal funds, shame on you all for going for the seemingly easy money at the expense of your constituents, the US taxpayer and the health and welfare of city beaches, and for not doing your math on the costs you all swear to control. Next time, look the gift horse in the mouth before buying.

SANDAG can do the job twice as well, honestly, with subtle and ecologically sound adaptive management techniques, and for less than the price the gullible cities have agreed to pay for their inflated half of the double billing by the USACE.

For the 550 or so concerned bluff top private property owners, you should form a special district and collect 2000 a year from each owner to fund projects to remove ground water from the bluffs and pursue strategies to successfully protect the soft upper bluffs, both of which contribute more to erosion than the lack of beaches. That is about a third of a gardener's salary each year. The special district and the City could by a home or house lot every 1/4 mile along the bluff and create a public access to the beach that would allow regular federal funding for beach restoration without a Federal waiver. (Forgot that little wrinkle?)

Garth Murphy

California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105
August 1, 2013

RE: Th 12a "Revised findings on consistency determination", Army Corps 50 years sand replenishment
Hearing Date: August 15, 2013 Santa Cruz, CA

Dear Commissioners,

I urge you to accept the revised findings (pages 1-51 and Appendix B of the report) based upon the three most important revisions of the original Army Corps 50 year project, which include:

1. **Reduction of the volumes of sand and width of the beaches**
2. **Detailed monitoring of the marine resources pre, during, and post construction**
3. **Approval of each phase of construction as individual modules**

These conditions are absolutely necessary to assure that the marine resources of this unique coastal area are preserved in the long term and that the **natural restoration processes** are allowed to proceed. In the event that natural restoration does not occur, future projects require revision.

Reduction in the volume of sand is the single most important aspect of these findings. The Army Corps project requests that at Solana Beach, 960,000 cu yards would be placed along 7,200-foot—long section of shoreline. In November 2012, the RBSP-II replenishment project was approved for only 146,000 cu yards along 1,600 feet of shore. It was lowered from the 360,000 cu yards originally requested due to environmental impacts. (SANDAG, 2011 Revised EIR, State clearinghouse #2010051063)

The current project is asking that almost seven times more sand be relocated than the previous project and **almost four and a half times more shoreline be impacted**. The reduced volumes of the RBSP-II project were based upon the original RBSP- I EIR where only 146,000 cu yards was approved for the replenishment. Since the short and long term impact predictions are based on the original RBSP-I studies, un-amended, the current project becomes nothing more than an "unaffordable experiment".

The RBSP-I EIR also recommended that continuous monitoring of all future replenishment studies be made in order to study the cumulative impacts of these projects. The carrying capacities (maximum number of individuals and species) often diminish as subsequent devastations of the communities are encountered. The inclusion of the "borrow" and "receiving" sites (sandy beach habitats) is absolutely essential since these are the heavily impacted marine resources. **Page 53 Appendix B -PED survey** (f) might be worded "Shoreline and **Nearshore** Monitoring Plan to include both areas. An additional (g) category could include **Shore Bird Census,** since the sandy beach habitats are the foraging grounds for these important marine resources, including the threatened western snowy plover as mentioned in earlier sections of the findings. (For Tables from RBSP I and RBSP II volumes see page 2)

Isla Cordelae
Science Educator and former project manager for the University of San Diego coastal studies (1975-1985) in Los Penasquitos, San Dieguito, Batiquitos, Aqua Hedionda, San Elijo Lagoons and Oceanside Harbor for the California Fish and Wildlife, San Diego County, and U.S. Army Corps of Engineers.

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Page P-2 **Regional Beach Sand Project II EA/Final EIR** (shows recommended reduced volumes)
08080112 **RBSP II EA-FinalEIR**_5.12 - only preface revised 5/31/11

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)
Solana Beach	**146,000**	146,000	360,000
Moonlight Beach 105,000	105,000	105,000	No Change
Leucadia	117,000	117,000	No Change

Table constructed from original data:
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

PROJECT OVERVIEW RBSP I (original project from which current project draws EIR impacts)

The purpose of the **Regional Beach Sand Project (RBSP)** was to dredge up to two million cubic yards (cy) of sand from up to six offshore borrow sites and replenish 12 beaches along the coast of San Diego County from Oceanside to the north to Imperial Beach to the south. Construction started on April 6, 2001 and was completed on September 23, 2001. Table 1 lists the receiver site, construction schedule, the borrow site used for replenishment material, and the quantities deposited at each receiver site.

Table 1. Regional Beach Sand Project Construction Schedule (page 5, Ex. Summary)

Receiver Site	Construction dates	Borrow Site	Quantity (cy)
Fletcher Cove, Solana Beach **Solana Beach**	June 15 - June 24	SO-5	**146,000**
Moonlight Beach, Encinitas	August 11 - August 16	SO-6/SO-7	105,000
Leucadia	June 5 - June 14	SO-7	132,000

Table constructed from original data: ROCKY INTERTIDAL RESOURCE DYNAMICS IN SAN DIEGO COUNTY: CARDIFF, LA JOLLA, AND POINT LOMA, FINAL EIGHT-YEAR REPORT (1997/2005) by John M. Engle, for SANDAG, August 2005

Del Mar April 27-May9 SO-5 183,000 Mission Beach, San Diego May 10 - May 21 MB-1 151,000 Imperial Beach May 22 - June 4 MB-1 120,000 Fletcher Cove, Solana Beach June 15 - June 24 SO-5 146,000 South Carlsbad State Beach June 25 - July 5 SO-7 158,000 North Carlsbad July 6 - August 1 SO-5/SO-7 225,000 Cardiff State Beach, Encinitas

Simon, Larry@Coastal

From: Engel, Jonna@Coastal
Sent: Thursday, October 17, 2013 12:01 PM
To: Dixon, John@Coastal; Ewing, Lesley@Coastal; Jesperson, Michelle@Coastal; Manna, Jeannine@Coastal
Cc: Delaplaine, Mark@Coastal; Simon, Larry@Coastal; Ahrens, Melissa@Coastal; Hudson, Steve@Coastal; Stevens, Eric@Coastal; Sarb, Sherilyn@Coastal
Subject: FW: Coastal Commission Announces Release of Draft Sea Level Rise Guidance

Hi All,

I am passing along this email from Dennis Lees, a really nice person and thoughtful biologist who sits on the Beach Ecology Coalition, who is very concerned about the ACOE 50-yr Encinitas and Solana Beach sand replenishment project.

Jonna

Jonna D. Engel PhD
Ecologist
California Coastal Commission
89 S. California St. Suite 200
Ventura, CA 93001
(805) 585-1800

From: Dennis Lees [mailto:dennislees@cox.net]
Sent: Wednesday, October 16, 2013 11:53 AM
To: Karen Martin
Cc: Dave Hubbard (dave@crcsb.com); 'Julianne Steers' (jsteers@ocean-institute.org); Adams, Loni@Wildlife; Rick Wilson; ccartwright@bren.ucsb.edu Cartwright; dan@cooperecological.com; Harry Helling; Blankenship, Daniel@Wildlife; julianne.passarelli@lacity.org (julianne.passarelli@lacity.org); jenny.dugan@lifesci.ucsb.edu Dugan; Pryor, David@Parks; Melissa Studer; Wang, Guangyu@Waterboards; Engel, Jonna@Coastal; Carolyn Labarbiera; Aaron McGregor (aaron.mcgregor@calost.org)
Subject: Fwd: Coastal Commission Announces Release of Draft Sea Level Rise Guidance

Hi, folks,

I've been campaigning vigorously locally and at the July meeting of the Coastal Commission against a 50-year beach nourishment program for Encinitas and Solana Beach proposed by the Army Corps L. A. office. This program is analogous to a similar program that the Corps has run in New Jersey, unsuccessfully, I might add, since the mid-1960s. My major objections have been that: 1) this expensive program is nothing but a Band-Aid to treat the symptoms of the real problems, 2) does nothing to deal with these very real problems in our community, 3) gets in the way of actually coming to grips with these issues, and 4) also creates significant ecological impacts, possibly even dead zones, in the nearshore borrow sites, one of which is in the newly created Swami's State Marine Conservation Area. The Corps immediately opted out on considering Managed Retreat types of alternatives in its consideration of alternatives. One of the very obvious approaches to dealing with increased intensity and frequency of storms due to global warming and sea-level rise is to construct and develop sand dunes between the low section of Pacific Coast Highway and the restaurants and office buildings in that area, west of San Elijo Lagoon, and the ocean. This program avoids such solutions completely. In fact, most of the sand for Encinitas is focused on protecting bluff-top properties along the southern third of the bluffs in that city.

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The CCC voted decisively against granting a Federal Consistency Determination for the program (8 to 3) but the Corps has appealed that decision and the program will be heard again in Newport at the November meeting. The Corps reduced the proposed volumes of sand by nearly half and I think that the CCC may approve the FCD this time. If you have interest or want to know more about the proposed program, please contact me. This could be an important precedent for dredging programs along our coast. The environmental damage done by such programs has not been realistically evaluated on either coast and I'm currently preparing a manuscript for publication to demonstrate how these programs are badly flawed. In fact, Pete Peterson has shown that to a degree as well. He addressed mainly the sampling design. I'm addressing the biology, again, my "weeds" and "trees" issues.

As an offshoot of that effort, the mayor of Encinitas sent this link to me for the CCC's draft sea-level rise analysis and guidance. Many of you are probably aware of it but I thought I'd pass it along in case you haven't seen it. At first glance, it looks like it's interesting reading.

http://www.coastal.ca.gov/climate/slr/guidance/CCC_Draft_SLR_Guidance_PR_10142013.pdf

Cheers, Dennis

Littoral Ecological & Environmental Services
1075 Urania Ave.
Leucadia, CA 92024
Business: (760) 635-7998
Cell: (760) 707-7324
www.LittoralEcological.com

We haven't inherited the earth, we have just borrowed it from our children!!

From: California Coastal Commission Sea Level Rise Guidance [mailto:SLRGuidanceDocument=coastal.ca.gov@mail181.wdc02.mcdlv.net] **On Behalf Of** California Coastal Commission Sea Level Rise Guidance
Sent: Monday, October 14, 2013 3:58 PM
To: Teresa Barth
Subject: [MARKETING] Coastal Commission Announces Release of Draft Sea Level Rise Guidance

Coastal Commission Draft Sea Level Rise Guidance Available for Review

Email not displaying correctly?
View it in your browser.

Simon, Larry@Coastal

From: Engel, Jonna@Coastal
Sent: Thursday, October 17, 2013 2:46 PM
To: Dixon, John@Coastal; Stevens, Eric@Coastal; Sarb, Sherilyn@Coastal; Delaplaine, Mark@Coastal; Simon, Larry@Coastal
Cc: Ewing, Lesley@Coastal; Jesperson, Michelle@Coastal; Manna, Jeannine@Coastal; Ahrens, Melissa@Coastal; Hudson, Steve@Coastal
Subject: FW: Beach nourishment in San Diego County

Hi All,

On the heels of the email I forwarded from Dennis Lees, I just got the following from USFWS Biologist Chris Medak. I've also heard that lobster fisherman out of Santa Barbara, Ventura, and Channel Islands have also been doing very poorly (along the coast and at the island where we do not have big sand replenishment projects) - one thought being a pulse of cold water right before the season opened. But.....I can certainly believe that the northern SD County sand replenishment projects have contributed to a decline in lobster – through habitat loss and food base loss. I concur with Chris that we really need to take a close look at these projects and where we approve apply robust monitoring that will help us assess the potential impacts.

Jonna

From: Medak, Christine [mailto:christine_medak@fws.gov]
Sent: Thursday, October 17, 2013 2:22 PM
To: Engel, Jonna@Coastal
Subject: Beach nourishment in San Diego County

Jonna,

I think this may be outside your turf but I was wondering if you have a contact for the coastal commission staff that may be working on beach nourishment projects along the north coast of San Diego County (i.e., Del Mar to Oceanside). My husband is a lobster fisherman and he thinks the lobster were absolutely devastated by the beach nourishment projects that took place last year. The sand all washed off the beach and filled in all the lobster habitat making them easy prey for sheepheads et al. On the opening day of lobster season he caught 1/3 of his lowest opening day catch ever. He is in the process of moving is traps south to Pt. Loma, where no beach nourishment projects took place and the lobster catch appears unaffected.

It is not just the lobster that are hurt by the beach nourishment projects. It is the entire invertebrate food base that gets covered by sand. I am hoping the coastal commission is taking a close look at these projects. Your help would be greatly appreciated.

Christine L. Medak
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U.S. Fish and Wildlife Service
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6 MITIGATION AND MONITORING

To assist in the cost-benefit analyses and in the selection of the NED Plan and other potential project alternatives, potential impacts to nearshore reefs and indicator species were assessed based on USACE model predictions for a variety of beach width options and sea level rise scenarios. To accommodate the need to conduct multiple model runs, a GIS-based approach was developed to utilize the existing spatial data available (e.g., LiDAR, multibeam bathymetry, and multi-spectral aerial imagery). To assess specifically potential project-related impacts, natural sediment variation was incorporated into the model based on 12 years of empirical coastal profile data.

The model predicted no project-related impact to nearshore reefs supporting surfgrass or other indicator species at Encinitas for both high and low sea level rise scenarios with beach widths of 100 ft or less; however, impacts to these resources were predicted for beach widths of 150 ft or greater. At Solana Beach, no project-related impacts to nearshore reefs supporting surfgrass were predicted for all beach width options and sea level rise scenarios. However, impacts to nearshore reefs supporting other indicator species (kelps) were predicted for beach widths greater than 50 ft for both low and high sea level rise scenarios. Costs to mitigate potential impacts and conduct monitoring were estimated based on recent similar mitigation projects (i.e., Wheeler North Kelp Reef). These costs were one metric used in the cost-benefit analysis to determine the NED Plan and other potential project alternatives.

Regarding potential impacts associated with renourishment, the need for renourishment was based on the equilibrium beach width that will be implemented (e.g., if a 100 ft beach width is proposed for the initial placement, renourishment volume will be based on maintaining a 100 ft beach width).

Therefore, no additional impacts are anticipated from renourishment, as any impact to nearshore resources would be expected during the initial beach fill. Renourishment events require substantially less sand to maintain beach widths than the initial fill volume. Impacts from those reduced volumes are expected to be less than those from the initial fill. Impacts from the initial fill will be mitigated as needed by the construction reef habitat features. Any impacts associated with renourishment would have been mitigated for following the initial fill. In addition, an adaptive monitoring program is proposed for the project to also account for potential cumulative impacts associated other beach nourishment activities (e.g., opportunistic programs, lagoon maintenance).

Due to inherent uncertainties associated with estimating impacts based on model predictions, a monitoring program would be implemented to assess actual impacts during the two years following construction. Delaying the identification of mitigation requirements for two years allows sand to migrate and to reach steady state conditions. Waiting for two years allows time for temporary impacts to end thus preventing the project from mitigating for short-term impacts that do not warrant mitigation. Reef features are naturally exposed to periodic burial, so that short-term burial resulting from the project is not a loss. Monitoring of the near shore resources will begin prior to construction to establish baseline conditions and resume immediately following construction. Mitigation would be triggered only if certain conditions occur during, and persist through, the two year post-construction monitoring period. Temporal loss for impacted resources due to the two-year waiting period are considered when establishing the mitigation functional equivalent described in **Appendix M**. The impact assessment methodology discussed in this appendix, the mitigation functional equivalent discussed in **Appendix M**, and

the two-year waiting period to measure long-term impacts were established in conjunction with federal and state resource agencies, including the NMFS, CDFG, Coastal Commission, and USFWS. If mitigation is implemented, mitigation monitoring would also be conducted. This section provides information regarding mitigation and monitoring for nearshore biological resources regardless of which project alternative is selected, and includes:

1. A pre- and post-construction monitoring program for rocky reef/surfgrass habitat in the project area to determine if project mitigation would be necessary;

2. A preliminary mitigation implementation plan, if mitigation is determined to be necessary; and

3. A preliminary mitigation monitoring plan, if mitigation is determined to be necessary.

The final mitigation and monitoring plans will be prepared during the pre-construction engineering design (PED) phase of the project. The details of these plans will be finalized in consultation with knowledgeable, experienced, and qualified marine ecologists, with monitoring performed by knowledgeable, experienced, and qualified marine biologists. These knowledgeable, experienced, and qualified marine ecologists may come from a variety of agencies, organizations, institutions, or community centers of practice and expertise, such as – the University of California, USACE Engineer Research and Development Center (ERDC), NOAA National Marine Fisheries Service (NMFS) Southwest Fisheries Sciences Center, U.S. Geological Survey (USGS) Western Ecological Research Center, other Federal and state agencies, as well as, consulting marine ecologists. California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), and NMFS staff will also be involved with the review process.

6.1 Pre- and Post-Construction Monitoring Program

The project has been designed to avoid or minimize impacts to sensitive biological resources to the maximum extent practicable. This was done by selecting fill alternatives that limit fill volume while achieving project objectives. Encinitas, for example, was able to select a beach width that avoids losses of rocky and surf grass habitats while still achieving shoreline protection objectives. Solana Beach selected an alternative that resulted in no impacts to surf grass resources while impacting minimal reef resources. Fill footprints for both cities avoid any direct impacts to sensitive resources; all estimated impacts are the result of indirect burial. However, for several alternatives, potential project impacts have been identified using a conservative coastal engineering model. Prior to the implementation of construction of the project, the extent of reef habitat and vegetation throughout and adjacent to the entire predicted equilibrium footprint will be mapped using remote sensing techniques such as multi-spectral aerial photography and/or interferometric side scan sonar. Multi-spectral aerial photography utilizes an airplane to capture multispectral reflectance characteristics that allow the identification and separation of various bottom substrates and vegetation, while interferometric side scan sonar is a type of technology used to interpret seabed features, material, and textures from acoustic backscatter response intensity, as well as, bathymetry. When the techniques are combined, data sets include bathymetry, bottom substrate type, and vegetation type information. Results from similar methodologies were used for this study to provide the baseline data (i.e., SANDAG 2002), and the proposed mapping provides the most cost-effective approach for surveying the large study area. This pre-construction monitoring is to establish baseline conditions to compare post-construction conditions against. All data would be geo-rectified, and habitat types digitized as a theme over an aerial image to calculate the coverage of various habitat types and

show its distribution. Diver surveys would also be conducted to ground truth or verify remote sensing data. The diver surveys would be at a level appropriate to effectively ensure that data were representative (e.g., 20 random locations for each substrate or habitat type). The proposed mapping would be repeated during years one and two post-construction to determine what long-term impacts result from the project that require mitigation. Based on the data collected, a decision will be made as to whether, and to what extent, mitigation is necessary.

The general approach for assessing impacts would be similar to that used to identify potential project-related impacts to eelgrass as per the Southern California Eelgrass Mitigation Policy (SCEMP; NMFS 1991). The project area and control site(s) will be surveyed prior to construction, and annually for two years following construction.

Seasonal monitoring may be required for grunion (if suitable habitat is identified in any of the sand placement areas). The season for grunion is identified as March 15 to September 1. A cultural resource survey of the mitigation sites would be needed prior to mitigation construction. A cultural resource survey of the borrow site would also be performed prior to construction. Water quality monitoring will be performed during construction on a weekly basis. Pre- and post-construction monitoring of the nearshore environmental will be conducted to allow for identification of project-related impacts for purposes of delineating mitigation requirements.

Given the relatively high natural variation of sediment transport that occurs in the nearshore zone, multiple control sites be mapped to provide a level of natural variability. Potential control areas, chosen for their similarity to potential impact sites, in the general project area include North Carlsbad (in the vicinity of Tamarack Boulevard) and South Carlsbad (north of Palomar Airport Road). By sampling control sites, changes in the sediment cover would be put into a regional perspective and natural variation taken into account. If this was not measured, any increase in sediment cover in the project area would be considered project related. This is similar to the eelgrass mapping/impact assessments, whereby changes at the project site are compared with reference areas. This is necessary if there is a reduction in eelgrass at the project site, that may be the result of a natural decline measured relative to the reference area. Pre-construction (baseline) areal coverage will be compared to Year 2 (post-construction) areal coverage, taking into account any natural variation at control areas to identify potential project-related impacts.

The City of Encinitas and the City of Solana Beach have been performing annual fall and spring beach profile surveys to monitor shoreline changes. The survey included transects historically monitored by the Cities. Data would be obtained from the back beach seaward, offshore of the presumed depth of closure. Beach profile data would be acquired to wading depth along transects located within or adjacent to the nourishment site.

The expected monitoring schedule includes:

Pre-construction baseline monitoring (year prior to construction):

- Spring Survey
- Fall Survey

Post-construction (annually for two years following construction):

- Spring Survey
- Fall Survey

6.2 Mitigation

If mitigation were required based on results of the second annual post-construction monitoring, rocky reef and surfgrass mitigation shall each be conducted at an equivalent functional value to the impacted area. Because it will take at least two years to identify impacts, some temporal loss of habitat, if impacts were to occur, is unavoidable. Delaying the identification of mitigation requirements for two years allows sand to migrate and to reach steady state conditions. Waiting for two years allows time for temporary impacts to end thus preventing the project from mitigating for short-term impacts that do not warrant mitigation. Recovery of impacted habitats may also occur as sand is redistributed within the littoral cell; some observed burial of reef or surfgrass habitat would be temporary because sand would be expected to move out of the project area. Additionally, if impacts are substantially different than predicted were to occur, future beach fills would be modified as part of the adaptive management plan for this project. The decision point for determination of mitigation is after the second annual post-construction monitoring. Any loss of nearshore habitat (greater than 1 foot over historical sedimentation) relative to the reference sites would require mitigation. Temporal loss of habitat are mitigated by using a mitigation functional equivalent that includes this temporal loss as one of the factors used in the calculation (see **Appendix M**). A functional equivalent of 2:1 is proposed for rocky reef resources.

Mitigation would be implemented in the project area at sites to be determined by the USACE and the two cities in consultation with the various resource and regulatory agencies noted previously (NMFS, USFWS, Coastal Commission, CDFG). Since potential impacts were identified for Solana Beach for the project alternatives carried forward, potential mitigation areas offshore of Solana Beach were identified (approximately 26 acres) and includes areas that consist primarily of sandy bottom habitat (**Figure 6.2-1**). No estimated project-related impacts were predicted for Encinitas under the alternatives that were carried forward, and therefore no potential mitigation areas were identified offshore of Encinitas. However, it should be noted that if mitigation is required for impacts that occur at Encinitas, there are options including the nearshore resources and the Swami's State Marine Conservation Area.

Reef habitat mitigation shall consist of shallow-water, mid-water, or deep-water reef at a 2:1 functional equivalent to the area of reef impacted. Shallow-water reef would be the type of reef replanted for any surfgrass mitigation, mid-water reef would be located inshore of the existing kelp beds, and deep-water reef would be located offshore of the existing kelp beds. The mid-water reef would be the first priority chosen for use for mitigation as it is most like the reef being impacted and is thus closer to an in-kind mitigation. However, deep-water reef mitigation may be required if insufficient area in the mid-water depth is available for all required mitigation.

Mid-water reef would be constructed on the offshore/outer edge of the existing reef; mid-water reef would be constructed at approximately -30 ft Mean Lower Low Water (MLLW); and deep water reef would be constructed at approximately -40 ft MLLW along the outside edge of the existing reefs. Shallow-water reef shall be constructed with a final top elevation of -10 to -14 ft MLLW. Construction of a reef that is shallower than -10 to -14 ft MLLW is not proposed because construction methods would not be practical (e.g., a barge with the reef construction materials would not be able to operate in this shallow of water). Although the surfgrass mitigation reef would be deeper than the impacted area, if surfgrass transplants are successful, the slightly deeper reef would replace the lost surfgrass resource. If surf grass transplants are not successful, the shallow-water reefs will be vegetated with kelp to serve as out of kind mitigation for surf grass losses, if any. No surf grass losses are predicted for either city.

Mid-water reef is the preferred reef mitigation as it is closest to in-kind replacement in terms of water depth and expected habitat. Mid-water reef also has some sand-retention value for adjacent beaches, similar to natural reefs. Mid- and deep-water reef shall be constructed in a fashion similar to the SCE Wheeler North Reef, which was constructed as mitigation for the impacts of the San Onofre Nuclear Generating Station. For example, if the monitoring shows 1 acre of reef impact and 1 acre of surfgrass impact, 2 acres of shallow-water reef would be constructed and 2 acres of mid- or deep-water reef would be constructed.

Although several studies currently are being conducted to determine how to successfully transplant surfgrass, and may show success, success rates to date have not been consistent (Reed and Holbrook 2003, Reed et al. 1999). Due to the absence of an established, successful method for mitigation of surfgrass loss, proposed mitigation currently is focused upon restoration of the rocky reef that surfgrass currently uses as habitat and an experimental transplant that allows for one attempt to transplant surf grass followed by out of kind kelp transplant, which does have a history of success. However, if it is determined that surfgrass has been affected by the project, and not due to natural variation, an experimental surfgrass transplant shall be implemented in addition to the construction of a shallow-water rocky reef.

Currently, surfgrass transplant success is much higher for subtidal than for intertidal conditions and, therefore, surfgrass mitigation efforts for this project will focus on subtidal transplants only. The methodology for the surfgrass transplant shall be the transplant of sprigs from a donor bed to the new reef using the method developed by Bull et al. (2004). To harvest sprigs, an unbranched terminal end of an actively growing rhizome is carefully removed from the perimeter of a bed with a knife. The rhizome of each sprig should contain several lateral shoots and a terminal shoot. Sprigs are then transplanted by attaching the cut end of the rhizome to the reef using marine epoxy. An alternative transplant method could be proposed, if evidence can be presented that the alternative method has as great or greater chance of success as the sprig transplant method. To avoid harvesting effects to the subject surfgrass bed, donor material will be taken from a larger area of surfgrass in the vicinity of the study area.

A portion of the shallow-water reef shall be test planted with surfgrass. The transplant will be conducted in the late summer/early fall, the time of year when most surfgrass seeds are released and germinate in southern California. A test area equal to approximately 25 percent of the surfgrass impact area (not to exceed 0.1 acre) will be test planted. Success of the transplant shall be determined after six months based on survivorship, percentage change in the number of leaves and the amount of areal coverage. The experimental transplant will be considered successful if the sprigs survive and there is a net increase in number of leaves and areal coverage. If the transplants survive, surfgrass grows. If the test transplant is successful, the remainder of the surfgrass impact area will be planted on the shallow-water reef with surfgrass. If the surfgrass transplant is not successful, two acres of shallow-water kelp (e.g., *Egregia menziesii* and *Eisenia arborea*) will be transplanted on the two acres of shallow-water reef built during the project mitigation.

6.2.1 Surfgrass Mitigation Monitoring Plan

Surf grass mitigation will be monitored for five years after the transplant is completed. This would be a part of the post-construction monitoring program to be performed for the project. Permanent transects shall be established on the mitigation reef containing the surfgrass bed (if the experimental surfgrass transplant is successful) and at a reference site (control area) of similar depth. The same number of transects would be established in the control area as in the

mitigation area, and transects will be at similar depths. Transects should be monitored at the following intervals, if successful:

Post-mitigation implementation*:

Year One

- within one month after completion
- 3 months after completion
- 6 months after completion
- 1 year after completion

Years Two through Five

- Spring survey
- Fall survey

*This time line follows full mitigation, which occurs only if the experimental transplant is successful. This is not after the experimental transplant, which is only monitored once, six months after transplant.

Success Criteria

The mitigation functional equivalent established in Appendix M results in the creation of mitigation reefs that are functionally equivalent to the rocky reef habitats permanently lost. This includes temporal loss of habitat value during the two-year monitoring period and design and construction time for the mitigation features. Success criteria would include determining if measured parameters are significantly different than the control transects. Success criteria for the mitigation reef itself would include no complete permanent burial of the reef. Because of the predominantly sandy bottom environment in the project area, placement of the deep water rocky reef would be considered successful if a characteristic invertebrate and fish community were to become established. On each surfgrass transect, the following parameters will be monitored at a minimum: 1) surfgrass density (i.e., number of shoots per square meter), 2) percent cover of surfgrass, sand, and rock, 3) sand depth, and 4) identification and quantity of flora and fauna. The line intercept method is recommended for measuring percent cover and sand depth. With this method, a tape measure is deployed and at pre-determined or random numbers, data are collected, Specific success criteria will be developed during the PED phase. General success criteria will consist of the following:

1. Approximately 50% - 60% of the fish, invertebrates, and algae species found at the reference site occur at the mitigation site two years post-mitigation.

2. Approximately 50% - 60% of surfgrass survival at the mitigation site two years post-mitigation implementation.

An estimated cost to implement the mitigation and mitigation monitoring is provided in Table 6.2-1through Table 6.2-4and is dependent on the estimated level of impact. Key assumptions are also provided Section 4.4.

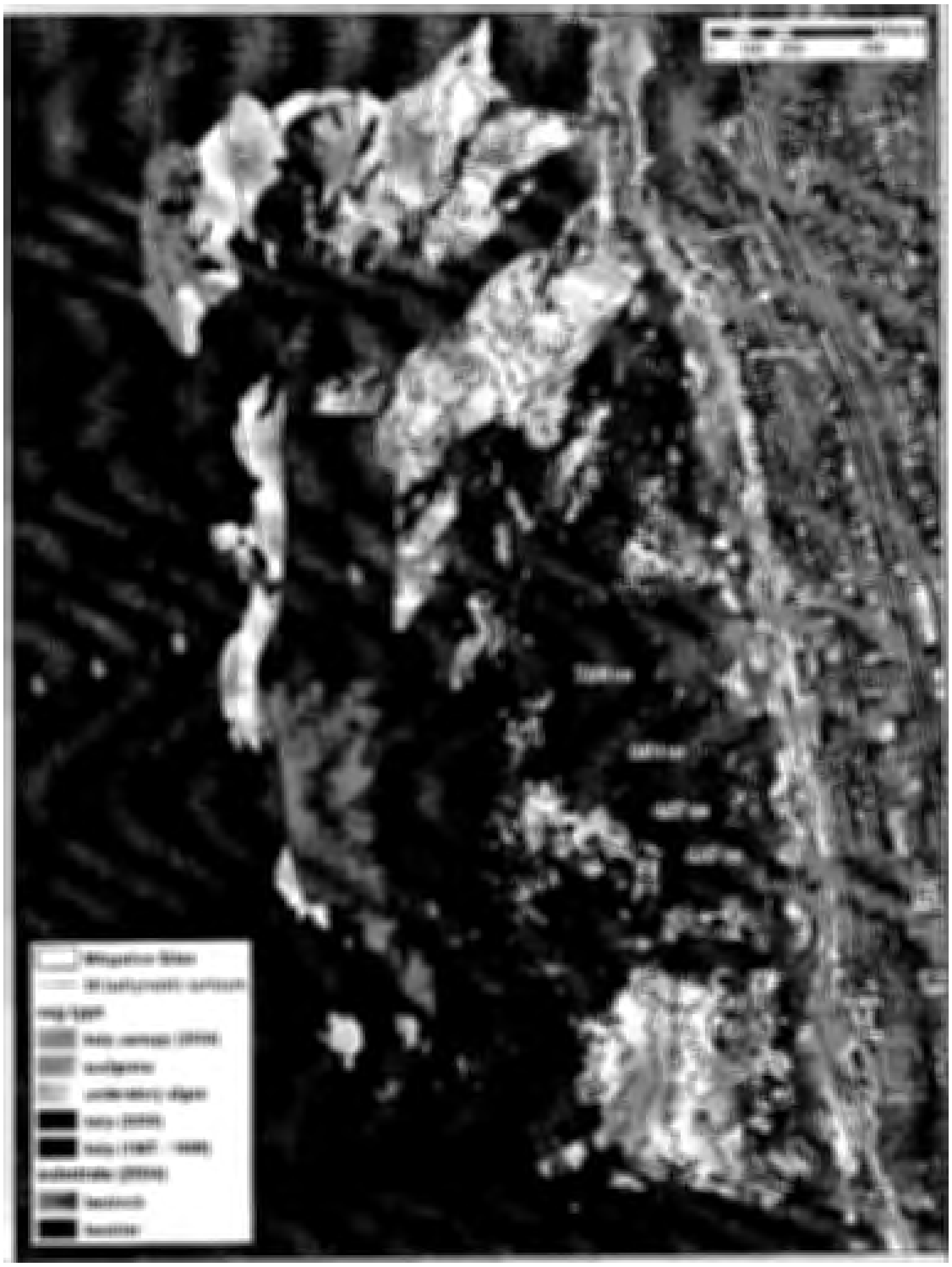

Figure 6.2-1 Potential mitigation areas off Solana Beach.

Table 6.2-1 Mitigation estimate for Encinitas for the low sea level rise scenario.

Beach Width Option (ft)	Resource	Project-Related Impact (Acres)	Mitigation Required?	Estimated Construction Monitoring Cost*	Surfgrass Transplanting Cost*	Reef Mitigation*	Estimated Kelp Transplanting Cost*	Estimated Mitigation Monitoring Cost*	Sub-Total Mitigation Cost*	Total Mitigation Cost**
50	Reefs with Surfgrass	(-1.7)	No	$75,000	N/A	N/A	N/A	N/A	N/A	$150,000
	Reefs with Other Indicators	(-7.2)	No		N/A	N/A	N/A	N/A	N/A	
100	Reefs with Surfgrass	(-0.3)	No	$75,000	N/A	N/A	N/A	N/A	N/A	$150,000
	Reefs with Other Indicators	(-1.5)	No		N/A	N/A	N/A	N/A	N/A	
150	Reefs with Surfgrass	**2.0**	**Yes**	$75,000	$500,000	$4,000,000	N/A	$75,000	$4,500,000	$18,870,000
	Reefs with Other Indicators	**9.5**	**Yes**		N/A	4,750,000	$35,000		$4,785,000	
200	Reefs with Surfgrass	**3.4**	**Yes**	$75,000	$850,000	$6,800,000	N/A	$75,000	$7,650,000	$38,190,000
	Reefs with Other Indicators	**22.5**	**Yes**		N/A	$11,250,000	$45,000		$11,295,000	

*Assumes 1:1 mitigation functional equivalent (used for cost-estimation purposes)
**Assumes 2:1 mitigation functional equivalent

Table 6.2-2 Mitigation estimate for Encinitas for the high sea level rise scenario.

Beach Width Option (ft)	Resource	Project-Related Impact (Acres)	Mitigation Required?	Estimated Construction Monitoring Cost*	Surfgrass Transplanting Cost*	Reef Mitigation*	Estimated Kelp Transplanting Cost*	Estimated Mitigation Monitoring Cost*	Sub-Total Mitigation Cost*	Total Mitigation Cost**
50	Reefs with Surfgrass	(-1.7)	No	$75,000	N/A	N/A	N/A	N/A	N/A	$150,000
	Reefs with Other Indicators	(-7.1)	No		N/A	N/A	N/A	N/A	N/A	
100	Reefs with Surfgrass	(-0.2)	No	$75,000	N/A	N/A	N/A	N/A	N/A	$150,000
	Reefs with Other Indicators	(-0.8)	No		N/A	N/A	N/A	N/A	N/A	
150	Reefs with Surfgrass	**2.1**	**Yes**	$75,000	$525,000	$4,200,000	N/A	$75,000	$4,725,000	$20,430,000
	Reefs with Other Indicators	**10.6**	**Yes**		N/A	$5,300,000	$40,000		$5,340,000	
200	Reefs with Surfgrass	**4.6**	**Yes**	$75,000	$1,150,000	$9,200,000	N/A	$75,000	$10,350,000	$44,300,000
	Reefs with Other Indicators	**23.2**	**Yes**		N/A	$11,600,000	$50,000		$11,650,000	

*Assumes 1:1 mitigation functional equivalent (used for cost-estimation purposes)

**Assumes 2:1 mitigation functional equivalent

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Table 6.2-3 Mitigation estimate for Solana Beach for the low sea level rise scenario.

Beach Width Option (ft)	Resource	Project-Related Impact (Acres)	Mitigation Required?	Estimated Construction Monitoring Cost**	Reef Mitigation**	Estimated Kelp Transplanting Cost**	Estimated Mitigation Monitoring Cost**	Total Mitigation Cost***
50	Intertidal Reef Platform	0.0	No	$75,000	N/A	N/A	N/A	$150,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A	N/A	
	Reefs with Other Indicators	-3.3	No		N/A	N/A	N/A	
100	Intertidal Reef Platform	**0.1**	**Yes**	$75,000	$50,000*	N/A	$75,000	$1,920,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**1.5**	**Yes**		$750,000	$10,000		
150	Intertidal Reef Platform	**0.3**	**Yes**	$75,000	$150,000*	N/A	$75,000	$7,270,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**6.5**	**Yes**		$3,300,000	$35,000		
200	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$8,800,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**8.0**	**Yes**		$4,000,000	$50,000		
250	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$11,630,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**10.6**	**Yes**		$5,400,000	$65,000		
300	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$13,650,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**12.8**	**Yes**		$6,400,000	$75,000		

*Based on out-of-kind mitigation cost

**Assumes 1:1 mitigation functional equivalent (used for cost-estimation purposes)

***Assumes 2:1 mitigation functional equivalent

Table 6.2-4 Mitigation estimate for Solana Beach for the high sea level rise scenario.

Beach Width Option (ft)	Resource	Project-Related Impact (Acres)	Mitigation Required?	Estimated Construction Monitoring Cost**	Reef Mitigation**	Estimated Kelp Transplanting Cost**	Estimated Mitigation Monitoring Cost**	Total Mitigation Cost***
50	Intertidal Reef Platform	0.0	No	$75,000	N/A	N/A	N/A	$150,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A	N/A	
	Reefs with Other Indicators	(-3.2)	No		N/A	N/A	N/A	
100	Intertidal Reef Platform	**0.1**	**Yes**	$75,000	$50,000*	N/A	$75,000	$2,320,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**1.9**	**Yes**		$950,000	$10,000		
150	Intertidal Reef Platform	**0.3**	**Yes**	$75,000	$150,000*	N/A	$75,000	$7,670,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**6.9**	**Yes**		$3,500,000	$35,000		
200	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$9,810,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**9.0**	**Yes**		$4,500,000	$55,000		
250	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$11,630,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**10.8**	**Yes**		$5,400,000	$65,000		
300	Intertidal Reef Platform	**0.4**	**Yes**	$75,000	$200,000*	N/A	$75,000	$13,860,000
	Reefs with Surfgrass	(-0.4)	No		N/A	N/A		
	Reefs with Other Indicators	**13.0**	**Yes**		$6,500,000	$80,000		

*Based on out-of-kind mitigation cost
**Assumes 1:1 mitigation functional equivalent (used for cost-estimation purposes)
***Assumes 2:1 mitigation functional equivalent

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6.2.2 Compensatory, Mid-Water, or Deep-Water Reef Mitigation Monitoring Plan

Similar to the Surfgrass Mitigation Monitoring Plan, permanent transects shall be established in the rocky reef area containing the kelp on the mitigation reef and at a reference site (control area) of similar depth. The same number of transects would be established in the control area as in the mitigation areas and transects would be at similar depths. On each kelp transect, the following parameters would be monitored at a minimum: 1) kelp density (number of kelp plants per square meter) of each age class, 2) holdfast diameter of each adult kelp plant on the transect, 3) number of stipes of each adult kelp plant on the transect, and 4) identification and quantity of associated flora and fauna. Transects should be monitored at the following intervals:

Post-compensatory mitigation implementation:

Year One

- within one month after completion
- 3 months after completion
- 6 months after completion
- 1 year after completion

Years Two through Five

- Spring survey
- Fall survey

Success Criteria

Success criteria of kelp would include determining if the measured parameters are significantly different than the reference transects. Success criteria for the mitigation reef itself (if it is not planted with kelp) would include no complete permanent burial of the reef. Because of the predominantly sandy bottom environment in the project area, placement of the deep water rocky reef would be considered successful if a characteristic invertebrate and fish community were to become established. On each kelp transect, the following parameters should be monitored and evaluated at a minimum: 1) kelp density (number of kelp plants per square meter) of each age class, 2) holdfast diameter of each adult kelp plant on the transect, 3) number of stipes of each adult kelp plant on the transect, and 4) identification and quantity of associated flora and fauna. Specific success criteria will be developed during the PED phase. General success criteria will consist of the following:

1. Approximately 50% - 60% of the fish, invertebrates, and algae found at the reference site occur at the mitigation site two years post-mitigation.

2. Approximately 50% - 60% of kelp survival at the mitigation site two years post-mitigation implementation.

Key assumptions are also provided Section 4.4.

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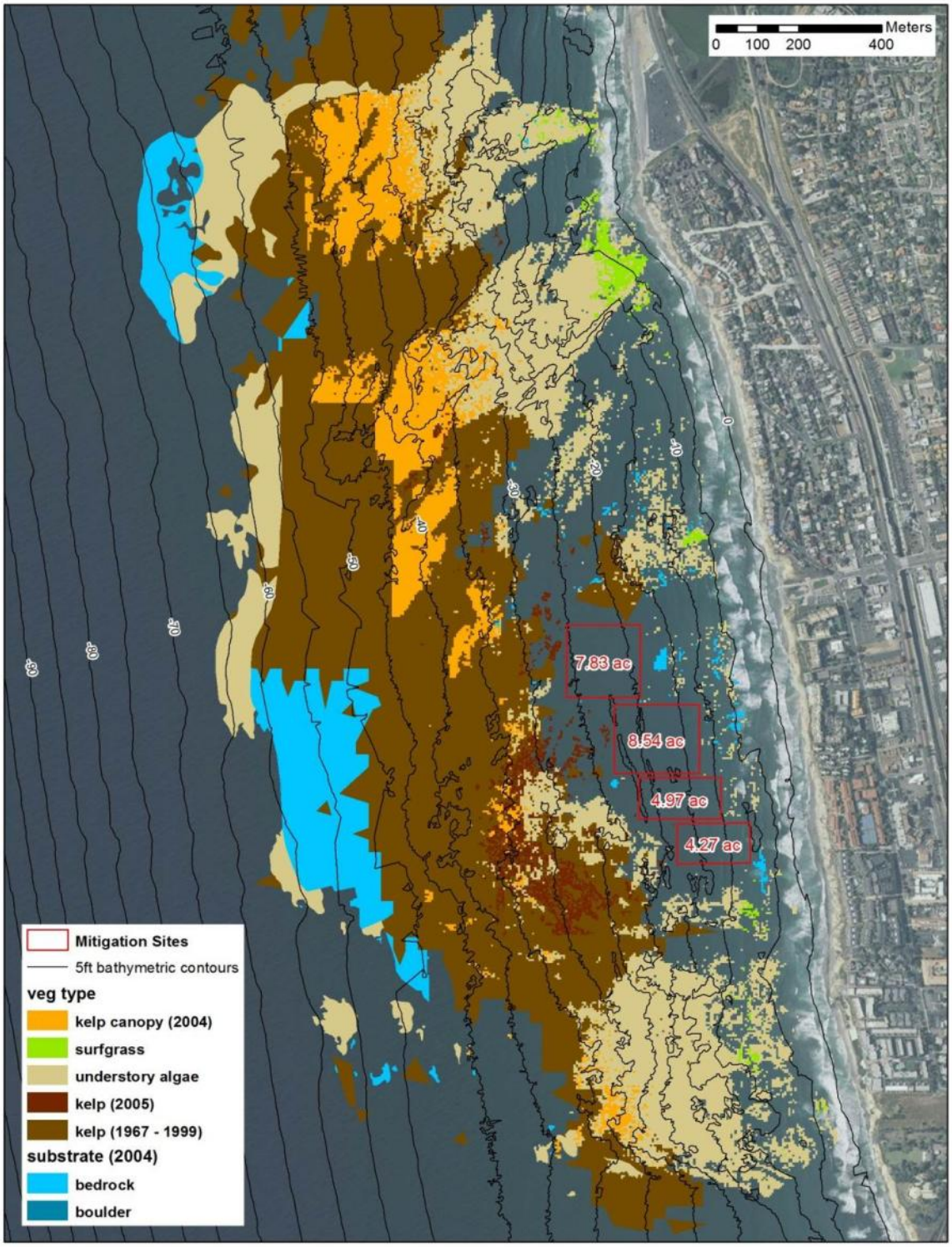

Figure 5.4-10 Potential mitigation areas off Solana Beach

CD-0203-13
Exhibit 15

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

February 26, 2013

Josephine R. Axt, Ph.D.
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
ATTN: Mr. Larry Smith (CESPL-PD-RN)
Los Angeles, California 90053-2325

Dear Dr. Axt:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the U.S. Army Corps of Engineers (Corps) integrated feasibility report and Environmental Impact Statement/Environmental Impact Report (Integrated Report) for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project (Project). The purpose of the Project is to effectively reduce risks to public safety and economic damages associated with bluff erosion and to restore beaches along the shorelines of the cities of Encinitas and Solana Beach in San Diego County, California. NMFS has some concerns regarding the proposed project and the Integrated Report. The Encinitas-Solana Beach Project sets a precedent for how Corps may plan and implement large shoreline protection and beach nourishment projects for which sensitive nearshore habitats may be impacted. NMFS offers the following comments pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA).

Proposed Action

The tentatively recommended plan is comprised of beach nourishment of a 100 foot (ft) wide beach for the City of Encinitas with re-nourishment cycles every 5 years and a 200 ft wide beach for the City of Solana Beach with re-nourishment cycles every 13 years. The Corps proposes an initial placement volume of 680,000 cubic yards (cy) at the Encinitas site and a total placement volume between 3,200,000 and 4,030,000 cy over 50 years. At Solana Beach, 960,000 cy is proposed for initial placement with a total placement volume between 2,210,000 and 4,040,000 cy of sediment.

The study area extends from the southern limits of the City of Solana Beach to the northern limits of the City of Encinitas. Two segments within this study area were identified for protection from bluff erosion. Segment 1 is a portion of the beach within Encinitas that extends approximately 7,800 ft from the 700 block of Neptune Ave south to West H Street. Segment 2 is approximately 7,200 ft long extending from the southern city limits of Solana Beach north to Tide Park, close to the northern city limits of Solana Beach.

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Sand would be dredged from offshore using borrow sites designated as MB-1, SO-5, and SO-6. Table 3.3-1 summarizes the three offshore borrow sites considered for the project. Borrow sites SO-5 and SO-6 are identified as the primary sites. Material from borrow site SO-5 would be used for Segment 2 (Solana Beach). Material from borrow site SO-6 would be used for Segment 1 (Encinitas) until exhausted; at which time SO-5 would provide material for both Encinitas and Solana Beach alternatives. Borrow site MB-1 would be used as a supplemental source to contribute to required sand volumes under a high sea level rise scenario.

	MB-1	SO-5	SO-6
Volume Available (approximate)	5,800,000 cy	7,800,000 cy	1,300,000 cy
Surface Area	107 acres	124 acres	44 acres
Depth of the Dredge Cut (ft)	20	20	20
Depth of Borrow Site (MLLW)	-60 to -74 ft	-34 to -95 ft	-42 to -56 ft

The total cost of the tentatively recommended plan is $177,121,000.

Magnuson-Stevens Fishery Conservation and Management Comments

NMFS and the Corps established a finding, or agreement, that specified essential fish habitat (EFH) consultation procedures. Based upon this finding, National Environmental Policy Act documents prepared by the Corps should contain sufficient information to satisfy the requirements in Section 600.920(g) for EFH Assessments. As set forth in the regulations, EFH Assessments must include (1) a description of the proposed action; (2) an analysis of the effects, including cumulative effects, of the action on EFH, the managed species, and associated species by life history stage; (3) the federal agency's views regarding the effects of the action on EFH; and (4) proposed mitigation, if applicable. If appropriate, the assessment should also include: the results of an on-site inspection; the views of recognized experts on the habitat or species affects; a literature review; an analysis of alternatives to the proposed action; and any other relevant information. The information must be easily found, and should include both an identification of affected EFH and an assessment of impacts. The level of detail in an EFH Assessment should be commensurate with the complexity and magnitude of the potential adverse effects of the action, 50 CFR 600.920 (e)(2).

The spatial and temporal scale and the associated environmental effects of this Project may have substantial adverse impacts to EFH. Dredging would affect 275 acres of subtidal habitat on the inner shelf. Disposal will directly impact 156 acres of beach habitat and indirectly affect a significant area of shallow subtidal habitat containing a number of sensitive resources and Habitat Areas of Particular Concern (HAPC). The exact acreage of affected HAPCs is difficult to quantify and is based upon a modeling effort described in the Integrated Report. Assuming all modeling assumptions are fully justified, the Integrated Report indicates 8.4 acres of rocky reef habitat would be impacted. Considering the potential additive impacts of increased sand in association with natural variation, the Project may impact 21 acres of rocky reef habitat. Given the potential for substantial adverse impacts to EFH, the Integrated Report should contain more detail regarding the effects of the action, alternatives analysis, and recommended mitigation measures. NMFS believes the Integrated Report provides insufficient information to fully

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inform an analysis of the adverse effects on EFH. Below are specific points the Corps should address for analyzing effects of the action on EFH. Upon receipt of a revised analysis, NMFS will review and submit appropriate EFH Conservation Recommendations consistent with our finding.

Level of detail in EFH analysis

Although the EFH section within the Integrated Report indicates that EFH for species within the Pacific Groundfish and Coastal Pelagic Species Fishery Management Plans would be adversely impacted, it does not provide a list of managed species by life stage that may be affected by the Project. In addition, it does not include EFH for the Highly Migratory Species FMP. Lastly, it does not provide a detailed analysis of the effects commensurate with the scope of the Project.

Given the significant cost of the Project and the potential for substantial adverse impacts to EFH, NMFS believes that the views of recognized experts should be presented in the analysis. Experts conld include university, agency, or private industry personnel with extensive knowledge about the habitat, managed species, or types of effects relevant to the proposed action. In addition, biostastical expertise may assist understanding of the confidence and risks associated with previous monitoring and the modeling assumptions used in the analysis. NMFS is aware that the Corps is conducting an Independent External Peer Review of the Project. Inclusion of the results from this review may benefit the EFH analysis.

NMFS encourages further review of the literature to ensure the conclusions made are adequately justified by the best scientific information available. Specific information regarding federally managed species may be found on our website:
http://swr.nmfs.noaa.gov/hcd/HCD_webContent/EFH/index_EFH.htm.
Additional references are cited in this comment letter. Below are some additional points that the Corps should consider for analyzing effects of the action on EFH.

Effects of dredging

The adverse effects of dredging on EFH may include: 1) direct removal/burial of organisms; 2) turbidity/siltation effects, including light attenuation from turbidity; 3) contaminant release and uptake, including nutrients, metals and organics; 4) release of oxygen consuming substances; 5) entrainment; 6) noise disturbances; and 7) alteration to hydrodynamic regimes and physical habitat. The dredging impacts of most concern to NMFS are impacts to the benthic invertebrate community and the permanent alteration to the topography of the seafloor at the borrow sites.

Many fishery species forage on infaunal and bottom-dwelling organisms, such as polychaete worms, crustacean, and other prey types. Dredging may adversely affect these prey species at the site by directly removing or burying these organisms. Recolonization studies suggest that recovery (generally meaning the later phase of benthic community development after disturbance when species that inhabited the area prior to disturbance begin to re-establish) may not be straightforward, and can be regulated by physical factors including particle size distribution, currents, and compaction/stabilization processes following disturbance. Rates of recovery listed in the literature range from several months to several years for estuarine muds to up to 2 to 3

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years for sands and gravels. Recolonization can also take up to 1 to 3 years in areas of strong current but up to 5 to 10 years in areas of low current.

Boyd *et al.* (2005) examined the benthic community at an aggregrate dredge site that experienced extraction of >100,000 tons of substrate/year for 21 years. They concluded that the alteration in sediment characteristics from persistent dredging prevented the climax community from returning. Newell *et al.* (2004) found a decrease in species richness, population density, and biomass at an aggregrate dredging site compared to control areas. Early successional, opportunistic species comprise benthic communities at long-term dredge sites (Robinson *et al.* 2005). Thus, forage resources for fish that feed on the benthos may be substantially reduced until recovery is achieved. The Corps should further analyze the effects of a reduced foraging base and the implications of precluding the development of a benthic invertebrate climax community.

The Integrated Report indicates that benthic recovery would be expected to be similar to Regional Beach Sand Project I and concludes that the impact would be less than significant on a regional level. It is anticipated that the impact would also 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. However, NMFS notes that the benthic community impact analysis conducted for the borrow sites at RBSP I was not comprehensive and may not adequately assess environmental impacts associated with dredging at the borrow sites. According to SANDAG (2011), the sampling effort associated with the borrow sites was limited given the reconnaissance level of the survey. NMFS believes additional analysis is warranted given the spatial (combined area of borrow sites are 275 acres) and temporal scale (50 year project with repeated dredging) of the Project.

Effects of sand placement

The disposal of dredged material on the beach may adversely affect EFH by 1) impacting or destroying benthic communities; 2) impacting adjacent sensitive habitats; 3) creating turbidity plumes and introducing contaminants and/or nutrients. Of primary concern to NMFS are the potential impacts associated with the sediment disposal to sensitive nearshore resources (e.g. seagrass and reef habitat) and beach habitat.

Reef habitat

The Integrated Report indicates that reef features are naturally exposed to periodic burial, so that short-term burial resulting from the project is not a loss. However, short term burial at depths of 0.8 feet exhibited a statistically significant decline in surfgrass shoot count within a laboratory setting (Craig *et al.* 2008). Thus, surfgrass habitat is likely to be impacted by beach nourishment and shoreline protection projects that place sand either directly or indirectly onto surfgrass beds (Craig *et al.* 2008). Surfgrasses exhibit late successional traits, recover very slowly from disturbance, require facilitation from algae before settling, and are strong competitors (Turner 1985). Additive impacts and repeated beach nourishment efforts likely will increase this rate of disturbance to these systems. Slow recovery times suggest that disturbances to these communities may be ecologically significant. Given that algal turf community facilitates

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surfgrass settlement, consideration should also be given to reefs containing turf algae. They do not appear to be accounted for in the nearshore impact analysis.

Removal of surfgrass from a rocky reef community has profound impacts to community structure (Turner 1985). Galst and Anderson (2008) have suggested that surfgrass is important for nearshore fish communities and reductions in surfgrass could negatively affect recruitment patterns. Specifically, experimental reductions in coverage of seagrass (ranging from 7 to 180 square meters) resulted in significant decreases in the density of newly recruited fish species. Similarly, NMFS expects reductions in coverage and/or density may reduce other ecological services provided by surfgrass, such as shelter, foraging, primary productivity, substrate for epibiota, and wave energy dissipation.

Beach habitat

Under the tentatively recommended alternative, a maximum of 93 acres of beach habitat would be disturbed by construction at Encinitas and 63 acres at Solana Beach. The Integrated Report concludes that recovery of the invertebrate prey base would be complete in less than 1 year. Due to the relatively small area affected, and the widespread occurrence and relatively rapid recovery rates of sandy beach invertebrates, the Integrated Report concludes that direct impacts to marine invertebrates within the receiver site footprints are expected to be less than significant. However, the Integrated Report provides little scientific rationale for this conclusion.

Although beach nourishment has the potential to restore ecosystem functions of sandy beach communities, persistent disturbances may preclude natural recovery Revell *et al.* (2011). Following a major El-Nino on nearby beaches, recovery of wrack abundance and shorebirds to pre-El Nino levels took 3 years. Reductions in biomass and mean size of invertebrates were still detected 2 years after the event. The loss of larger and older cohorts of intertidal invertebrates (e.g., sand crabs, E. analoga, and pismo clams, T. stultorum) may take 1 to 10 years for recovery.

The benefit of sandy beach habitat to fishery resources is often overlooked because of frequent disturbance, low primary productivity and minimal habitat heterogeneity (Dexter 1992). Energy input is primarily from allocthonous organic material (e.g. macrophytes, phytoplankton) and plankton that supports high densities of filter-feeding, benthic macroinvertebrates (Polis and Hurd 1996, Dugan *et al.* 2003, Crawley *et al.* 2006). These invertebrates are a valuable link to upper level predators such as fishes and shorebirds (Leber 1982).

Beach maintenance activities such as nourishment and bulldozing cause high rates of mortality in benthic macroinvertebrates (Speybroeck *et al.* 2006). For example, the impact to sand crabs (*Emerita* spp.) and clams from beach maintenance activities has been well documented (Peterson *et al.* 2000, Peterson *et al.* 2006). Recovery of these macroinvertebrates can take up to two years if no additional disturbances occur (Dolan and Stewart 2006). For some species, such as Pismo clams, recovery may take even longer (Revell *et al.* 2011).

Losses of benthic invertebrates cascade through the food web by decreasing the abundance of prey items available to recreationally and commercially important fishes. Recreationally important species such as barred surfperch and California corbina (Efford 1965, Barry *et al.*

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1996) consume these macroinvertebrates, as well as many other fishes trophically linked to recreationally and commercially important fishes. Other recreational fishes include barred surfperch, white seabass, queenfish, spotfin croaker, California halibut, jacksmelt and California grunion utilize this habitat for foraging (Allen and Pondella 2006). In addition, leopard shark (*Triakus semifasicata)*, managed under the Pacific Groundfish FMP, utilize shallow coastal waters as pupping and feeding/rearing grounds. Neonate pups occur in and just beyond the surf zone in areas of southern California. Therefore, repeated disturbances are likely to have cumulative impacts to prey availability. Changes in the availability of prey resources reduce the quality of habitat and may adversely affect the overall fitness of fishery species in the area.

Adequacy of nearshore impact analysis

Sediment transport modeling was used to predict the influence of the project on sand elevations in the vicinity of the receiver sites. A 2004 LiDAR dataset was used as base bathymetry to examine changes in sand thickness. Substrate and vegetation data from 2002 was added as a layer to indicate areal coverage of the resources. Modeled sedimentation results were then overlaid on these data sets. In addition, a sand layer was created from empirical data provided from the 1996 to 2008 coastal profile dataset and was used to estimate sedimentation and potential impacts to resources based on natural variation. The potential project-related impact was determined by subtracting the most probable impact from natural variation. Encinitas modeling indicates no project-related impact to nearshore resources. Solana Beach modeling estimates indicate a permanent impact to approximately 8.4 acres of rocky reef. However, no impacts to reefs supporting surfgrass were predicted.

The Integrated Report indicates this methodology was developed in coordination with CDFG, NMFS, and USFWS. However, NMFS staff expressed concerns with the approach at an October 2011 interagency meeting and requested that various assumptions be more fully described and justified. Examples of issues suggested to be more clearly explained were 1) how natural variation was defined and incorporated into the modeling and analysis, 2) a rationale for assuming the average condition as the most probable impact, and 3) a description of how maximum and minimum impacts were described. However, the methodology provided in the Integrated Report is not substantively different than that provided by the Corps in 2011. NMFS maintains staff's previous recommendation that the methodology provide additional justification for the assumptions used in the analysis. Below is some additional discussion regarding the three points mentioned above.

Based upon the methodology description, the Integrated Report calculates natural variation by using coastal beach profile datasets. Profile data may provide some indication of changes in sand depth, but are not reflective of variation in biological resources associated with reef habitat. There are limitations to this approach that have previously been described. NMFS notes the following conclusions in the RBSP Year 4 Post-Construction Monitoring Report:

> *Beach profile data are primarily bathymetric (i.e., water depth) data along a narrow corridor, and differences can be perceived as changes in sand cover. However, transect data cannot provide sand cover over a large area, but only along the transect line. Beach profile data are very good for observing general patterns; however, the primary*

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limitation, especially in areas where there are reefs, is the inability to address changes in reef area. To document reef area and seasonal changes in reef area, remote sensing surveys, similar to what was conducted for SANDAG's Nearshore Inventory Program would need to be conducted.

Moreover, simple subtraction of the natural variation in sand depth from the predicted sand burial depth expected from the project does not seem to be a justified approach for evaluation of reef impacts. This approach does not seem consistent with the impact evaluation procedure for RBSP I and II. The estimated project-related impacts were calculated by subtracting the standard deviation of empirical coastal profile data from the most probable impact of beach nourishment (Table 5.2-4). However, subtracting one standard deviation from the mean only represents 34.1% of possible impact values. Typically, confidence intervals encompassing 90% to 95% of possible values are reported (Douglass *et al.* 1999; Stockdon *et al.* 2002). In addition, solely subtracting the standard deviation assumes sedimentation will only decrease as a result of natural variation. It is inherent in the definition of 'natural variation' that values may increase or decrease. If the analysis subtracted the standard deviation only to show natural variation was greater than the probable project impact, the analysis then ignored the potential synergistic effects of project impacts and natural variation. Therefore, NMFS believes this method may be statistically inadequate to model potential project impacts. The additive effects of sand placement may exceed the ability of biological indicator species to withstand naturally occurring sand movements. The most probable impact, as presented in Appendix H, may provide a better indication of the potential for additive impacts associated with sand placement. Under the tentatively recommended plan scenario, 1.8 acres of reef with surfgrass and 6.7 acres of reef with other biological indicators may be impacted at Encinitas and 0.4 acre impact to intertidal reef platform and 12.1 acres of reef with other biological indicators may be impacted at Solana Beach.

The theoretical sand surfaces appear to be based upon average values of sand movement. Denny and Gaines (1990) demonstrated the inadequacy of means and variances as sole descriptors for considering the impact of wave forces on the population dynamics and evolution of marine species. Gaines and Denny (1993) suggest that many other ecological and evolutionary problems are also better expressed in terms of extreme values than in terms of means and variances. They suggested that physical stresses that kill or physiologically impair are clear examples where maxima or minima are often more critical than means for predicting community structure. Given that sediment burial and scour are significant physical stressors in the affected area, NMFS would expect that the maximum values of sand movement may be more appropriate for determining potential impacts to reef habitat. The Corps should further justify the application of average values for their impact determination and present the range of impacts that may occur using the minimum and maximum values associated with sand movement.

NMFS further questions the conclusions that no surfgrass impacts will occur based upon results from RBSP I. NMFS notes the following from the RBSP Year 4 Post-Construction Monitoring Report:

Sand cover at SB SS-2 [a transect at the Solana Beach site] *increased to levels beyond what was observed prior to the RBSP and remained at those levels. At SB-SS-2, the only*

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apparent source of sediment was the RBSP suggesting that the RBSP may have potential impacts on this nearshore reef. The increased sedimentation did not appear to affect surfgrass cover; however, shoot density declined as a possible response to the increased sedimentation. If sedimentation persists it is likely that declines in indicator species would occur.

and

Based on the volume of material that was placed at the receiver sites for the RBSP, no environmental impacts were observed; however, the placement of large quantities (exceeding that of the RBSP) in close proximity to nearshore sensitive resources may result in significant impacts to these resources.

Based upon figures provided by the Corps during an October 2011 interagency meeting, the two receiver sites overlap previous beach nourishment sites from RBSP I. Specifically, 146,000 cy were placed at Solana Beach and 105,000 cy were placed at Encinitas. Initial placement volumes for the Project are more than six times that placed at RBSP I. Thus, in light of the conclusions from RBSP I above, significant impacts to nearshore sensitive resources at both project sites may occur.

Lagoon impacts and mitigation measures

San Elijo Lagoon and San Dieguito Lagoons occur in close proximity to the nourishment sites. San Elijo Lagoon lies between the two nourishment sites and may have the greatest potential for adverse impacts associated with increased lagoon sedimentation. San Dieguito Lagoon lies to the south of the Solana Beach nourishment site. According to Appendix B-2, as gross transport increases with increasing beach nourishment, lagoon sedimentation is expected to increase. An increase in lagoon sedimentation is a negative project impact, and the estimated costs of removing the sedimentation by dredging provide a valuation of this impact. However, this impact is not described in Section 5.4 Biological Resources nor are mitigation measures identified to address the increased sedimentation. In addition, no environmental commitments are identified in Section 10.2. This impact may also warrant discussion in Section 5.1 Geology and Topography and/or Section 5.2 Oceanographic and Coastal Processes.

Analysis of previous monitoring

During the environmental review of a similar, but smaller project (San Clemente Beach Nourishment project), NMFS conveyed concerns regarding the adequacy of analysis and conclusions drawn from previous studies. Peterson and Bishop (2005) reviewed 46 beach monitoring studies and showed that: 1) only 11 percent of the studies controlled for both natural spatial and temporal variation in their analyses; 2) 56 percent reached conclusions that were not adequately supported; and 3) 49 percent failed to meet publication standards for citation and synthesis of related work. They opined that regulatory and resource agency practices are in urgent need of reform as the risk of cumulative impacts grows in the face of sea level rise, climate change, and increased coastal development. NMFS notes that, with the exception of one project from the 1970s, all the studies that were reviewed were on the Atlantic or Gulf coastlines. 16

Thus, their results may not be directly applicable to projects implemented in Southern California. However, NMFS shares the concerns expressed by the authors that the presumption that nourishment projects are ecologically benign may be based upon an incomplete and flawed body of science. If previous monitoring results in Southern California are to be used as support for conclusions that impacts to biological resources are minor and/or insignificant, NMFS believes a more rigorous examination of their sampling design, statistical analyses, and conclusions are necessary.

Erosion sources and effect on alternative analysis

The Integrated Report is supposed to describe existing and future without-project conditions of the study area and identify problems and opportunities to reduce storm damages, improve public safety, increase recreation opportunities, and protect the environment. The Monte Carlo Simulation used to model bluff failure appears to focus on bluff toe erosion from waves. Bluff erosion also occurs from groundwater, rainfall, and failures at the bluff top. According to Young *et al.* (2009), nine seacliff sections in southern California showed maximum seacliff erosion in the the most rainy time period when wave energies were not particularly elevated. Although the Corps' authority may focus on bluff toe protection, the analysis should still address other other sources of erosion. At a 2011 interagency meeting, NMFS and FWS staff requested that the analysis account for other sources of bluff erosion. Since erosive forces other than just wave energy may occur at the bluff top and on the bluff face, they need to be more clearly accounted for in the alternative formulation and analysis. Groundwater and rainfall may require armoring and/or retreat to reduce risks to public safety and economic damages.

Economic analysis

Significant expenditure of public dollars requires thorough analysis of the alternatives. NMFS recognizes the importance of infrastructure protection, recreation benefits, and public safety that may be derived from the beach nourishment approach proposed in the Integrated Report. Project alternatives were formulated to exclusively reduce erosion to the base/toe of the bluff. The Integrated Report compares the bluff erosion damages that are prevented by the Project to the damages associated with residual sloughing at the bluff top edge that would not be prevented by a Federal-interest project. This comparison provides an indication of the level of economic risk expressed as a percentage of the residual damages as a share of the preventable damages. The "Level of Risk" for the tentatively recommended plan is 32% at Encinitas and 45% at Solana Beach.

A similar level of risk factor should account for the environmental risks. Environmental costs should be fully considered in the economic evaluation of the project. The proposed Project involves six times the amount of material used during previous beach nourishment projects and may have significant environmental impacts. The Corps has acknowledged the potential need to mitigate 8.4 acres of rocky reef impact, but NMFS has concerns that this may be an underestimate. Furthermore, there is uncertainty whether the proposed mitigation would offset impacts to rocky reef habitat. Lastly, the environmental costs associated with repeated disturbance to soft bottom communities are not incorporated into the analysis. The Corps maintains that there are adequate contingency measures in place to account for uncertainty

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regarding environmental impacts. NMFS has previously questioned the Corps reliance on their contingency measures during the project planning phases and expressed concerns about the modeling assumptions. An informed decision as to whether the project achieves a positive benefit cost ratio (BCR) is compromised if accurate costs are not provided for monitoring and mitigation. The Corps should provide a more explicit accounting for the range of potential impacts to marine resources and provide a justified worse-case scenario in the economics analysis.

Managed retreat alternative analysis

The Integrated Report indicates there are no quantitative economic benefits that would enable a managed retreat alternative to qualify for a Federal interest since the benefit to cost ratio would be less than one and the Cities of Encinitas and Solana Beach do not support a Managed Retreat Alternative. However, the analysis of this alternative within the Integrated Report is based upon a very limited cost-benefit analysis and does not consider alternatives evaluated in detail elsewhere in the State (e.g., ESA PWA (2012)). Given the cost of the proposed Project ($177 million), the economic "Level of Risk", the uncertainty of environmental impacts, and the likely need to continue similar actions after the life of the Project, managed retreat warrants additional analysis.

Conclusion and Preliminary Recommendations

NMFS believes the Integrated Report provides insufficient information to fully inform an analysis of the adverse effects on EFH. We have identified specific issues above that would improve the overall analysis. Upon receipt of a revised analysis, NMFS will review and submit appropriate EFH Conservation Recommendations consistent with our finding. In the interim, NMFS offers the following recommendations to consider in your decision-making process.

1. According to Table 3.1-2 which summaries the preliminary screening of alternatives, all of the beach nourishment alternatives with various beach width increments would meet the fundamental objectives of the Project. The primary difference amongst these alternatives is the extent to which the economic analysis justifies a Federal interest in the Project. If the basic objectives of the Project may be met via a reduced beach nourishment volume, NMFS recommends the alternative(s) with the minimum beach width to avoid and/or minimize impacts to EFH.

2. A scientifically defensible monitoring plan should be developed prior to a record of decision on the proposed project. The purpose of the monitoring plan is to detect environmental impacts associated with the proposed project and serve as the basis for determining whether compensatory mitigation is appropriate. Results from the monitoring plan will inform the development of a final mitigation plan, which will be based upon the approach described in the contingency mitigation plan. The monitoring plan should be described in greater detail than the program currently described in Section 6.1 of Appendix H. The sampling design and statistical analyses should be clearly described and should be based upon fundamental principles of statistical inference. This monitoring plan should be reviewed and approved by the Corps, NMFS, and other interested resource agencies prior to a record of decision. In addition, to

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ensure adequate scientific rigor, consideration should be given to involving an independent review by recognized, biostatistical experts.

3. According to Appendix B Coastal Engineering Appendix, the Project will result in increased sedimentation to nearby coastal lagoons. Maintenance of lagoon mouths is necessary to ensure adequate tidal circulation to support the ecological functions provided by these sensitive lagoon habitats. The Corps should provide funding to the appropriate entities responsible for lagoon mouth maintenance to offset any increases in lagoon sedimentation at lagoon systems adversely affected by the Project.

4. As described in the Integrated Report and expressed in our comments above, there is great uncertainty regarding the extent of impacts to nearshore reef habitat. NMFS questions some of the assumptions used in the nearshore habitat impact analysis. The Corps should explicitly address each of the identified concerns, provide detailed justification for the assumptions, and provide a range of potential mitigation alternatives that may be necessary to offset the adverse impacts to nearshore reefs and EFH.

Endangered Species Act Comments

As a Federal agency and pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et. seq.), the Corps shall, in consultation with and with the assistance of NMFS, insure that any action it authorizes, funds, or carries out, does not jeopardize the continued existence of any species listed as threatened or endangered, or result in the destruction or adverse modification of designated critical habitat designated. In order to comply with the ESA, the Corps should determine whether any ESA-listed species or designated critical habitat may be adversely affected by the Project. NMFS recommends that the Corps engage in consultation with the NMFS Protected Resources Division in Long Beach, California, for assistance with ESA compliance. Upon request, NMFS staff may be able to help in determination of which ESA-listed species or designated critical habitat, if any, may be present in the Project area and how these ESA-listed species or designated critical habitats may be directly or indirectly affected by the Project. NMFS staff may also be able to assist in development of protective measures that can help minimize the potential for adverse effects to ESA-listed species or designated critical habitat.

Marine Mammal Protection Act Comments

Marine mammals are protected under the Marine Mammal Protection Act (MMPA) (16 U.S.C. § 1361 et. seq.). Under the MMPA, it is generally illegal to "take" a marine mammal without prior authorization from NMFS. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. Except with respect to military readiness activities and certain scientific research conducted by, or on behalf of, the Federal Government, "harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

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NMFS recommends that the Corps assess the potential for harassment or injury to marine mammals as a result of the Project, and implement any measures that may be necessary prevent the take of any marine mammals, as defined under the MMPA. If the incidental take of marine mammals is expected to occur as a result of the Project, the Corps should apply for an Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA) from NMFS well in advance of the Project. NMFS staff is available to assist with this assessment and compliance with the MMPA, including any IHA or LOA applications, upon request from the Corps. If it becomes apparent that impacts to marine mammals in the form of "take" may be occurring as a result of the Project that has not been authorized, the Corps should cease operations and contact NMFS immediately to discuss appropriate steps going forward.

Thank you for considering our comments. Please contact Mr. Bryant Chesney at (562)980-4037, or via email at Bryant.Chesney@noaa.gov if you have any questions concerning our EFH comments or require additional information. If you have any questions pursuant to ESA or MMPA issues, please contact Dan Lawson at (562) 980-3209 or Dan.Lawson@noaa.gov, or Monica DeAngelis at (562) 980-3232 or Monica.DeAngelis@noaa.gov, respectively.

Sincerely,

For Rodney R. McInnis
Regional Administrator

cc: Administrative File: 150316SWR2005HC_N183

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From: Avery, Jon <jon_avery@fws.gov>
Sent: Monday, October 21, 2013 1:58 PM
To: Simon, Larry@Coastal
Cc: Keith Merkel; Smith, Lawrence J SPL; Katherine Weldon; Lawrence Honma; David Zoutendyk; Carol Roberts; David Ott; Leslea Meyerhoff
Subject: Re: Encinitas & Solana Beach Coastal Storm Damage Reduction Project

Larry,

Sorry for the late response. As you likely know we have been out of the office on furlough from October 1 - 16.

Per your inquiry, the Corps' revised project description does address many of our concerns. We appreciate the Corps and the cities of Encinitas and Solana Beach working with us and making modifications to the proposed project to reduce potential ecological effects. Nevertheless we do have some remaining concerns:

1) The Corps consistency determination cover letter to the Coastal Commission for the proposed project (CD-0203-13) dated 20 September 2013 indicates that "no federal listed species will be affected..." We disagree. The California least tern and western snowy plover both occur within the action area for the project and may be affected by the proposed action.

Primary foraging areas for the California least terns nesting at Batiquitos Lagoon and San Dieguito lagoon (and expected future least tern nesting at San Elijo Lagoon) co-occur in space and time with some project dredging and vessel activities areas as well as appreciable areas likely to be affected by dredging and beach replenishment associated plumes. Least tern primary foraging areas are predominately within 2 miles of nesting locations in suitable waters. The potential nesting area at San Elijo Lagoon is extant, but nesting at this lagoon has likely been curtailed since 2005 by substantial increases in predatory pressure from American crows (Robert Patton, pers comm. 2013). While the project dredge and replenishment plumes are not expected to involve relatively large areas, these plumes could be several hundred feet long (as predicted within the subject project's Draft EIS/EIR) within these least tern primary foraging areas. Least tern foraging could be displaced by the project dredging and associated vessel activities and plumes. Least terns would likely have foraging activities displaced (or attracted) by plumes in the surf zone and nearshore. Local bird researcher Robert Patton has noted that in the project area "...most sightings of [least terns] in the area [are] of individuals foraging in the surf zone." This noted surf zone is the same area where appreciable plumes from project beach replenishment would likely occur; we expect they will be detectable to foraging terns and the fish they prey upon. The displacement or attraction to these plumes is a "may affect" for least terns.

Western snowy plovers occur on some of the beaches and environs of the project action area, predominately in the south Cardiff State Beach area. While the beaches in the two project footprint areas where the beach replenishment would directly occur are likely insufficient to support snowy plovers (and thus potential nesting) during high tide, some foraging by snowy plovers at lower tides could occur in these during the project life during replenishment activities. More importantly, roosting and foraging snowy plovers were documented at Cardiff State Beach in recent years from July through May. For example, 79 individual snowy plovers were reported from the beach near the Seaside parking lot (southern portion of Cardiff State Beach) on 26 August 2013. The Seaside parking lot and an adjacent vacant upland area (former parking lot area with asphalt removed; "vacant lot") are planned as potential staging areas for the proposed project. This vacant lot has been used for snowy plover roosting in recent years, particularly at high tide (Robert Patton, pers. comm.

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2013). We expect this vacant lot area to become increasingly valuable for snowy plovers in the future, including potential for future snowy plover nesting (even without restoration). Additionally, proposed project vehicle access to the beach and project areas to the south are proposed from the Seaside parking lot across/along the southern end of Cardiff State Beach to the Solana Beach replenishment area, nearby where plovers have been detected on the beach. The close proximity of the staging and access activities to roosting/foraging snowy plovers, the potential use of this occupied vacant lot area for project staging, and the potential for disturbing or crushing plovers on the beach within the access route from the Seaside parking lot makes the project as proposed a "may affect" for snowy plovers.

The Endangered Species Act (Act) threshold of "may affect" is quite low. Any appreciable effect on listed species, including positive effects, triggers the consultation requirement of the Act for federal agencies (e.g., 50 CFR §402.02, 50 CFR §402.14). Under the Act, if a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required, except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat (50 CFR §402.02, 50 CFR §402.13). We suggest the Corps enter into Informal Consultation (an optional process that includes all discussions and correspondence between the Services and a Federal agency prior to formal consultation), to help determine whether their proposed Federal action may affect or is likely to adversely affect listed species. This process allows the Federal agency to utilize the Service's expertise to evaluate the agency's assessment of potential effects and to propose minimization measures.

The appropriate determination by the Corps for the least tern is probably "may affect; not likely to adversely affect", if plumes from replenishment and dredging activities would remain less than 500 feet long, as predicted within the Draft EIS/EIR. The appropriate determination by the Corps for the snowy plover is probably "may affect; not likely to adversely affect", if the Corps can ensure that potential impacts to snowy plovers would be avoided. Otherwise, a "may affect; likely to adversely affect" determination is appropriate.

2) The Corps consistency determination cover letter (CD-0203-13) dated 20 September 2013, indicates that "no federal listed species will [have] their continued existence be jeopardized by project implementation." The opinion on whether or not a federal action would "jeopardize the continued existence" of a listed species is provided by the U.S. Fish and Wildlife Service or National Marine Fisheries Services; that has not occurred in this case. It is inappropriate for the Corps to make this statement/determination in this situation. Statements regarding "jeopardizing the continued existence" of listed species should only be made after completion of formal consultation and delivery of a Biological opinion (a document which includes the opinion of the Fish and Wildlife Service or the National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat (50 CFR §402.02, 50 CFR §402.14(h)). While Section 7(a)(2) of the Act states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat, consultation on the proposed action has not occurred. The appropriate Act thresholds for the Corps' determinations in this situation under the Act are "may affect/no effect" and "likely to adversely affect/not likely to adversely affect" (50 CFR 402).

3) We are not aware of any additional measure the Corps and Cities could implement to minimize potential effects from the project to least terns. If detectable project replenishment or dredging plumes within the least tern primary foraging areas for Batiquitos, San Elijo (if occupied by nesting terns), or San Dieguito lagoons are greater than the Draft EIS/EIR-predicted maximum 500 feet long during the tern breeding season, then some offsetting measures would be appropriate, such as crow predator control at the San Elijo Lagoon salt panne.

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4) In regards to western snowy plovers, we expect that if the vacant lot adjacent to the Seaside parking lot is utilized by the project (i.e., for staging), then it should be subject (post initial beach replenishment) to some restoration, placement of permanent barriers (e.g.,post and cable or fencing), and snowy plover information signage. The restoration should including basic exotic plant removal and lay-back/reduction of a portion of the existing steep slopes facing the beach (to facilitate snowy plover chick ingress/egress to the beach from the vacant lot). Below are some measures we included in a past informal consultation to address potential impact to snowy plovers (please utilize as examples, as appropriate):

1. Fence construction/maintenance will occur from September 16 to February 28 to avoid the plover breeding season, or sooner if a qualified biologist demonstrates to the satisfaction of the Service's Carlsbad Fish and Wildlife Office (CFWO) that all nesting is complete or not occurring in the area;

2. The [applicant] will temporarily mark (with flagging or orange fencing) the project impact limits (including the access route and paved staging area). The [applicant] will submit to the CFWO for approval, at least 7 days prior to initiating project impacts, the final construction plans, including photographs of the marked project impact limits. If work occurs beyond the marked limits, all work will cease until the problem has been remedied to the satisfaction of the CFWO. Temporary marking will be removed upon project completion;

3. The [applicant] will staff a CFWO-approved project biologist who will be responsible for overseeing compliance with protective measures for the plover, and will be approved by the CFWO. The project biologist will be a trained ornithologist with at least 40 hours in the field observing plovers and documented experience locating and monitoring them. In order to receive CFWO approval, the biologist's name, address, telephone number, and work schedule on the project must be submitted to the CFWO at least 5 working days prior to initiating project impacts. The project biologist will perform the following duties:

a) Be on site during work to ensure compliance with all conservation measures;

b) Oversee installation of the temporary marking;

c) Be present during all construction to direct work personnel, maintain the temporary marking, enforce the limits of impact, and ensure that no harm to pocket mice or plovers occurs. The project biologist will walk project impact limits daily before work begins to determine if plovers have entered the project area. If a plover is detected or the limits of impact are exceeded, the project biologist will passively flush snowy plovers away from project area and in the

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direction of adjacent beach (e.g., slowly walking through project area to effect dispersal to adjacent beach);

d) Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented by construction personnel. At a minimum, training will include: 1) the purpose for resource protection; 2) a description of the pocket mouse, plover and their habitat; 3) the conservation measures that should be implemented during project construction to avoid impacts to the pocket mouse and plover, including strictly limiting activities, vehicles, equipment, and construction materials to the marked project footprint to avoid sensitive resource areas in the field (i.e., avoided areas delineated on maps or on the project site by marking); 4) environmentally responsible construction practices in Conservation Measure 5; 5) the protocol to resolve conflicts that may arise at any time during the construction process; 6) the general provisions of the Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act;

e) Halt work, if necessary, for any project activities that are not in compliance with any conservation measures. The project biologist will report any non-compliance issues to the CFWO within 24 hours of its occurrence and confer with the CFWO to ensure the proper implementation of species and habitat protection measures;

f) Submit weekly compliance reports (including photographs of impact areas) to the CFWO to show that authorized impacts were not exceeded and general compliance with all conservation measures. A separate memo/report will be prepared and submitted to the CFWO immediately if/when an impact occurs outside of the approved project limits; and

g) Submit a Biological Monitoring Report to the CFWO within 60 days of project completion that includes: as-built construction drawings with an overlay of areas that were impacted or preserved and other relevant information documenting that authorized impacts were not exceeded and that general compliance with the conservation measures was achieved.

4. If night work is necessary, night lighting will only be used in the surf fence construction/ maintenance zone and will be of the lowest illumination necessary for human safety, selectively placed, shielded, and directed away from natural habitats. Night lighting will not be used at the staging area;

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5. The [applicant] will ensure that the following conditions are implemented during project construction/maintenance:

a. Employees will strictly limit their activities, vehicles, equipment, and construction materials to the marked impact limits;

b. To avoid attracting predators of the plover, the project site will be kept as clean of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site;

c. Pets of project personnel will not be allowed on the project site;

d. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will occur in designated areas outside of waters of the U.S. within the fenced project impact limits. These designated areas will be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering waters of the U.S., and will be shown on the construction plans. Fueling of equipment will take place within existing paved areas greater than 100 feet from waters of the U.S. Contractor equipment will be checked for leaks prior to operation and repaired as necessary. "No-fueling zones" will be designated on construction plans.

Thanks,

Jon

760 431.9440 x309

On Tue, Oct 15, 2013 at 11:08 AM, Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov> wrote:

Jon,

Per your email reply, below, do you have any comments on the materials provided to you on September 24? It appears from my reading of the meeting notes and the follow-up materials that the revised Corps project addresses your concerns. I would appreciate receiving any comments you might have as I am working on the CCC staff report for the revised consistency determination scheduled for the Commission's November meeting. Thanks,

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
www.dfg.ca.gov
Marine Region
4665 Lampson Avenue, Suite C
Los Alamitos, CA 90720
(562) 342-7210

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

February 27, 2013

Ms. Josephine R. Axt, Ph.D
US Army Corp of Engineers
P.O. Box 532711
Los Angeles District
ATTN: Mr. Larry Smith (CESPL-PD-RN)
Los Angeles, California 90053-2325

Subject: Encinitas and Solana Beach Storm Damage Reduction Draft Environmental Impact Statement/Environmental Impact Report/Feasibility Study (SCH # 2012041051)

Dear Ms. Axt:

The Department of Fish and Wildlife (Department) has reviewed the Encinitas and Solana Beach Storm Damage Reduction Draft Environmental Impact Statement/Environmental Impact Report (draft EIS/EIR) and Feasibility Study. This report was prepared by the US Army Corp of Engineers (USACE). The proposed Project is described as follows:

- Segment 1: The City of Encinitas will have a portion of their beach area replenished with sand extending laterally 7,800 feet from the 700 block of Neptune Ave. and Daphne south to West H St. The southern portion of this segment is located in the northern most portion of Swami's State Marine Conservation Area (SMCA). The beach sand replacement alternatives include pumping between 340,000 and 800,000 cubic yards of sand onto the beach from an offshore borrow site. Each alternative includes a bluff notch fill in order to repair the undercut bluff areas. This alternative includes 5 or 10 year sand replenishment cycles.

- Segment 2: The City of Solana Beach portion of the Project will encompass the city limits and extend laterally 7,200 feet from approximately Tide Park south to the southern city limit. The beach sand replacement alternatives include pumping from 440,000 to 1.62 million cubic yards of sand onto the beach from an offshore borrow site. Each alternative includes a bluff notch fill in order to repair the undercut bluff areas. This alternative includes 10 or 13 year sand replenishment cycle.

- Both segments propose replacing sand on extensively eroded beach areas for public safety, recreation, infrastructure and private property protection. The

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project alternatives in the draft EIS/EIR include: no project, replacement of beach sand, and bluff notch filling for the two non-contiguous segments of beach.

As a trustee for the State fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations (California Fish and Game Code §1802). In this capacity, the Department administers the Marine Life Protection Act (MLPA) and other provisions of the California Fish and Game Code and California Code of Regulations (CCR), Title 14 that afford protection to the fish and wildlife of the State. The Department is a Trustee Agency for purposes of CEQA [CCR, Title 14, §15386(a)]. Under the MLPA, the Department is responsible for marine biodiversity protection in coastal marine waters of California. Pursuant to our statutory authority, the Department submits the following concerns, comments, and recommendations regarding the Project.

Impacts to Marine Fish and Wildlife

The draft EIS/EIR indicates that Project activities may directly impact and permanently bury or scour existing intertidal reefs with surf-grass and algae, as well as abalone and other invertebrates. Other sensitive habitats observed by Department staff within or adjacent to the two project segments include: large intertidal boulders, tide-pools, and sub-tidal reef pedestals. The draft EIR/EIS has not adequately identified these resources and potential impacts to these habitats from Project activities, or provided adequate avoidance, minimization and mitigation measures. Many species rely on these habitats for attachment, shelter, roosting, foraging and reproduction.

The Department also has concerns regarding the potential for direct loss and degradation to marine plants and animals from Project activities. Both of the Project segments are located in high energy wave areas. Once algae or surf-grass mats are removed, it is difficult for them to re-establish on reefs naturally or by transplantation, due to harsh wave conditions. Additionally, indirect adverse impacts including scour and/or burial may occur due to storms and cross-shore or long-shore sediment transport. The draft EIR/EIS should adequately identify these potential impacts from Project activities, and provide adequate avoidance, minimization and mitigation measures.

Impacts from Project activities may permanently change the community structure of existing sandy beach habitats within or adjacent to the Project segments. These habitats are critical to the preservation and maintenance of the vast array of fish and wildlife resources that utilize these areas. For example, the intertidal sandy beach is important foraging and spawning habitat for the California species of special concern and federally threatened Western snowy plover (*Charadrius alexandrinus nivosus*) and the California grunion (*Leuresthes tenuis*). Coastal strand habitat is an important and diminishing California natural resource and supports a unique ecological community (Dugan and Hubbard 2009). The draft EIS/EIR does not adequately discuss the

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impacts to sandy beach and coastal strand species and habitats, nor how it should be conserved during initial and subsequent beach construction.

Impacts to Marine Protected Areas

Marine Protected Areas (MPAs) in southern California went into effect in January 2012. Three of these MPAs are located near the Project area, and one, Swami's SMCA, is located within the Project footprint. According to the Marine Managed Areas Improvement Act, in an SMCA it is unlawful to "injure, damage, take, or possess any living, geological, or cultural marine resource for commercial or recreational purposes, or a combination of commercial and recreational purposes, that the designating entity or managing agency determines would compromise protection of the species of interest, natural community, habitat, or geological features" (Public Resources Code §36710(c)). Swami's SMCA includes offshore reef habitat and nearshore bedrock benches. These areas are important nearshore areas that include a wide range of species including surf-grass, algae, abalone and lobster. While Swami's SMCA does allow the take of living marine resources pursuant to sediment management activities, it does not allow the conversion (e.g. changing nearshore rocky areas from hard to soft substrates via burial), degradation, or destruction of habitats within the MPA.

In addition to Swami's SMCA, there are three additional MPAs near the Project area. These include: Batiquitos Lagoon SMCA, San Elijo Lagoon SMCA and San Dieguito Lagoon SMCA. It is likely that Project activities will also impact these MPAs due to the movement of sediment. As required in the Marine Life Protection Act (MLPA), MPAs were carefully sited in order to capture specific habitats and to meet size and spacing requirements in order to create a network effect along the California coastline. The removal, destruction, or degradation of any habitats within an MPA is likely to jeopardize the effectiveness of the MPA network as a whole. Due to the regulations outlined in the MLPA, the MMAIA, and CCR Title 14, significant impacts to habitats within MPAs shall be avoided and loss of habitat in an MPA cannot be mitigated outside the MPA.

Reef Mitigation Strategy

The draft EIS/EIR describes the main impacts being the burial and/or scouring of reefs with indicator species located immediately offshore of segment 2 in the City of Solana Beach. These impacts were described as adverse and unavoidable, and that mitigation will be required. Table ES-2 (page S-9) of the draft EIS/EIR predicts a total area of natural reef loss between a minimum of 1.6 acres under the Alternatives 1C and 2B and a maximum of 8.4 acres under Alternative 1A. Compensation for these losses will be provided by constructing shallow, mid and deep water artificial reefs.

Federal regulations require a functional assessment be conducted whenever mitigation for a federal project is deemed necessary. In order to determine appropriate mitigation for these impacts, the USACE convened a panel to assist in the development of an acceptable mitigation plan. The panel consisted of staff from the National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service, California Coastal

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Commission, USACE, the Department and Keith Merkel with Merkel and Associates. During a conference call on March 1, 2012, the panel agreed to use the NMFS Wetland Mitigation Ratio Calculator to determine acceptable mitigation ratios for reef impacts. (Appendix M of the draft EIS/EIR entitled "Mitigation Strategy" describes the process that was used to calculate mitigation ratios). The ratio calculator includes seven parameters. The panel agreed on the appropriate values for the parameters that includes a range of low, average and high values. The panel recommended ratios for shallow, mid-water, and deep water reefs as follows; 1.35:1 for the low values, 2.18:1 for the average values and 5.58:1 for the high values. The USACE did not use these recommendations. They instead used 2.5:1 for shallow water reefs, 2.0:1 for mid-depth reefs and 1.5:1 for deep water reefs. The ratios proposed are not sufficient to adequately mitigate for reef impacts and the USACE proposed ratios should be revised using the panel recommendations.

Impacts to California Least Tern and other Seabirds

Impacts to offshore areas of the Encinitas and the Solana Beach segments will increase ocean turbidity and may prevent sight dependent seabirds such as the California least tern (*Sterna antillarum browni*), a State fully protected and endangered species, from seeing and obtaining its prey during the breeding season. Nesting activity disturbances during construction may also occur in the lagoon nesting sites nearby.

Recommendations

The following items should be fully addressed in the final EIS/EIR:

1. The Department supports Project alternatives having a beach width and volume of sand that reduces the risk such that the initial or subsequent adverse impacts to biological resources are avoided. In addition, it is recommended the beach sand have a replacement cycle that is adaptive in nature rather than static cycles of 5 to 13 years. A longer sand replacement cycle may be needed (based on the impact monitoring results) to further avoid or minimize impacts to marine resources. The USACE should consult with the resources agencies prior to subsequent sand replacement projects.

2. The Department recommends the final EIS/EIR include specific language in the summary section as well as Appendix M that clearly identifies that the USACE will utilize the ratio calculation process recommended by the panel. Also, actual impacts determined through the implementation of a comprehensive monitoring plan developed in consultation with the resource agencies should also be included. This monitoring plan should include a pre-construction survey for marine resources and rocky reef habitats, a component for adaptive management monitoring during construction, and a complete post construction survey.

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3. In order to protect marine resources within Swami's SMCA, and to comply with the specific laws and regulations pertinent to Swami's SMCA, the preferred projects chosen should identify strategies to avoid permanent and minimize temporary loss or degradation of reefs and other habitats. A Swami's SMCA biological impacts monitoring, avoidance and minimization plan should be developed in consultation with the Department to sufficiently protect fish, wildlife and habitats of this area. These plans should be included in the final EIS/EIR.

4. Baseline biological surveys should be conducted for Swami's SMCA as well as reference sites, borrow sites and along the pipeline route. Quantitative surveys should include, but are not limited to: fish, all reefs, boulders, marine plants, all abalone species, locally unique habitats and vulnerable species (e.g. California grunion), sandy beach habitat, benthic and epi-benthic invertebrates, listed or fully protected species, seabirds and shorebirds. Draft baseline survey plans should be reviewed and approved by the Department.

5. The MLPA laws and regulations do not include provisions for the construction of artificial reefs as mitigation for impacts to habitats located within an MPA [California Fish and Game Code §2857(c)]. The Department recommends that the draft EIR/EIS be amended to reflect that adverse impacts to reefs and the construction of an artificial reef for mitigation will not be allowed in the Swami's SMCA.

6. Monitoring during construction for direct impacts to shallow reef and surf-grass may assist with adaptive management as well as to facilitate research and development for new impact reducing strategies.

7. Impacts to the San Dieguito Lagoon SMCA, San Elijo Lagoon SMCA, and Batiquitos Lagoon SMCA should be assessed. Mitigation and monitoring plans to minimize and avoid impacts should be developed in consultation with the Department and included in the final EIS/EIR.

8. A sandy beach and coastal strand habitat avoidance and minimization plan should be developed in consultation with the Department. For example, the beaches should be built such that the resulting beach has the same or similar sand type and slope as the existing beach. Additionally, areas of the built beach should leave gaps at intervals in order for the invertebrates to easily re-colonize the built beach on each side facilitating faster sandy beach invertebrate recovery times.

9. The bird breeding season between May 1st and August 31st should be avoided for the Western snowy plover and California least tern. If avoiding the bird breeding season is not feasible, then appropriate surveys and impact assessments should be conducted. Protection plans should be developed to

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avoid foraging and nesting impacts if necessary. Surveys and impact assessments of over-wintering Western snowy plovers is also recommended. All reports should be reviewed and approved by the Department and other agencies.

10. If surveys indicate that Western snowy plover, California least tern, California grunion and abalone protection plans are necessary, they should be developed in consultation with the resources agencies.

11. Finally, a comprehensive mitigation and monitoring plan is required to address all adverse impacts (including unexpected impacts) to marine resources. After impact monitoring is completed, mitigation and monitoring plans should be developed in consultation with the Department and the other resources agencies.

Thank you for the opportunity to review and comment on the draft EIS/EIR. As always, Department personnel are available to discuss our concerns, comments, and recommendations. Please contact Ms. Loni Adams, Environmental Scientist, at (858) 627-3985 or ladams@dfg.ca.gov if you have any questions.

Sincerely,

Paul Hamdorf

Paul Hamdorf
Acting Regional Manager
Marine Region

cc: Department of Fish and Wildlife
Becky Ota- Belmont Office
Vicki Frey- Eureka Office
Loni Adams- San Diego Office

Ms. Wende Protzman
635 South Highway 101
Solana Beach, California 92075

Mr. Mark Delaplaine
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Mr. Bryant Chesney
National Marine Fisheries Service
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Mr. Jon Avery
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6010 Hidden Valley Road, Suite 101
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Mr. James M. Munson
Environmental Protection Specialist
U.S. EPA, Region IX
75 Hawthorne Street CED-2
San Francisco, California 94105
Munson.James@epamail.epa.gov

CITATIONS

Dugan, J. E. and D. M. Hubbard. 2010. Loss of Coastal Strand Habitat in Southern California: The Role of Beach Grooming. Estuaries and Coasts. 33:1-11.

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State of California • Natural Resources Agency
Edmund G. Brown Jr., *Governor*

DEPARTMENT OF PARKS AND RECREATION
Major General Anthony L. Jackson, USMC (Ret), *Director*

San Diego Coast District
4477 Pacific Highway
San Diego, CA 92110

February 26, 2013

US Army Corps of Engineers, Los Angeles District
Planning Division
Lawrence Smith, CESPL-PD
915 Wilshire Blvd.
Los Angeles, CA 90017

RE: **Encinitas-Solana Beach Coastal Storm Damage Reduction Project Integrated Feasibility Study and EIS/EIR**

Dear Mr. Smith,

Thank you for the opportunity to comment on the *Encinitas-Solana Beach Coastal Storm Damage Reduction Project Integrated Feasibility Study and EIS/EIR, San Diego County, California*, USACE, Dec. 2012. The California Department of Parks and Recreation (State Parks) is a Trustee Agency and is mandated by law to protect the natural, cultural and recreational resources found within the State Park system. Therefore, we submit the following comments to assist you in developing a project design that avoids or minimizes impacts to lands held in public trust. In general we support the goal of this project, to protect public access and recreational opportunities, without extensive hardening of the coastline. Our department is also concerned about the project's compliance with the American's with Disabilities Act (ADA). Given the extensive public use of this area, please make certain that all aspects (both during construction and upon completion) of the project comply with ADA.

State Parks remains concerned about several aspects of the project and requires further clarification and assurances that the project will not result in significant impacts to cultural and environmental resources on State Public Trust Lands. The first question is about archaeological findings at Moonlight State Beach, and the second is the necessity of staging at Cardiff State Beach.

1) Impacts to archaeological site at Moonlight State Beach
Within the last six months, federally-listed archaeological site CA-SDI-17402 (also listed as P37026506/SDM-S-83) has been located on the beach itself. Recorded prior to WWII by Malcolm Rogers of the San Diego Museum of Man, it should have shown up in your South Coastal Information Center search. The City of Encinitas has contracted with Dr. Mark Becker, ASM Affiliates, Inc. of Carlsbad, who is doing the site assessment at this time (mbecker@asmaffiliates.com, 760-804-5757), and would be able to consult with you. Section 4.8.3 statement (p. 264, line 20) that no onshore cultural materials were located needs to be changed. It is the shallow nature and unknown western boundary of this site (C14 dated so far from 3800 bp to 1800 bp) that would be affected by the use of existing sand to create an "L"-shaped berm to anchor sand placement (Section 3.3.4, p. 122, lines 37-40). Advanced testing of this western edge is essential in designing the berm construction and sand placement strategy. This is not just a monitoring situation at the time of construction, but something that could conceivably change the sand replacement strategy. Please consult with District Archaeologist Therese Muranaka (Therese.Muranaka@parks.ca.gov, 619-778-2553).

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2A) Impacts to Cardiff State Beach from staging and transportation to receptor sites
State Parks would prefer that staging and access to Segment 2 (Solana Beach) occur at Fletcher Cove; if this is not feasible, then project staging and access must be designed to avoid impacts to State Park operations, public access, and the rocky substrate that supports archaeological and paleontological resources. Federally-registered archaeological site CA-SDI-13754 (San Diego Museum of Man site SDM-W-312), a well-known Archaic stone bowl site, rests just underwater at low tide in the shell formation. Staging (p. 123, lines 28-38), even only at beginning and ending phases of the project, or for fueling and maintenance purposes, poses a problem for these cultural resources. Underwater survey prior to site selection would be required. Paleontological comment regarding Cardiff 'reef' should be gathered from Dr. Tom Demere of the San Diego Natural History Museum (tdemere@sdnhm.org, 619-255-0232) as to the stability of the shell formation, which in turn supports the archaeological site. It is of note that Fig. 8.3-2 does not match Fig. 1.8-2 and Fig. 3.1-2, as it shows a more northern reach for sand replenishment, impacting the Cardiff 'reef' for more than just staging. Furthermore, to avoid impacts to park operations and public access, work schedules and staging locations would have to be agreed upon by the North Sector Superintendent Robin Greene (Robin.Greene@parks.ca.gov) and formalized with a Right of Entry (ROE) agreement.

2B) Impacts to rocky intertidal reef at Cardiff State Beach (Seaside Reef)
Although the project seeks to avoid placing sand on rocky intertidal habitat, State Parks is concerned that changes in sand drift patterns may negatively affect the habitat. The rocky intertidal habitat in the vicinity of Seaside Reef is the best and most accessible in the Encinitas/Solana Beach Area. It is critical that this location remains healthy and intact. The EIS/EIR proposes post-project monitoring to assess potential impacts and then prescribes a vague mitigation strategy for impacts in the event that they may occur. With a mitigation strategy that is as vague as the one proposed State Parks shall require that all efforts are made to avoid impacts to the rocky intertidal habitat at Seaside. A site-specific monitoring plan must be implemented to measure the effects of sand replenishment on the habitat quality of the nearby rocky intertidal habitat. This plan should be designed to be complementary with ongoing monitoring conducted by the Multi-Agency Rocky Intertidal Network (MARINe).

State Parks requests that project proponent meet with staff when 50% plans are available for review. State Parks will initiate internal project review; and negotiate terms and conditions of Right of Entry Permit for access to State Park Lands. To initiate this process please contact our CEQA coordinator Cindy Krimmel (Cindy.Krimmel@parks.ca.gov, 619-278-3771).

Sincerely,

Clayton A. Phillips, San Diego Coast District Superintendent

Cc Darren Smith, Acting District Services Manager
Robin Greene, North Sector Superintendent
Therese Muranaka, Archaeologist
Reading File

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

February 26, 2013

Josephine R. Axt, Ph.D.
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
ATTN: Mr. Larry Smith (CESPL-PD-RN)
Los Angeles, California 90053-2325

Subject: Draft Environmental Impact Statement for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project, San Diego County, CA (CEQ# 20120400).

Dear Ms. Axt:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for Encinitas-Solana Beach Coastal Storm Damage Reduction Project (Project), San Diego County, California. Our review is provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act. Our comments were also prepared in accordance with the provisions of the Federal Guidelines promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act (CWA).

EPA recognizes the need to minimize threats to public safety from collapsed bluffs, and we support this goal. Based on our review of all of the project action alternative scenarios, we have rated the DEIS as *Environmental Concerns – Insufficient Information* (EC-2) (see enclosed "*Summary of Rating Definitions*"), due to our concerns regarding climate change and sea level rise, and impacts to water quality. We also have concerns regarding the source and quality of beach nourishment materials; biological quality surveys and monitoring; endangered species; floodplain management; cumulative impacts and air quality.

EPA recommends that the FEIS give greater consideration to the project's potential impacts and mitigation needs under high sea level scenarios and that further consideration be given to the need for monitoring and mitigation plans to address environmental impacts from the proposed fill activities, such as loss of surf grass, loss of hard bottom habitat, and water quality. We also encourage the U.S. Army Corps of Engineers to include, in the Final Environmental Impact Statement (FEIS), the results of a comprehensive biological survey of the Encinitas-Solana Beach shoreline. Without such a survey, it is difficult to accurately evaluate the potential environmental impacts of the various alternatives described in the proposed action.

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EPA appreciates the communication between our offices and the opportunity to review this DEIS. When the FEIS is released, please send one hard copy and three CD's to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3521, or have your staff contact James Munson, the lead reviewer for this project. James can be reached at (415) 972-3852 or munson.james@epa.gov.

Please note that, as of October 1, 2012, EPA Headquarters no longer accepts paper copies or CDs of EISs for official filing purposes. Submissions must be made through the EPA's new electronic EIS submittal tool: e-NEPA. To begin using e-NEPA, you must first register with the EPA's electronic reporting site - https://cdx.epa.gov/epa_home.asp. Electronic submission does not change requirements for distribution of EISs for public review and comment, and lead agencies should still provide one hard copy and three CD's of each Draft and Final EIS released for public circulation to the EPA Region 9 office in San Francisco (Mail Code: CED-2).

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

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SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

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EPA'S DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE ENCINITAS-SOLANA BEACH COASTAL STORM DAMAGE REDUCTION PROJECT, SAN DIEGO COUNTY, CA, (CEQ# 20120400)

Alternatives Analysis/Climate Change

The DEIS includes no-action alternatives and multiple action alternatives for each beach, and each alternative has a high sea level rise scenario and a low sea level rise scenario. The document identifies a tentatively recommended plan with two alternatives that call for beach nourishment on two project areas but with different beach widths, (EN-1A Encinitas Beach 100 feet and SB-1A Solana Beach 200 feet). The tentatively recommended plan assumes a low sea level rise scenario, but does not provide a sufficient rationale for why this was chosen. Page 115 of the DEIS states, "Should high sea level rise scenario predictions become evident during the course of the project, adaption of the design to the high sea level rise scenario would be implemented. To achieve that adaption the higher re-nourishment volumes would be implemented." EPA is concerned that the impacts analysis and mitigation is primarily calibrated using the low sea level rise scenario; hence, there is insufficient data to fully analyze the impacts and mitigation needs should the high sea level rise scenario become the federal action.

Page 47 of the DEIS states: "The low sea level rise is represented by a trendline analysis of yearly MSL data recorded at La Jolla in San Diego County from 1924 to 2006. This indicates an upward trend of approximately 0.0068 ft per year, as described in the Coastal Engineering Appendix." Page 46 indicates that this number is formulated using a "Curve I from the National Research Council (1987)." Using a low sea level rise from a curve created in 1987 that reflects data calculating changes from 1924 to 2006 may not fully capture probable sea level rise levels over the next 50 years. At 0.0068 feet per year, this amounts to an increase of 0.34 feet over the 50 year life of the project; however, Table 1.8-4 on page 48 of the DEIS shows conflicting data from the "'Projections from year 2000 baseline' Source: California Ocean Protection Council, 2011." Those data project an average rise of approximately 1.17 feet or "14 inches" by 2050, which is less than $^{4}/_{5}$ of the project's 50 year action period -- a difference of approximately 0.84 feet over the life of the project.

As written, the DEIS' alternatives and economic sections are insufficient to demonstrate why the Corps chose the "tentative recommended plan" or why this plan was chosen over the "Environmentally Superior Plans (EN-1B & SB-1C)". We also note that the artificial reef alternative was dismissed, but the "tentative recommended plan" includes 16 acres of artificial reef; detailed description of the artificial reef alternative that was discarded is not available for comparison. Furthermore, although a CWA Section 404 permit is not needed for the proposed action, this Civil Works project should meet the intent of the CWA Section 404(b)(1) Guidelines. The DEIS alternatives analysis does not demonstrate the project's consistency with the nature of the Clean Water Act Section 404(b)(1) Guidelines and selection of the Least Environmentally Damaging Practicable Alternative (LEDPA).

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Recommendations:

The FEIS should include a full detailed description of the tentatively recommended plan, including high sea level scenarios, using up-to-date data, and looking forward through at least the life of the project.

The FEIS should include a description of how each alternative would meet the needs of the project while reducing adverse impacts to species of concern, coral reefs, and surf grass.

The FEIS alternatives analysis should include a reasonable range of practicable alternatives that meet the project purpose and demonstrate the project's consistency with the CWA Section 404(b)(1) Guidelines and selection of the LEDPA.

Water Quality

While the project will have impacts to high value marine habitats, including special aquatic sites (defined at 40 CFR 230.3(q-1)), the Section 404(b)(1) Analysis (Appendix D) concludes that all impacts are localized and temporary and, therefore, insignificant. There is little discussion of the basis for this conclusion.

As a result of the large volumes of sand being placed on receiver beaches, (1.64 million cy), the Tentatively Recommended Plan described on page 501 could lead to significant and unavoidable adverse impacts on surface water quality, benthic habitat, and fisheries from increased turbidity and fill in special aquatic sites. Page 333 of the DEIS states that, "turbidity is limited to the bottom and is rarely visible at the surface"; however, little information is provided in the document to support this statement. Other short and long term threats to water quality include construction-related contaminants such as oil and hydraulic fluid and increased turbidity that would occur during future maintenance activities for the proposed project.

Recommendations:

The FEIS should include the results of a comprehensive biological survey of the Encinitas-Solana Beach shoreline.

The FEIS should address the potential of the project to contribute to elevated turbidity levels. The Corps should consider marine design modifications regarding factors such as location and size to minimize these environmental impacts.

Additional minimization measures for impacts to the aquatic environment should be discussed in the FEIS, such as measures related to timing and rate of fill placement.

The FEIS should commit to: 1) placement in fall or winter to better mimic natural shoreline turbidity processes and reduce impacts during high recreational use times, and 2) development of debris management plans to ensure that the borrow site materials do not deposit trash or other debris that may be harmful to the ocean environment.

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Source & Quality of Beach Nourishment Materials

The DEIS briefly considers sources of sand such as onshore and offshore borrow sites (DEIS p. 100); however, in regards to possible onshore borrow, the document states, "Some potential for beach replenishment material exists within the quarry and the surrounding area, although the cost would be much higher than offshore sources due to the costs associated with transport."

Recommendation:

The Corps should evaluate and discuss, in the FEIS, any opportunities to further minimize impacts to the aquatic environment by coordinating with other Corps permitted dredging projects that may produce suitable material for beach nourishment purposes, or using sources from which the dredging might provide enhancement of environmental, navigational, or recreational conditions. The ROD should include a commitment to consideration of opportunistic sources of beach nourishment material prior to each nourishment cycle.

We note that the chemical testing of the sediments in the proposed Oceanside borrow pit occurred several years ago. Due to this lapse of time, additional testing may be necessary. Page 203 of DEIS describes an initial general sampling scheme, with an unspecified number of cores taken at depths of 2 feet and approximately 20 feet; however, it is unclear how many of those cores were taken from borrow sites planned for the Tentative Recommended Plan. EPA is also concerned that the document fails to include plans to take core testing down to the anticipated dredging depth.

Recommendation:

The discussion of the chemical testing of the proposed Oceanside borrow site should be expanded in the FEIS to describe what was done in greater detail, including why further up-to-date testing is not needed down to the anticipated dredging depth.

Biological Quality Surveys and Monitoring

As discussed in the DEIS, surveys and monitoring have typically been incorporated into beach nourishment projects. We acknowledge the Corps' commitment to a 50 year monitoring period (over the life of the project); however, the document does not sufficiently discuss a biological monitoring plan.

Recommendation:

The FEIS should include a clear detailed description of a survey and monitoring program for the biological impacts of the preferred alternative, and commit to its incorporation as a required project element. This information should be included for both nearshore and borrow areas in order to evaluate the effectiveness of the proposed action in protecting biological diversity and quality. The monitoring plan should include pre- and post-project

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dive surveys and benthic community sampling of the borrow site and the receiver site to ensure that each benthic community returns to its pre-project density and structure. We recommend that the monitoring program have a clear adaptive management strategy to ensure that the aquatic environment is protected.

Endangered Species

The DEIS insufficiently evaluates the potential impacts to on shore species of concern such as snowy plover, least tern and their habitat. The document states that the species are found in the area, but does not sufficiently disclose the results of site specific surveys.

Recommendation:

The FEIS should include the results of a comprehensive biological survey of the entire project area as well as the borrow site, including a complete review of species outside the immediate project area that may be affected by the project.

The results of consultation with the United States Fish and Wildlife Service and National Oceanic and Atmospheric Administration, if appropriate, regarding threatened or endangered species or critical habitat should be included in the FEIS.

The FEIS should commit to having beach nourishment activities avoid the nesting seasons for listed species, such as the least tern and snowy plover.

Executive Order 11988: Floodplain Management

Per Flood Insurance Rate Maps (FIRM), portions of the project footprint are in a Zone VE Coastal Flood Zone with velocity hazard and established base flood elevation (BFE). See FIRM#: 06073C1045G San Diego Co Unincorporated & Incorporated Areas 05/16/2012. Executive Order 11988 Floodplain Management requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains.

Recommendation:

The FEIS should discuss any impacts that the Proposed Project may have on the potential for flooding.

Cumulative Impacts

The DEIS does not include a sufficient description of other projects in the area that are under construction or planned within the 50 year time frame and could have cumulative impacts , such as adjacent beach re-nourishment projects and or the ecosystem restoration at the San Elijo Lagoon, which is located between the Encinitas Beach and Solana Beach.

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Recommendation:

Given that the Project will take place over the next 50 years, the FEIS should include a comprehensive discussion of reasonably foreseeable projects that may take place in the area during the construction period, such as the San Elijo Lagoon Restoration project, San Clemente Shoreline Feasibility Study and others, and analyze the potential cumulative impacts on affected resources.

Air Quality

Construction Mitigation Measures

EPA recognizes the incorporation of mitigation best management strategies for the project on page S-10 to reduce or minimize air pollutant emissions. More stringent emission controls are available that could further reduce emissions.

Recommendations:
We recommend that all applicable requirements under the South Coast Air Quality Management District (SCAQMD) Rules and the following additional measures be incorporated into the Construction Emissions Mitigation Plan.

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing, and phase grading operations, where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage, and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Reduce use, trips, and unnecessary idling from heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform at California Air Resources Board (CARB) and/or EPA certification, where applicable, levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. CARB has a number of mobile source anti-idling requirements. See their website at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations

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- If practicable, lease new, clean equipment meeting the most stringent of applicable Federal or State Standards. In general, only Tier 2 or newer engines should be employed in the construction phase.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable, to reduce emissions of diesel particulate matter and other pollutants at the construction site.

Administrative controls:

- Identify all commitments to reduce construction emissions and incorporate these reductions into the air quality analysis to reflect additional air quality improvements that would result from adopting specific air quality measures.
- Identify where implementation of mitigation measures is rejected based on economic infeasibility.
- Prepare an inventory of all equipment prior to construction, and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.) Meet CARB diesel fuel requirement for off-road and on-highway (i.e., 15 ppm), and where appropriate use alternative fuels such as natural gas and electric.
- Develop construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.
- Identify sensitive receptors in the project area, such as children, elderly, and infirm, and specify the means by which you will minimize impacts to these populations. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.

Air Quality Impacts Associated with Transporting Fill Material

EPA is concerned that the air quality analysis in the DEIS does not adequately address mitigation of emissions associated with the multiple collection barge trips needed to remove and transport fill from the Project site, nor does the DEIS appear to include estimates of the number of necessary collection barge trips, distance traveled, and corresponding air emissions.

Recommendations:

The FEIS should include a revised air quality analysis and updated emissions comparison to SCAQMD significance thresholds to account for the emissions from the equipment required to transport fill. The FEIS should also commit to additional minimization measures for emissions from barges, tugboats, dredge equipment and equipment used to place the sand on the beach.

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Figure 4.13-1 Popular Surfing Spots

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Table 4.13-3 Surf Sites in the Study Area

Name	Location
Ponto, Batiquitos	North of Encinitas Receiver Site
Grandview	North of Encinitas Receiver Site
Avocados	North of Encinitas Receiver Site
White Fence	North of Encinitas Receiver Site
Log Cabins	North of Encinitas Receiver Site
North Beacons	North of Encinitas Receiver Site
Bamboos	North of Encinitas Receiver Site
South Beacons	North of Encinitas Receiver Site
North El Portal	Within Encinitas Receiver Site
Stone Steps	Within Encinitas Receiver Site
Rosetas	Within Encinitas Receiver Site
Moonlight	Within Encinitas Receiver Site
D Street	Within Encinitas Receiver Site
Trees	Between Encinitas and Solana Beach Receiver Sites
Boneyards, outside Swamis	Between Encinitas and Solana Beach Receiver Sites
Swamis	Between Encinitas and Solana Beach Receiver Sites
Dabbers	Between Encinitas and Solana Beach Receiver Sites
Brown House	Between Encinitas and Solana Beach Receiver Sites
Pipes	Between Encinitas and Solana Beach Receiver Sites
Traps	Between Encinitas and Solana Beach Receiver Sites
Turtles	Between Encinitas and Solana Beach Receiver Sites
Barneys	Between Encinitas and Solana Beach Receiver Sites
85/60s	Between Encinitas and Solana Beach Receiver Sites
Tippers	Between Encinitas and Solana Beach Receiver Sites
Campgrounds	Between Encinitas and Solana Beach Receiver Sites
Suckouts, Lagoon Mouth	Between Encinitas and Solana Beach Receiver Sites
Cardiff Reef, South Peak	Between Encinitas and Solana Beach Receiver Sites
Evans	Between Encinitas and Solana Beach Receiver Sites
Georges, Cardiff Beach	Between Encinitas and Solana Beach Receiver Sites
Parking Lots	Between Encinitas and Solana Beach Receiver Sites
Seaside Reef	Between Encinitas and Solana Beach Receiver Sites
Pallies	Between Encinitas and Solana Beach Receiver Sites
Table Tops, Tide Beach Park	Within Solana Beach Receiver Site
Pillbox, Fletcher Cove	Within Solana Beach Receiver Site
South Side, Fletcher Cove	Within Solana Beach Receiver Site
Cherry Hill, Seascape Surf Beach	Within Solana Beach Receiver Site
Del Mar, 17th – 20th Street	South of Solana Beach Receiver Site
15th Street	South of Solana Beach Receiver Site

Source: Detailed in Appendix B Table 11.3-1

Detailed descriptions of individual sites are provided in Appendix B9 of the Encinitas & Solana Beach Shoreline Study (USACE 2012).. Beginning in 2012, as part of the SANDAG RBSP II project, video monitoring of several surf spots will be initiated by SANDAG in conjunction with the Surfrider Foundation to establish a video-based Surf Monitoring Program.

Utilizing technology provided by CoastalCOMS, a company which specializes in video-based coastal monitoring, this new Surfrider program will establish a baseline for surf quality at six San Diego County beaches where RBSP II beach fills are to occur, and will include daily observations of surf quality with the help of a newly-installed video monitoring system.

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July 2, 2013

Delivered via email

Larry Simon
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105

Re: Federal Consistency Hearing, CD-003-13

Dear Mr. Simon,

Please accept these comments on behalf of the Surfrider San Diego County Chapter. The Surfrider Foundation is an organization representing 250,000 surfers and beach-goers worldwide that value the protection and enjoyment of oceans, waves and beaches. For the past decade, the San Diego Chapter of the Surfrider Foundation has reviewed and commented on coastal construction projects and policy in San Diego County. We take a project of this size and expense very seriously. As stakeholders in this project, our staff and volunteers have dedicated hundreds of hours in meetings with the local cities and consultants as well as reviewing the over 1500 pages of the draft EIR/EIS and its fourteen appendices.

We were impressed by the Coastal Commission (CCC) Staff report released on June 28, 2013, which takes the right approach and is an excellent start to addressing some of our concerns. We support the acceptance of the thirteen proposed conditions as a minimum, and would advocate for additional conditions to make this project comply with the Coastal Act. The staff report was clear with its assertion that impacts to unique surfing resources must be avoided, which we applaud. However, we are perplexed as to why staff only made recommendations to correct these impacts at "Tabletops" and not the other reef breaks with anticipated impacts.

We urge the Commission to add further conditions to ensure all "likely" impacts to surfing are prevented. We especially request that those areas already identified in the Corps EIR as having likely impacts be reduced to no or unlikely impact. The identified likely impact areas include, Stonesteps and Fletcher Cove. In addition, several surf breaks like Cherry Hill and Rockpile were not considered in the impact analysis and should also be considered as well as other relevant breaks in the area.

Reducing the amount of sand to prevent the impacts to surfing resources would avoid many of the habitat impacts as well. We feel the initial sand placements are still far too large. All of the proposed project alternatives exceed the natural sand input into the entire Oceanside littoral cell. In other words, the project proposes to place significantly more sand in two small segments (approximately 4 miles), than naturally enters the entire system (52 miles). Furthermore, this project proposes to place 960,000 cubic yards in Solana Beach alone, while the last RBSP II project placed 1.5 million cubic yards over eight locations throughout San Diego County. This includes 460,000 cubic yards placed in Imperial Beach which had unintended negative consequences, including damage to private property and loss of surfing resources.

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Additional calculations must be conducted to determine if Condition 1 (reduced nourishment in Solana Beach segment) is sufficient to not trigger the "likely" impacts to Tabletops reef. If not, the sand terminus should be moved further south and the amount of sand should be further reduced. Furthermore, it is unclear from this condition if the amount of sand will be reduced or just moved south. The Commission should provide direction to reduce the amount of sand in this segment based on the factor of 3 deviations from the natural sand input for the entire cell.[1]

The CCC staff report correctly acknowledges that surfing resources stand to lose the most if this project moves forward as proposed. To make matters worse, the negative impacts to surfing have been significantly underestimated and dismissed by the Corps. Illustrating this fact is a discrepancy in a statement on surfing attendance from Army Corps reported in the CCC Staff report (p 34-35):

> "In a response to a May 2013 Commission staff inquiry regarding potential project impacts to surfing identified in the *Feasibility Study*, the Corps stated that:
>
> *"The surfing analysis done for this feasibility study demonstrates a change in surfing quality along five key measures but does not conclude the overall impact is beneficial or detrimental. Given that this detailed analysis of surfing does not indicate an overall direction from surfing impacts (positive or negative) and given that surfing visits presently make up a relatively small share of total beach visitations to the study area estimated at less than 10% of total visits to the study area shoreline, the overall impact to recreation values from surfing is not expected to affect plan selection if quantified. Further, surfing visits are not expected to increase as much as other recreation visits in the future due to the significant beach-based recreation that would be supported by the project. Consequently, surfing impacts have not been quantified to establish recreation benefits but have been analyzed to develop a qualitative understanding of how surfing could potentially be impacted to aid stakeholders. Surf breaks are expected to change in character in those areas where shallow reefs are covered in sand, but the number of surfing opportunities is not expected to change."*

The estimate provided in the Army Corps response letter that less than 10% of total visits to the study area are due to surfers is in conflict with the beach attendance data and survey conducted in Solana Beach in 2009[2]. In this report (data compiled using both beach counting and surveys), at least 26% of beach users are there to surf (see excerpt below from page 3-7).

> "Beach Visitor Survey

---

[1] Carla Chenault Grandy, Gary B. Griggs, July 22 to 26, 2007, Variability of Sediment Supply to the Oceanside Littoral Cell, *Proceedings of Coastal Zone 07, Portland, Oregon,* p 4 Table 2, University of California, Santa Cruz, Earth and Planetary Science Department and Institute of Marine Sciences. http://www.csc.noaa.gov/cz/CZ07_Proceedings/PDFs/Poster_Abstracts/3150.Chenault%20Grandy.pdf Notes 343,000 as the Natural sand input to the cell before channelization and dams.

[2] City of Solana Beach, DRAFT LAND LEASE/RECREATION FEE STUDY REVISED JULY 2010 Prepared by PMC, 6020 Cornerstone Court West, Suite 350, San Diego, California 92121 www.pmcworld.com

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"For one year, starting in July 2008, ~~462~~ 563 beach visitors were interviewed. Over one~~A~~ quarter (~~25~~26%) said that their primary purpose for being at the beach was surfing (Table 3-6). This was closely followed by sunning/lying on the beach (24%) and walking/running on the beach (~~21~~22%)."

TABLE 3-6
PRIMARY PURPOSE FOR BEACH VISIT

Primary Purpose	Percent
Surfing/Water sports	26%
Sunning/lying on beach	24%
Walk/run on beach	22%
People watching	9%
Swimming/play in water	7%
Collecting shells, beachcomb, etc.	5%
Fishing	3%
Special event	3%
Picnic	1%
Total	100%

Source: CIC Research, July 2009

Below are the estimated 2008-9 attendance figures for Solana Beach (Table 3-9, page 3-10 to 3-11). Note the total estimated adult attendance of 101,414.9 of which over 26,446.9 are estimated as surfers.

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TABLE 3-9
ESTIMATED ANNUAL VALUE PER SEGMENT

Segment	AdultVisitorDaysPerYear				ChildrenVisitorDaysPerYear				EstimatedValue@$19.8321.15PerVisitorPerDay			
	Beach	Wading	Surfing	Total	Beach	Wading	Surfing	Total	Beach	Wading	Surfing	Total
4	2,300.4	489.5	2,920.4	5,710.3	425.2	170.1	-	595.3	$48,654	$10,352	$61,767	$120,773
5	3,409.9	440.5	946.3	4,796.7	1,176.4	496.1	-	1,672.5	$72,119	$9,317	$20,014	$101,449
6	1,174.7	195.8	65.3	1,435.7	141.7	255.1	14.2	411.0	$24,845	$4,141	$1,380	$30,366
7	652.6	130.5	97.9	881.0	85.0	70.9	28.3	184.3	$13,803	$2,761	$2,070	$18,634
8	652.6	32.6	114.2	799.4	14.2	14.2	-	28.3	$13,803	$690	$2,415	$16,908
9	685.2	146.8	130.5	962.6	14.2	28.3	-	42.5	$14,493	$3,106	$2,761	$20,359
10	473.1	32.6	32.6	538.4	28.3	-	-	28.3	$10,007	$690	$690	$11,387
11	668.9	65.3	-	734.2	127.6	-	-	127.6	$14,148	$1,380	$-	$15,528
12	212.1	16.3	-	228.4	56.7	14.2	-	70.9	$4,486	$345	$-	$4,831
13	2,088.3	163.2	1,403.1	3,654.6	283.5	14.2	-	297.6	$44,168	$3,451	$29,676	$77,295
15	7,390.8	1,419.4	4,046.2	12,856.3	1,842.6	1,233.1	70.9	3,146.5	$156,315	$30,021	$85,576	$271,911
16	8,516.5	1,908.9	930.0	11,355.3	3,019.0	1,573.3	42.5	4,634.8	$180,124	$40,373	$19,669	$240,165
17	1,223.6	293.7	440.5	1,957.8	269.3	170.1	-	439.4	$25,880	$6,211	$9,317	$41,408
18	1,370.5	375.2	440.5	2,186.2	70.9	212.6	-	283.5	$28,985	$7,937	$9,317	$46,239
19	538.4	277.4	342.6	1,158.4	56.7	127.6	-	184.3	$11,387	$5,866	$7,246	$24,500
20	81.6	81.6	114.2	277.4	28.3	14.2	14.2	56.7	$1,725	$1,725	$2,415	$5,866
21	587.3	32.6	163.2	783.1	42.5	70.9	-	113.4	$12,422	$690	$3,451	$16,563
22	668.9	163.2	114.2	946.3	85.0	42.5	-	127.6	$14,148	$3,451	$2,415	$20,014
23	913.6	114.2	179.5	1,207.3	70.9	70.9	-	141.7	$19,324	$2,415	$3,796	$25,535
24	766.8	114.2	97.9	978.9	28.3	14.2	-	42.5	$16,218	$2,415	$2,070	$20,704
25	1,680.5	228.4	195.8	2,104.7	198.4	70.9	-	269.3	$35,542	$4,831	$4,141	$44,513
26	2,316.8	310.0	587.3	3,214.1	326.0	184.3	-	510.2	$48,999	$6,556	$12,422	$67,978

(table continues on next page)

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Segment	AdultVisitorDaysPerYear				ChildrenVisitorDaysPerYear				EstimatedValue@$19.8321.15PerVisitorPerDay			
	Beach	Wading	Surfing	Total	Beach	Wading	Surfing	Total	Beach	Wading	Surfing	Total
27	2,169.9	424.2	473.1	3,067.2	481.9	411.0	-	892.9	$45,894	$8,972	$10,007	$64,872
28	1,925.2	489.5	587.3	3,002.0	680.3	595.3	-	1,275.6	$40,718	$10,352	$12,422	$63,492
29	1,778.4	440.5	571.0	2,789.9	439.4	510.2	28.3	978.0	$37,612	$9,317	$12,077	$59,006
30	1,468.4	489.5	1,011.5	2,969.4	609.5	453.6	-	1,063.0	$31,056	$10,352	$21,394	$62,802
31	1,811.0	424.2	1,011.5	3,246.7	141.7	241.0	14.2	396.9	$38,302	$8,972	$21,394	$68,668
32	2,072.0	244.7	1,158.4	3,475.1	70.9	170.1	14.2	255.1	$43,823	$5,176	$24,500	$73,499
33	995.2	130.5	1,305.2	2,431.0	155.9	70.9	-	226.8	$21,049	$2,761	$27,605	$51,415
34	881.0	195.8	897.3	1,974.1	113.4	113.4	-	226.8	$18,634	$4,141	$18,979	$41,753
35	571.0	65.3	750.5	1,386.8	70.9	56.7	14.2	141.7	$12,077	$1,380	$15,873	$29,331
36	1,925.2	146.8	701.6	2,773.6	283.5	170.1	-	453.6	$40,718	$3,106	$14,838	$58,661
37	2,153.6	261.0	2,121.0	4,535.6	326.0	155.9	14.2	496.1	$45,549	$5,521	$44,858	$95,928
38	6,232.4	1,337.8	2,121.0	9,691.2	1,715.0	1,431.5	-	3,146.5	$131,815	$28,295	$44,858	$204,969
39	750.5	179.5	375.2	1,035.2	127.6	198.4	14.2	340.2	$15,873	$3,796	$7,937	$27,605
Total	63,107.0	11,861.1	26,446.9	101,414.9	13,606.7	9,425.4	269.3	23,301.4	$1,334,713	$250,862	$559,351	$2,144,926

This data is relevant to data used in the Corps study as we can compare attendance from the Solana Beach survey to data used by the Corps. The data compiled in the Solana Beach report concurs with data provided by the Army Corps Data in their Encinitas Solana Beach Draft Main Report (p 305-306) showing estimated attendance in 2008-2009 as 101,075, which is very close to the more scientifically estimated data from the City of Solana Beach.

"4.13.4 Beach Attendance Estimates

"Table 4.13-1 provides beach attendance estimates compiled for Cardiff State Beach, San Elijo State Beach, and by the Cities of Encinitas and Solana Beach for local beaches. There are four state beaches within the City of Encinitas. Cardiff State Beach and San Elijo State Beach are managed by the California Department of Parks and Recreation. The other two state beaches, Leucadia and Moonlight State Beaches are managed by the City of Encinitas. Beach attendance counts are normally people recreating in the water or on the sand, and at adjacent picnic areas, parking lots, recreation concessions and bike paths. They do not include people that merely transit on bikes or in cars. This is an estimate by lifeguards on duty (USLA 2012)."

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Table 4.13-1 Beach Attendance by Jurisdiction, 2001-2011

Fiscal Year	San Elijo State Beach	Cardiff State Beach	Year	City of Encinitas	City of Solana Beach
2001/02	766,100	1,189,445	2001	3,414,129	850,000
2002/03	801,096	1,315,308	2002	0	0
2003/04	857,860	1,274,876	2003	0	0
2004/05	858,859	1,225,631	2004	-	-
2005/06	996,646	1,715,856	2005	2,502,345	-
2006/07	840,932	1,330,007	2006	-	-
2007/08	1,016,013	2,221,668	2007	2,891,026	0
2008/09	960,683	2,264,552	2008	2,992,331	101,075
2009/10	860,706	1,538,338	2009	3,027,050	202,275
2010/11	973,238	1,392,097	2010	3,440,422	207,300
-	-	-	2011	0	210,500

Source: USACE 2003, USLA 2012 (United States Lifesaving Association) Available at http://www.usla.org/?page=STATISTICS, California Department of Parks and Recreation 2012b

If the data concerning total beach attendance between the Solana Beach report and the Army Corps draft EIS/EIR is so similar, why is the Corps so drastically under-estimating the percentage of beach-goers who go to the beach to surf? This discrepancy in data is another example of how project proponents have been dismissive of the true impacts this project poses to surfing resources and surfers in general. Additionally, the beach-going public is for the most part unaware of the potentially irreversible impacts this long-term project stands to impose. Over the past few months, Surfrider San Diego has been working diligently to inform the beach-going public. Please see this four-minute video, which captures the reactions of local surfers and members of the surf industry to this proposed project. Furthermore, 270 San Diegans submitted letters of support echoing our comments to both cities and the Army Corp of Engineers, and in the last month we have collected more than 200 local signatures on a petition demanding a "locally preferred alternative" to this project that does not trigger the "likely" impacts to our treasured surfing resources.

Please do not hesitate to contact me at 619-246-8881 or Julia@surfridersd.org for more information or with questions.

Best Regards,
Julia Chunn-Heer
Campaign Coordinator, San Diego County Chapter of the Surfrider Foundation
Resident of Encinitas

Jim Jaffee
Advisor, San Diego County Chapter of the Surfrider Foundation
Resident of Solana Beach

Kristin Brinner
Beach Preservation, San Diego County Chapter of the Surfrider Foundation

The Surfrider Foundation is a non-profit grassroots organization dedicated to the protection and enjoyment of our world's oceans, waves and beaches through a powerful activist network. Founded in 1984 by a handful of visionary surfers in Malibu, California, the Surfrider Foundation now maintains over 250,000 supporters, activists and members worldwide. For an overview of the Surfrider Foundation San Diego Chapter's current campaigns, programs and initiatives go to www.surfridersd.org or contact us at info@surfridersd.org or (858) 622-9661.

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Resident of Solana Beach

Attached:
Surfrider's comments submitted in response to the Notice of Preparation (NOP)

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The Washington Post

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Surfonomics quantifies the worth of waves

By Gregory Thomas, Published: August 24, 2012

In 2002, a surfer named Chad Nelsen enlisted an economist at Duke University to help put a price tag on a popular surfing spot on Puerto Rico's northwest coast. Nelsen's idea was novel: to prove that the waves breaking on the beach constituted a multimillion-dollar asset and persuade the local town to take pains to preserve it.

Real estate developers were after another multimillion-dollar asset: the views from the beach, which would be the selling point for three high-rise condominiums they planned to build.

Surfers and environmentalists feared that the construction at Rincon, the village in Puerto Rico, would change the flow of sediment around the beach and bury a reef that created the surf break. Nelsen sought to show that without the reef, there would be no waves, no surfers and, ultimately, a big drop in tourism dollars.

"We found that people were buying second houses there just for the surfing," said Linwood Pendleton, the Duke economist who assisted Nelsen and is a chief economist for the National Oceanic and Atmospheric Administration. "It was contributing literally millions of dollars a year to the local economy."

Rincon and its world-class wave break, discovered by surfers in the late 1960s, embodies a cycle that's as regular as the tides: Surfers trek to remote reaches of the globe in search of the perfect wave. They discover prized beaches. Word gets out. Tourists pile in. Developers seize land and opportunity.

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Construction alters the wave break. The surf loses its edge.

Surf advocates have long argued that Mother Nature is priceless, invoking geological and hydrological mechanics that distinguish the character and appeal of the waves. In a new strategy, Nelsen and a handful of other surf intellectuals are letting go of lofty environmentalist rhetoric and fighting economics with economics.

"Those of us who really love the ocean have an instinct when we see beautiful places like this to think that they're priceless and to think that the commodification of nature, and putting price tags on everything, is the root cause of nature's destruction. ... I think that's actually counterproductive," Jason Scorse, director of the Center for the Blue Economy, said in a TEDx talk in April. Scorse is the author of the book "What Environmentalists Need to Know About Economics" (2010). "When nature is undervalued, we make bad decisions."

Rincon was a rare victory for surfers. The international campaign to protect the wave break, led by the Surfrider Foundation, an advocacy group, blocked the condo proposal and persuaded lawmakers to designate Tres Palmas, the name of the break, as the heart of Puerto Rico's first marine reserve.

And it helped launch the science of "surfonomics."

Intrinsic value in a wave

In March, Nelsen, 42, completed a doctorate of environmental science at UCLA, where he studied the economics of surfing. Surfonomics is an offshoot of natural resource economics that seeks to quantify the worth of waves, both in terms of their value to surfers and businesses and their non-market value — or how much people would be willing to pay not to lose them.

"The assumption is often that surfing is worth zero dollars," said Nelsen, environmental director for the Surfrider Foundation. "It's taken for granted. It's not perceived as being a viable and important source of economics, particularly with decision makers in coastal zone management that we're talking to all the time."

To prove there is intrinsic value in a wave, Nelsen started at the beginning. A report he produced last August tabulates the number of surfers in the country and how much money they shell out for the privilege of riding the waves. After surveying more than 5,000 surfers, Nelsen concluded that about 3.3 million people in the country surf 108 times a year, drive an average of 10 miles per session and contribute at least $2 billion to the U.S. economy annually.

"The report is to demonstrate that, hey, there's a lot of surfers in the U.S. They go to the beach a lot, and they spend a lot of money in these communities," Nelsen said. "Therefore, you should take their interests seriously."

In part, the survey is an effort to shake the stereotype of the shaggy stoner who lives out of a van and doesn't contribute to society. Nelsen calls that misconception "the Spicoli virus" in reference to Sean Penn's iconic surfer-slacker character from the 1982 movie "Fast Times at Ridgemont High." The median surfer these days is 34 and pulls in more than $75,000 a year, according to Nelsen's study.

"Even 10 years ago, the posture was one of trying to dismiss the arguments of these 'crazy surfers,' " said Michael Walther, a coastal engineer in Florida whose research persuaded officials in Monmouth County, N.J., to rethink a beach renourishment plan that would have buried a surf break at Sandy Hook

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in 2001.

Building proposals for a new harbor in Los Angeles, a cruise ship terminal in Australia, a factory in Mexico or a jetty in France don't account for potential damage to surf breaks that bolster nearby communities with tourism dollars. When surfers have spoken up, Nelsen said, their arguments have tended to be passionate but abstract and lacking a concrete link between the building, the break and the local economy. Meanwhile, the argument of real estate developers is more easily couched in economic terms: job creation, revenue and growth.

A simple case study: A world-class surf break at Madeira, an island off the coast of Portugal, suffered a damaging blow when the government installed a seawall in the 1990s. The idea was to defend cliffs against erosion to prepare the area for tourism infrastructure. U.S.-based Save The Waves Coalition objected, saying the wall would make surfing more dangerous. The seawall was built, and surfers stopped visiting en masse. Save The Waves Founder Will Henry thinks that they lost the fight because they weren't properly equipped.

"If you talk in dollars, that's a language the government speaks," Henry said. "We didn't have any real data at the time to say, 'This asset is going to be worth X amount of dollars over the next 10 years.' It just didn't exist."

Save The Waves has since produced two studies evaluating the economic value of surf breaks, in partnership with academics at Stanford University, the University of Oregon and the University of Hawaii. Mavericks, an epicenter of big-wave surfing in Half Moon Bay, Calif., is worth $23.9 million annually in a report produced in 2010. A wave at Mundaka, off the coast of southern Spain, brings in about $4.5 million to the local economy each year, according to a 2007 study.

Economists calculate the value of a surfable wave by tabulating visiting expenses of surfers and surf spectators. Some of the indicators they watch: distance traveled, visits per year, time taken off work, length of stay, drive time, gas money, parking fees, food breaks, gear rentals. The theory is that such figures represent how much money a person is willing to part with for the experience. At Mavericks, for example, economists calculated that more than 420,000 people, not just surfers, visit each year to watch the waves and spend an average of $56.70 per visit.

'Waves are our Yosemite Valleys'

The practice of protecting natural resources for public use is as old as Yellowstone, the country's first national park. It was established in 1872 "for the benefit and enjoyment of the people," according to the statute signed by President Ulysses S. Grant. The field of natural resource economics is a natural outgrowth of the same idea. It began as a means of quantifying value in mining, fishing and timber industries, and it provides a method of assessing dollar values for travel and activities around places where people recreate. The methodology gives economists tools to gauge how much people are willing to pay to go skiing or whale-watching or to hike the Appalachian Trail.

"These waves are our Yosemite Valleys," Nelsen said. He believes they deserve the same considerations and protections. "We think of these as national treasures."

The same way national parks set use restrictions on select areas, surfers are beginning to induct unique wave breaks into what they call World Surfing Reserves. The designation was created in 2009 by Save The Waves and modeled on an Australian organization called National Surfing Reserves that has had success coordinating protection plans with government officials for about a dozen surf breaks. What is

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often lacking is the financial element — key to swaying decision makers, said Neil Lazarow, an economist who evaluated surfing on Australia's famed Gold Coast.

The movement to apply economics to environmentalism got a boost last year from the President's Council of Advisors on Science and Technology. In a report issued to the White House, the council recommends investing in research surrounding "environmental capital," or non-consumptive natural resources that people will pay to enjoy. The idea that self-sustaining resources such as waves don't attract dollars simply because you can't count people moving through a turnstile is outdated thinking, said Pendleton, the Duke economist.

"We've tended to focus on big industrial uses of the outdoors while forgetting about these much more sustainable uses of the outdoors, especially recreation," Pendleton said. "And we do it at our own economic peril."

Economic studies of activities like surfing are critical when economists are calculating damage assessments in the wake of environmental disasters, such as the Deepwater Horizon oil spill in the Gulf of Mexico.

"Unfortunately, we've been performing a lot of crisis-driven studies where we are figuring things out after the fact," said Charles Colgan, chief economist for the National Ocean Economics Program, a project of the Monterey Institute of International Studies. "We don't want to wait for the next oil spill or hurricane to figure out what's going on. It's a costly way to do things."

As industries such as commercial fishing have taken a plunge, tourism has come to account for a larger chunk of the ocean economy. Commercial fishing produced slightly less than $5.7 billion in 2009 while coastal tourism and recreation accounted for more than $61 billion that year, according to NOAA reports.

Colgan thinks the rise in coastal tourism is partly because of the economic downturn driving people to cheaper housing inland. Because it is too expensive to live where they can surf, people are traveling farther to do so.

"As growth is shifting inland and people are traveling to the coast from further inland, the idea of surfing as just a cultural issue on the coast needs to be shifted," Colgan said. "It's not about that one stretch of beach. It affects a larger geographical area."

A risky proposition

Surf economists admit that surfonomics is a risky proposition. The few reports documenting the value of waves have not, so far, been challenged or scrutinized by developers. But what if, for example, a wave worth $24 million annually is pitted against a new hotel that would bring in $30 million a year, Surfers Against Sewage, another advocacy group, says in a 2010 report on ocean resources. "Are the developers then in a position to 'buy' that wave from the surfers?"

"That's everyone's fear, especially when you start stacking up recreation against offshore oil," Pendleton said. "How can we ever compete?"

Scorse, the marine policy advocate, is in the final stages of a study that he said proves that surfing contributes potentially hundreds of millions of dollars — not in tourism, but in property tax revenue. He said his research, which he expects to complete this year, shows that houses within walking distance of

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surf spots in Santa Cruz, Calif., are worth far more than coastal homes farther from great wave breaks.

Nelsen, for his part, isn't worried about the implications.

"We're not arguing that the world is one big cost-benefit analysis," he said. "You could probably make more money on Yosemite than you make today if you filled it with condos. But no one is arguing that we should. Surfonomics is just one measure of the value of these resources. It's not the only measure."

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CNNMoney
A Service of CNN, Fortune & Money

Surfonomics 101

June 5, 2013: 9:37 AM ET

A good break has a value that ripples out into the surrounding community -- but calculating that cost can be tricky.

By Paul Kvinta

This break is worth something. But how much?

FORTUNE -- One glorious Sunday morning last fall, economist Jason Scorse was strolling down 41st Avenue in Santa Cruz, Calif., dodging surfers. They were everywhere -- bustling in and out of surf shops, gearing up in parking lots behind their SUVs, schlepping boards down the steep steps to the world-class breaks beneath Pleasure Point. Scorse lives to surf but not on weekends. Too crowded. Still, the 44-year-old college professor -- erudite, bald, and with a neatly trimmed beard -- in many ways represents the face of surfing in America today. "The sport has lost the image of being a thing for hippies and stoners, of being kinda ragtag and stupid," he says. "Surfing today is the Silicon Valley CEO. It's the brain surgeon. It's the super-athlete. It's dad, mom, and the kids." It's also significant business.

Over the last decade the number people in America who surf at least once a year has increased by nearly half to 2.6 million (more than a million surf at least eight times annually). The median surfer these days earns $75,000 a year, and in 2010 some $6.3 billion was spent on boards, wetsuits, sunglasses, and surf-related clothing and accessories. With women increasingly joining the lineup (they comprise 36% of American surfers) and with the sport swelling in Europe, China, and Korea, some analysts predict that the global surf industry will generate more than $13 billion by 2017. That number doesn't include revenue generated by the growing international surf travel business. Companies like Santa Monica-based Waterways Travel specialize in sending well-heeled surfers on two-week safaris to hard-to-reach surf breaks in places like Peru, Indonesia, and Fiji for up to $12,000.

But Scorse says these numbers tell only part of the story. As director of the **Center for the Blue Economy at the Monterey Institute** and author of the book *What Environmentalists Need to Know About Economics*, he and a handful of other surf-minded economists are pioneering "**surfonomics**," a field that attempts to show that the waves themselves have economic value. From the sweeping vantage atop Pleasure Point, Scorse points out The Hook, Sharks, Privates, and several other breaks crowded with surfers. "All those guys are surfing for free," he says. "No one's taking any tickets. But those waves still have an economic value, and we can measure that in several different ways."

MORE: **Barbie wants to make it big in Mumbai**

Surfonomics was born on the northwest coast of Puerto Rico in 2002 when surfers feared that a proposed beachfront condo development would spoil the hydraulics of the 30-foot waves that had made the sleepy town of Rincon legendary. Determined to do battle with more than just emotional arguments, a trio of environmental groups commissioned a study showing that tourism -- most of it surf-related -- generated at least $52 million a year for Rincon. Armed with this price tag, the surfers successfully blocked the condo project. In 2007 a similar study concluded that the surf break at Mundaka on the coast of southern Spain generated $4.5 million annually for the local economy.

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These studies revealed a market value for the waves. But waves also have a measurable non-market value that benefits surfers. "It's a hidden value, because no money changes hands," Scorse says. "Basically you're trying to determine what people would pay to surf if someone was taking tickets. Or you're trying to determine what surfers would pay not to lose a wave." Economists capture this with "travel cost studies" that measure things like the distance surfers and spectators travel to a surf break, the number of times they visit, the amount of time they take off work, and the amount they spend on gas. A 2010 study valued the big-wave break at Mavericks off Half Moon Bay, Calif., at $23.9 million after determining that 420,000 people visit each year and spend an average of $56.70 per visit. A 2012 study of the break at Trestles in San Diego County found that 300,000 visitors spent an average of $80 a visit, for a total valuation of $24 million.

But Scorse says these studies are just nibbling around the edges. The full value of surf breaks, he insists -- the Big Kahuna, as it were -- is capitalized into real estate. "See these houses," he says, nodding towards the multi-million-dollar homes along Santa Cruz's Pleasure Point. "The irony of travel cost studies is that when you ask the guy who spent $2 million on a house here, 'How far did you travel?' 'Did you use your car?' 'Did you buy gas?' You get zero for all that. He can walk right out his front door and surf. So those studies aren't picking up the full value." What Scorse wanted to know was this: If he woke up tomorrow and the surf was gone in Santa Cruz, would all this real estate be worth what it is?

MORE: One reason people love to hate Zynga

In a study he conducted last year, he compared three beachfront neighborhoods in Santa Cruz, two within walking distance to surfing, one not. After controlling for several variables -- proximity to the beach, ocean views, home characteristics, neighborhood amenities -- he found that a house next to a surf break is valued approximately $106,000 more than a comparable house a mile away. Given the value of coastal real estate in California, even if just a tiny fraction can be attributed directly to surfing, that's huge money. "Then there's the tax revenue from that," Scorse says. "Property tax is around one-and-a-half percent in California, so it's not a tremendous amount, but if you're talking hundreds of millions of dollars in real estate, that's millions of dollars a year in perpetuity. It's not nothing. It's not trivial."

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Th11a

ADDENDUM TO COMMISSION PACKET FOR ENERGY, OCEAN RESOURCES, and FEDERAL CONSISTENCY

For Thursday, November 14, 2013

Item No. Th11a

CD-0203-13 (U.S. Army Corps of Engineers

- Correspondence

CALIFORNIA COASTAL COMMISSION
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Th 11a

ADDENDUM

November 8, 2013

TO: Coastal Commissioners and other Interested Parties

FROM: Mark Delaplaine, Manager, Energy, Ocean Resources and Federal Consistency Division
Larry Simon, Federal Consistency Coordinator

SUBJECT: **Addendum to Item Th 11a**, Consistency Determination CD-0203-13 (U.S. Army Corps of Engineers, Encinitas and Solana Beach Coastal Storm Damage Reduction Project, San Diego County)

Add the following to **Appendix A** (Substantive File Documents):

17. Coastal Development Permit CDP 6-11-018 (SANDAG, Regional Beach Sand Project II).

18. SANDAG, Regional Beach Sand Project II Final EIR, 2011.

19. SANDAG, 2012 Regional Beach Monitoring Program, Annual Report, September 2013.

20. City of Encinitas, Encinitas-Solana Beach Coastal Storm Damage Reduction Project Supplemental Surfing Change Analysis, October 2013.

This Addendum also provides comment letters on the proposed project received since publication of the October 31, 2013, staff report and through noon on November 8, 2013.

November 8, 2013

Mary Shallenberger
Commission Chair
California Coastal Commission
P.O. Box 354
Clements, CA 95227-0354

RE: U.S. Army Corps of Engineers 50-Year Coastal Storm Damage Reduction and Beach Nourishment (Consistency Determination No. CD-0203-13)

Dear Ms. Shallenberger,

On behalf of the Los Peñasquitos Lagoon Foundation (LPLF), I would like to once again express deep concern over the 50-year Coastal Storm Damage Reduction and Beach Nourishment project (Project) proposed by the U.S. Army Corps of Engineers for the City of Solana Beach and City of Encinitas. Though the revised Project submitted to Coastal Commission has reduced the amount of sand to be placed along the beaches of Encinitas and Solana Beach, the proposed volumes under Alternatives EN-1B and SB-1B still pose a significant threat to the health of Los Peñasquitos Lagoon (LPL) and surrounding communities by cutting off tidal mixing due to increased sediment input into the Lagoon's ocean inlet and elevated beach profiles caused by the north-to-south movement of sand that occurs naturally within the Oceanside Littoral Cell. While the Project applicants have proposed additional monitoring at Torrey Pines State Beach to help identify impacts to LPL's inlet from the revised Project, the lack of an established protocol and adequate timeline to mitigate these impacts could have devastating impacts to the Lagoon's valuable resources and expose nearby communities and parks visitors to West Nile Virus and Equine Encephalitis from *Culex tarsalis*, a freshwater mosquito whose population increases exponentially during extended inlet closures due to perennial freshwater inputs from the Lagoon's urbanized watershed. For these reasons, LPLF strongly opposes the revised Project or any version of this project that does not provide a more adaptive approach beach nourishment (e.g. placing smaller volumes of sand on the receiving sites) and a realistic approach to mitigating impacts to Los Peñasquitos Lagoon (e.g. established mechanisms and timeline needed to avoid impacts to the Lagoon and public safety). For these reasons, LPLF argues that the

revised Project does not meet Federal Consistency and violates Sections 30230, 30231, and 30233 of the Coastal Act.

Recent beach nourishment efforts conducted in 2012 by SANDAG resulted in a massive amount of sand deposited within the inlet at LPL and along Torrey Pines State Beach. As a result, the Lagoon experienced multiple, extended inlet closures that greatly impacted salt marsh vegetation that include 26 sensitive plant species, resulted in deaths of aquatic species, severely degraded water quality, impaired nesting and foraging of listed bird species, and exposed nearby community and park visitors to mosquitos that can transmit West Nile Virus and Equine Encephalitis to human populations. The Army Corp's revised project currently under review by the Commission will still place volumes of sand in an order of magnitude greater than SANDAG efforts within the same general locations. LPLF feels that the proposed project is flawed on several fronts that include:

1. The project does not adequately mitigate for down-shore impacts to Los Peñasquitos Lagoon, located south of the project area, and is, therefore, in violation of Coastal Act Sections 30230, 30231, and 30233.

2. The Army Corps use of National Economic Development (NED) to justify the economic value of the revised Project is not comprehensive in assessing potential costs associated with project impacts.

3. The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon and avoid significant threats to public safety from West Nile Virus and Equine Encephalitis.

Designated as a Marsh Natural Preserve and a Critical Coastal Area (CCA #77) by the State, Los Peñasquitos Lagoon (LPL) is afforded the highest level of protection, as it is one of few remaining salt marshes in the southern California. Currently listed as a 303-d Impaired Waterbody under the Clean Water Act due to sediment, Los Peñasquitos Lagoon contains Environmentally Sensitive Habitat Areas (ESHA) that support species endemic to salt marsh lagoons that include three listed birds (Light-Footed Clapper Rail, Western Snowy Plover and Beldings Savannah Sparrow) and 26 sensitive plant species. The Lagoon also serves as an important refuge for migratory birds following the Pacific Flyway and is the closest coastal lagoon to the only Areas of Special Biological Significance (ASBS) located within San Diego County (La Jolla State Marine Conservation Area and the San Diego-Scripps State Marine Conservation Area).

The Project does not adequately mitigate down-shore impacts to coastal lagoons south of the project area and is, therefore, in violation of Coastal Act Sections 30230, 30231, and 30233.

Termed the Oceanside Littoral Cell, sediment within the nearshore area in North County San Diego follows a southerly migration due to prevailing long-shore current and wave direction that pushes sand from Oceanside to the submarine canyons located south of Los Peñasquitos Lagoon. Based on this scientific fact, it is hard to understand why the Army Corps feasibility study concluded that sediment placed on the beaches of Encinitas and Solana Beach would remain within their proposed project area and not affect Los Peñasquitos Lagoon. While it was expressed within the report that the models indicated no impacts beyond the project area, the report also stated "inherent uncertainties associated with estimating impacts based on model predictions." Clearly there is a large degree of uncertainty as to the overall impacts to Los Peñasquitos Lagoon and offshore areas.

The Project, as now proposed, would now place up to 1,270,000 cubic yards (cy) of sand on beaches between Encinitas and Solana Beach with additional 610,000 cy placed in subsequent years. Viewed within the context of previous beach nourishment under Regional Beach Sand Projects I & II that greatly impacted the inlet at LPL, the amount of sand proposed for beach nourishment under the revised Project is massive. The 1,270,000 cy of sand proposed for initial placement on beaches in Encinitas and Solana Beach represents an increase by two orders of magnitude of sand volume placed on north county beaches during annual maintenance activities (e.g. lagoon inlet maintenance) and an order of magnitude increase beyond the 321,000 cubic yards of sand placed by SANDAG in November 2012 within Army Corps' proposed project area under Regional Beach Sand Project II (RBSP II). Several lines of evidence have linked beach nourishment efforts conducted by SANDAG (i.e. Regional Beach Sand Projects I & II) to increased sand deposition within the Los Peñasquitos Lagoon inlet and elevated beach profiles along Torrey Pines State Beach. The massive amount of sand within the Lagoon inlet associated with RBSP II required two separate efforts between May 2013 and June 2013 to mechanically remove ocean-borne sediments to restore connectivity with the ocean and allow impounded waters to drain. Estimated volume of sand removed from LPL during these two maintenance efforts was 40,000 cy and it is anticipated that a third maintenance effort may be needed before the Spring of 2014 since approximately 20,000 cy of sand still occlude the inlet area. This represents a 41% increase in the amount of sand removed annually from the Lagoon inlet between 2008-2012. Grain size analysis performed at the LPL inlet in May 2013 indicated a greater proportion of coarse to moderately coarse material within the Lagoon than in previous years, which matches the material type used by SANDAG for beach nourishment in November 2012 during RBSP II. Furthermore, beach elevations at Torrey Pines State Beach north of the LPL inlet were approximately 3-5 feet higher than in the previous 10 years. Elevated beach profiles reduce tidal mixing within lagoon channels since the Lagoon is cut

off from ocean waters for most of the tidal cycle. Furthermore, shoaling processes move sand off the beach and back into the lagoon inlet, further reducing and often negating tidal mixing within Los Peñasquitos Lagoon. Photos taken at Los Peñasquitos Lagoon in May 2013 and June 2013, as well as beach profile elevations using LIDAR are once again provided in Exhibit A (of the original comment letter submitted to the Coastal Commission in July 2013) to demonstrated elevated beach profiles (please note that the inlet had been excavated prior to the 5/24/2013 date in the LIDAR profile, but quickly closed again requiring a second maintenance effort in June 2013).

The Army Corps use of National Economic Development (NED) to justify the economic value of the project is not comprehensive in assessing potential costs associated with project impacts.

The applicants fail to comprehensively evaluate the actual costs associated with the revised Project by not internalizing costs associated with impacts to public health and safety, nor the increased costs associated with removing the additional sand from the inlet at Los Peñasquitos Lagoon. Army Corps use of the National Economic Development (NED) to justify the selected project alternative ignores costs associated with multiple efforts to excavate lagoon inlets and the value of human life, since it could result in human cases of brain encephalitis caused by the vector-borne West Nile Virus and Equine Encephalitis. Current costs associated with inlet maintenance at Los Peñasquitos Lagoon averages $120,000 per effort. Funding for this effort is extremely hard to procure as it is often seen as a reoccurring maintenance effort by most, if not all, potential funding sources. Should the Army Corps project proceed as currently depicted, this cost could easily triple at the very least, given what has occurred as a result of SANDAG's beach nourishment efforts in 2012. This would place an undue economic burden on LPLF, California State Parks and the City of San Diego to maintain the inlet at LPL that range from $360,000 to $500,000 per year over the duration of 50 years. This would incur a cost of $18,000,000 to $25,000,000. Were these costs included in the determination of NED?

While the applicant is quick to point out potential costs to infrastructure and private property for any alternative besides EN-1A and SB-1A, which were discarded under the revised Project in favor of EN-1B and SB-1B, it fails to account for costs to infrastructure and private property due to prolonged inlet closures at LPL. Both the industrial parks located within Sorrento Valley, just east of LPL, and surrounding coastal communities would be highly vulnerable to flooding from impounded waters and storm runoff should the inlet close for an extended period of time due to the increased volume of sand within the LPL inlet from downshore movement of sand placed on the beaches of Solana Beach and Encinitas. Sorrento Valley contains many of the regions top

Biotechnology companies who compete worldwide in a highly competitive and time sensitive market and provide a substantial tax base for the City of San Diego. Were the costs associated with both temporary and permanent loss of business and damages to residential areas and businesses that border LPL included in the determination of NED?

When describing the viability of each project alternative, the Army Corps of Engineers fails to accurately assess the cost/benefit of "managed retreat" alternative or cite recent scientific literature that has examined beach nourishment needs and benefits along the California coast within the context of predicted sea level rise scenarios. Using Torrey Pines State Beach as a reference site for San Diego beaches, a recent study conducted by the California Department of Boating and Waterways in conjunction with San Francisco State University concluded that managed retreat would be the best alternative, since benefits associated large beach nourishment efforts would be ephemeral at best while remaining financially burdensome and result in impacts to valuable habitats (Phillip King *et al.* 2011, revised in 2013. *The Economic Costs of Sea-Level Rise to California Beach Communities*). Have the applicants considered these findings or other relevant scientific literature?

LPL is currently a known location of mosquito breeding habitat in San Diego County for *Culex tarsalis,* the species known to transmit West Nile Virus (WNV) and Equine Encephalitis in southern California. *C. tarsalis* is a freshwater mosquito that currently breeds in LPL due to the presence of perennial freshwater inputs from the urbanized watershed. Documented cases of WNV have occurred in both wild and sentinel avian populations, as well as within human populations located near the Lagoon. Open space, urban, and commercial areas that contain sensitive receptors (elderly and young children) surround the Lagoon, presenting a higher risk of complications associated with West Nile Virus infection in human populations. The County of San Diego's Department of Environmental Health has attempted to control populations and breeding habitat of *C. tarsalis* within the Lagoon through methods that include aerial spraying of larvicide over 70 acres in 2011. However, these efforts have not proved successful in reducing overall populations of mosquitos. During prolonged inlet closures, populations of *C. tarsalis* can rapidly increase to the point that local residents cannot leave their houses in the morning and early evening hours. WNV and Equine Encephalitis can lead to brain encephalitis in humans that can leave permanent neurological damage and, in some cases, result in fatalities. In 2010 the Environmental Protection Agency placed the value of human life at $9.1 million per individual. Was this cost included in the determination of NED?

The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon and avoid significant threats to public safety from West Nile Virus and Equine Encephalitis.

While the Project applicant has proposed additional monitoring transects at the inlet of LPL, it fails to provide a detailed, or even conceptual, approach nor mechanisms to determine project impacts and mitigate them in a timely manner needed to protect the resources of LPL and protect the public from West Nile Virus and Equine Brain Encephalitis. Prolonged inlet closures at LPL can be devastating to both aquatic and terrestrial flora and fauna as dissolved oxygen and salinity levels can drop precipitously within a couple weeks. Furthermore, populations of *Culex tarsalis* can explode exponentially due to impounded freshwater within the Lagoon, as recently occurred during the last prolonged inlet closure which could have exposed both local residents and park visitors to West Nile Virus and Equine Encephalitis. Based on this, LPLF is deeply concerned should the Project receive Federal Consistency due to the lack of a protocol and timeline for mitigating impacts to the inlet at LPL (i.e. mechanically excavating the inlet) and establishing funding and mechanisms to release the funding in a timely manner to avoid impacts to LPL and threats to public health and safety. These concerns are just given the fact that the Project's monitoring program described for assessing shoreline impacts would require a 2 year period before determining Project impacts. The approximately 2-month closure at LPL in the Spring of 2013 due in part to elevated sand volumes caused by RSBP II was devastating to both aquatic and terrestrial species endemic to LPL. Aside from nuisance smells and increased vector populations that impacted local businesses and residents, the prolonged closure resulted in massive fish kills, loss of recruitment of the endangered Belding's savannah sparrow due to flooding of nesting habitat, and impacts to native salt marsh vegetation due to leaching of salt from lagoon soils. Populations of *Culex tarsalis* increased exponentially during this 2-month closure to the point that local residents, businesses and park visitors were impacted (as evidenced by the situation being highlighted in local news). Fortunately, both West Nile Virus and Equine Encephalitis were not detected in the Lagoon and the inlet was successfully opened before conditions became more conducive to the presence and spread of these viruses. Based on this, one can only imagine the devastation to Lagoon resources and risk to public health/safety should the inlet remained closed for 2 years due to lack of funding needed to removed 2 to 3 times that volume of sand that normally occludes the inlet at LPL.

Based on these points, LPLF requests that the Coastal Commission add, at the very least, the following additional conditions to the Project for Federal Consistency Determination No. CD-0203-13:

1. Project applicants (Army Corps, City of Encinitas and City of Solana Beach) will work with LPLF, California State Parks and Coastal Commission staff to establish and implement a monitoring and mitigation program at Los Peñasquitos Lagoon and Torrey Pines State Beach prior to any beach nourishment activities.

2. Mitigation funding will be set aside to pay for inlet maintenance at Los Peñasquitos Lagoon and made available as needed, since inlet closures beyond 2 weeks can be catastrophic for Lagoon resources and expose local residents and park visitors to West Nile Virus and Equine Encephalitis.

    a. Funding will be provided to LPLF for inlet maintenance efforts that include heavy equipment with operators, elevation surveys, permit compliance and reporting.

    b. Funding will be provided to LPLF to maintain inlet maintenance permits through the duration of the 50-year project.

    c. Funding will be set aside prior to beach nourishment activities to guarantee its availability.

Since its creation in 1983, the LPLF has worked closely with the Coastal Commission and other resource agencies to protect and preserve this valuable coastal resource. The Foundation implores the Coastal Commission to continue its dedication to protect Los Peñasquitos Lagoon and work with LPLF and the Army Corps to assure that beach nourishment efforts do not impact this State Marsh Preserve and Critical Coastal Area. Please contact me directly for more information and future coordination - (760) 271-0574 or by email at: mikehastings1066@gmail.com. I have included our previous letter for consideration, including photos in Exhibit A since both are still relevant to the Project and it potential impacts to Los Peñasquitos Lagoon and the public.

Regards,

Mike Hastings, Executive Director

Los Peñasquitos Lagoon Foundation

Cc:

Sherri Lightner, Councilmember for District One, City of San Diego

Dave Roberts, Supervisor for District 3, County of San Diego

Clay Phillips, San Diego Coast District Superintendent, California State Parks

Lee McEachern, San Diego District, Coastal Commission

July 8, 2013

Mary Shallenberger
Commission Chair
California Coastal Commission
P.O. Box 354
Clements, CA 95227-0354

RE: U.S. Army Corps of Engineers 50-Year Coastal Storm Damage Reduction and Beach Nourishment (Consistency Determination No. CD-003-13)

Dear Ms. Shallenberger,

On behalf of the Los Peñasquitos Lagoon Foundation (LPLF), I would like to express deep concern over the 50-year Coastal Storm Damage Reduction and Beach Nourishment project proposed by the U.S. Army Corps of Engineers for the City of Solana Beach and City of Encinitas. The project poses a significant threat to the health of Los Peñasquitos Lagoon (LPL) by cutting off tidal mixing due to increased sediment input into the Lagoon's ocean inlet and elevated beach profiles caused by the north-to-south movement of sand that occurs naturally within the Oceanside Littoral Cell. Recent beach nourishment efforts conducted in 2012 by SANDAG resulted in a massive amount of sand deposited within the inlet at LPL and along Torrey Pines State Beach. As a result, the Lagoon experienced multiple, extended inlet closures that greatly impacted salt marsh vegetation that include 26 sensitive plant species, resulted in deaths of aquatic species, severely degraded water quality, impaired nesting and foraging of listed bird species, and exposed nearby community and park visitors to mosquitos that can transmit West Nile Virus and Equine Encephalitis to human populations. The Army Corp's project currently under review by the Commission will place volumes of sand in an order of magnitude greater than SANDAG efforts within the same locations. LPLF feels that the proposed project is flawed on several fronts that include:

1. The project ignores down-shore impacts to coastal lagoons south of the project area.

2. The Army Corps use of National Economic Development (NED) to justify the economic value of the project is not comprehensive in assessing potential costs associated with project impacts.

3. The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon.

Designated as a Marsh Natural Preserve and a Critical Coastal Area (CCA #77) by the State, Los Peñasquitos Lagoon (LPL) is afforded the highest level of protection, as it is one of few remaining salt marshes in the southern California. Currently listed as a 303-d Impaired Waterbody under the Clean Water Act due to sediment, Los Peñasquitos Lagoon contains Environmentally Sensitive Habitat Areas (ESHA) that support species endemic to salt marsh lagoons that include three listed birds (Light-Footed Clapper Rail, Western Snowy Plover and Beldings Savannah Sparrow) and 26 sensitive plant species. The Lagoon also serves as an important refuge for migratory birds following the Pacific Flyway and is the closest coastal lagoon to the only Areas of Special Biological Significance (ASBS) located within San Diego County (La Jolla State Marine Conservation Area and the San Diego-Scripps State Marine Conservation Area).

The Project Ignores Down-Shore Impacts To Coastal Lagoons South Of The Project Area.

Termed the Oceanside Littoral Cell, sediment within the nearshore area in North County San Diego follows a southerly migration due to prevailing long-shore current and wave direction that pushes sand from Oceanside to the submarine canyons located south of Los Peñasquitos Lagoon. Based on this scientific fact, it is hard to understand why the Army Corps feasibility study concluded that sediment placed on the beaches of Encinitas and Solana Beach would remain within their proposed project area and not affect Los Peñasquitos Lagoon. While it was expressed within the report that the models indicated no impacts beyond the project area, the report also stated "inherent uncertainties associated with estimating impacts based on model predictions." Clearly there is a large degree of uncertainty as to the overall impacts to Los Peñasquitos Lagoon, which is not listed as one of the coastal lagoons to be monitored under the proposed project.

The project, as proposed, would place up to 1,640,000 cubic yards (cy) of sand on beaches between Encinitas and Solana Beach with additional sand (between 280,000 cy to 420,000 cy) placed in subsequent years. This represents an increase by two orders of magnitude of sand volume placed on north county beaches during annual maintenance activities (e.g. lagoon inlet maintenance) and an order of magnitude increase beyond the 321,000 cubic yards of sand placed by SANDAG in November 2012 within Army Corps' proposed project area. Several lines of evidence have linked beach nourishment efforts conducted by SANDAG to increased sand deposition within the Los Peñasquitos Lagoon inlet and elevated beach profiles along Torrey Pines State Beach. The

massive amount of sand within the Lagoon inlet required two separate efforts between May 2013 and June 2013 to mechanically remove ocean-borne sediments to restore connectivity with the ocean and allow impounded waters to drain. Estimated volume of sand removed from LPL during these two maintenance efforts was 40,000 cy and it is anticipated that a third maintenance effort will be needed before the Fall of 2013 since approximately 20,000 cy of sand still occlude the inlet area. This represents a 41% increase in the amount of sand removed annually from the Lagoon inlet between 2008-2012. Grain size analysis performed at the LPL inlet in May 2013 indicated a greater proportion of coarse to moderately coarse material within the Lagoon than in previous years, which matches the material type used by SANDAG for beach nourishment in November 2012. Furthermore, beach elevations at Torrey Pines State Beach north of the LPL inlet were approximately 3-5 feet higher than in the previous 10 years. Elevated beach profiles reduce tidal mixing within lagoon channels since the Lagoon is cut off from ocean waters for most of the tidal cycle. Furthermore, shoaling processes move sand off the beach and back into the lagoon inlet, further reducing and often negating tidal mixing within Los Peñasquitos Lagoon. Photos taken at Los Peñasquitos Lagoon in May 2013 and June 2013, as well as beach profile elevations using LIDAR are provided in Exhibit A to demonstrated elevated beach profiles (please note that the inlet had been excavated prior to the 5/24/2013 date in the LIDAR profile, but quickly closed again requiring a second maintenance effort in June 2013).

The Army Corps use of National Economic Development (NED) to justify the economic value of the project is not comprehensive in assessing potential costs associated with project impacts.

The Army Corps use of the National Economic Development (NED) to justify the selected project alternative ignores costs associated with multiple efforts to excavate lagoon inlets and the value of human life, since it could result in human cases of brain encephalitis caused by the vector-borne West Nile Virus and Equine Encephalitis. Current costs associated with inlet maintenance at Los Peñasquitos Lagoon averages $120,000 per effort. Funding for this effort is extremely hard to procure as it is often seen as a reoccurring maintenance effort by most, if not all, potential funding sources. Should the Army Corps project proceed as currently depicted, this cost could easily triple at the very least, given what has occurred as a result of SANDAG's beach nourishment efforts in 2012. This would place an undue economic burden on LPLF and California State Parks to maintain the inlet at LPL that range from $360,000 to $500,000 per year over the duration of 50 years. This would incur a cost of $18,000,000 to $25,000,000. Were these costs included in the determination of NED?

LPL is currently a known location of mosquito breeding habitat in San Diego County for *Culex tarsalis,* the species known to transmit West Nile Virus (WNV) and Equine Encephalitis in southern California. *C. tarsalis* is a freshwater mosquito that currently breeds in LPL due to the presence of perennial freshwater inputs from the urbanized watershed. Documented cases of WNV have occurred in both wild and sentinel avian populations, as well as within human populations located near the Lagoon. Open space, urban, and commercial areas that contain sensitive receptors (elderly and young children) surround the Lagoon, presenting a higher risk of complications associated with West Nile Virus infection in human populations. The County of San Diego's Department of Environmental Health has attempted to control populations and breeding habitat of *C. tarsalis* within the Lagoon through methods that include aerial spraying of larvicide over 70 acres in 2011. However, these efforts have not proved successful in reducing overall populations of mosquitos. During prolonged inlet closures, populations of *C. tarsalis* can rapidly increase to the point that local residents cannot leave their houses in the morning and early evening hours. WNV and Equine Encephalitis can lead to brain encephalitis in humans that can leave permanent neurological damage and, in some cases, result in fatalities. In 2010 the Environmental Protection Agency placed the value of human life at $9.1 million per individual. Was this cost included in the determination of NED?

The proposed monitoring and mitigation program is incomplete and not developed in a manner that would identify and offset impacts to Los Peñasquitos Lagoon.

LPLF urges the Coastal Commission to augment the conditions proposed for monitoring and mitigation for the project to meet Federal Consistency requirements since the current conditions suggested by the Commission will not protect Los Peñasquitos Lagoon (LPL) and the public. Given the assumption that no impacts with occur outside of the project area, Army Corps fails to identify potential impacts to the LPL or establish a method to mitigate these impacts. Furthermore, monitoring data collected by SANDAG under their Regional Beach Sand Project II (RBSP II) is insufficient in assessing potential impacts to LPL since established survey transects at Torrey Pines State Beach for RBSP II are located south of the Lagoon inlet and will not provide useful data in assessing the project's potential impacts with regard to shoaling at the inlet and deposition within LPL. Based on these points, LPLF requests that the Coastal Commission add, at the very least, the following additional conditions to the project for Consistency Determination No. CD-003-13:

1. Army Corps will work with LPLF and California State Parks to establish and implement a monitoring program at Los Peñasquitos Lagoon and Torrey Pines State Beach to characterize baseline conditions

and identify potential impacts to the Lagoon inlet from beach nourishment efforts conducted in Solana Beach and Encinitas.

   a. Funding for the monitoring program will be provided by Army Corps and conducted in coordination with LPLF and the Scripps Institute of Oceanography.

   b. Monitoring will be conducted on a monthly basis and following events of large surf and/or storm surges.

2. Mitigation funding will be set aside to pay for inlet maintenance at Los Peñasquitos Lagoon and made available as needed, since inlet closures beyond 2 weeks can be catastrophic for Lagoon resources and expose local residents and park visitors to West Nile Virus and Equine Encephalitis.

   a. Funding will be provided to LPLF for inlet maintenance efforts that include heavy equipment with operators, elevation surveys, permit compliance and reporting.

   b. Funding will be provided to LPLF to maintain inlet maintenance permits through the duration of the 50-year project.

   c. Funding will be set aside prior to beach nourishment activities to guarantee its availability.

Since its creation in 1983, the LPLF has worked closely with the Coastal Commission and other resource agencies to protect and preserve this valuable coastal resource. The Foundation implores the Coastal Commission to continue its dedication to protect Los Peñasquitos Lagoon and work with LPLF and the Army Corps to assure that beach nourishment efforts do not impact this State Marsh Preserve and Critical Coastal Area. Please contact me directly for more information and future coordination - (760) 271-0574 or by email at: mikehastings1066@gmail.com.

Regards,

Mike Hastings

Mike Hastings, Executive Director

Los Peñasquitos Lagoon Foundation

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

Figure 1. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 14, 2013.

Figure 2. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 14, 2013.

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

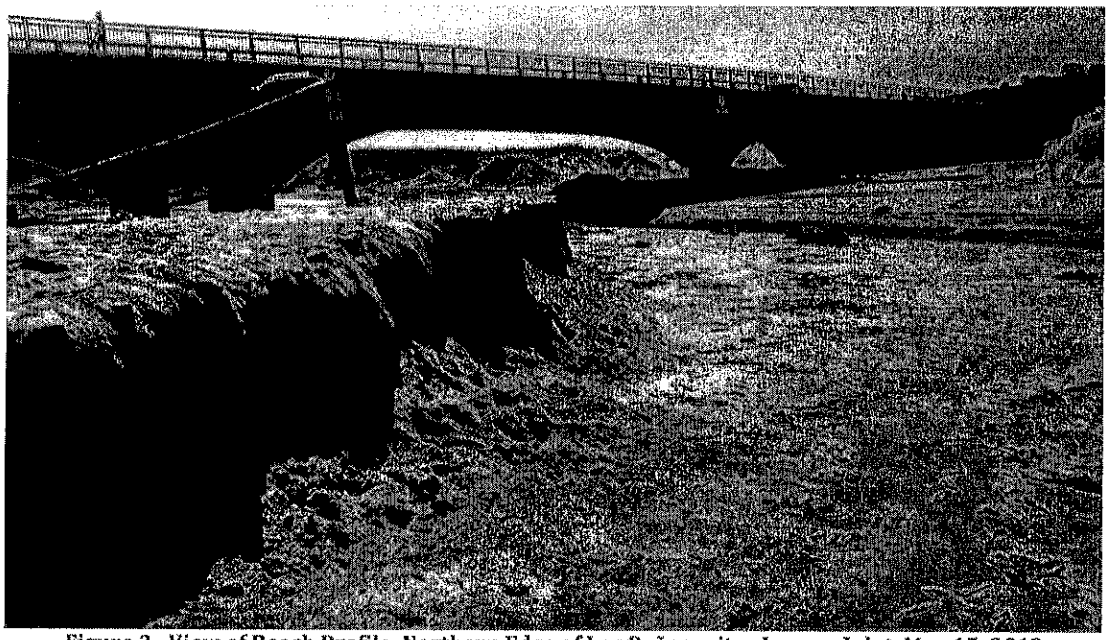


Figure 3. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. May 15, 2013

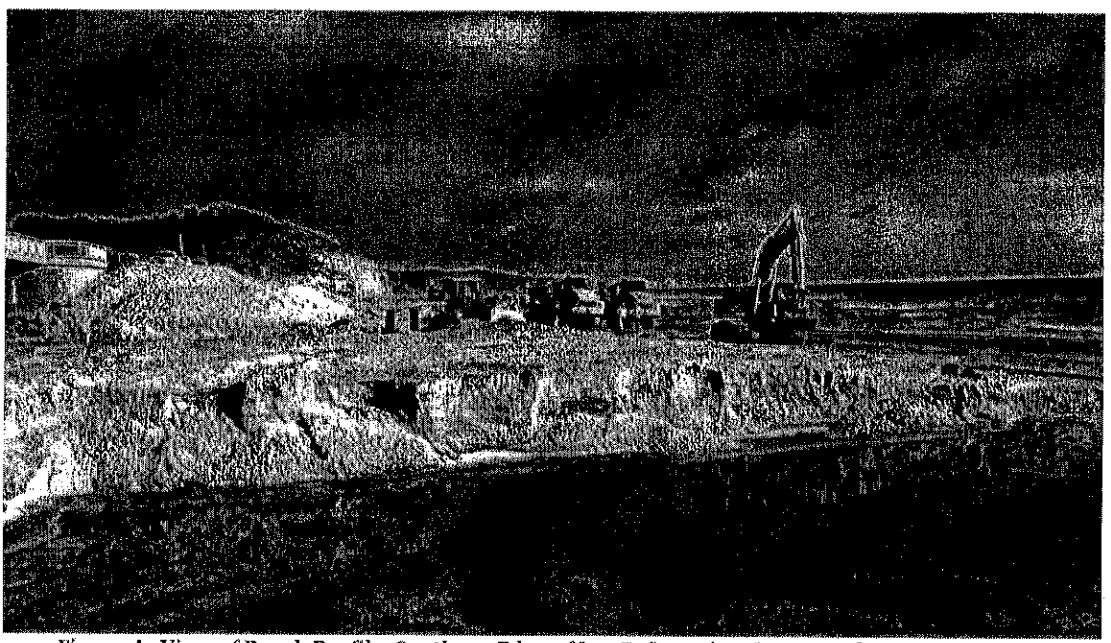


Figure 4. View of Beach Profile, Southern Edge of Los Peñasquitos Lagoon Inlet. June 12, 2013. Approximately 3-6 feet of additional sand above the lagoon inlet waterline.

Exhibit A
Photos of Elevated Beach Profiles at Los Peñasquitos Lagoon Inlet
Beach Elevation Data at Torrey Pines State Beach - LIDAR

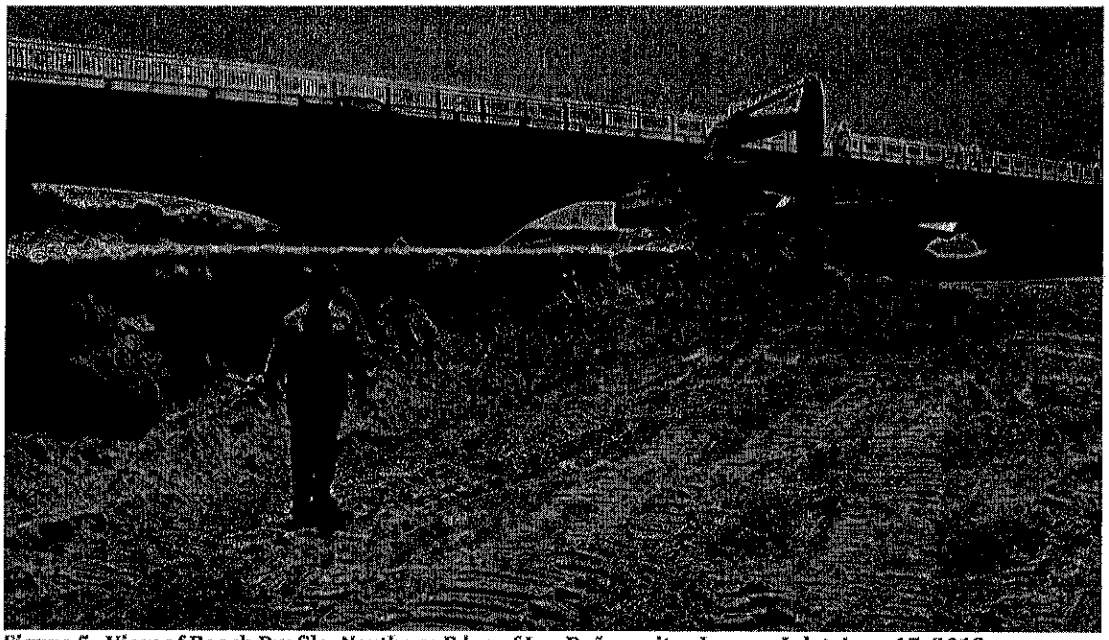


Figure 5. View of Beach Profile, Northern Edge of Los Peñasquitos Lagoon Inlet. June 17, 2013. The inlet area had already been excavated multiple times prior to this photo.

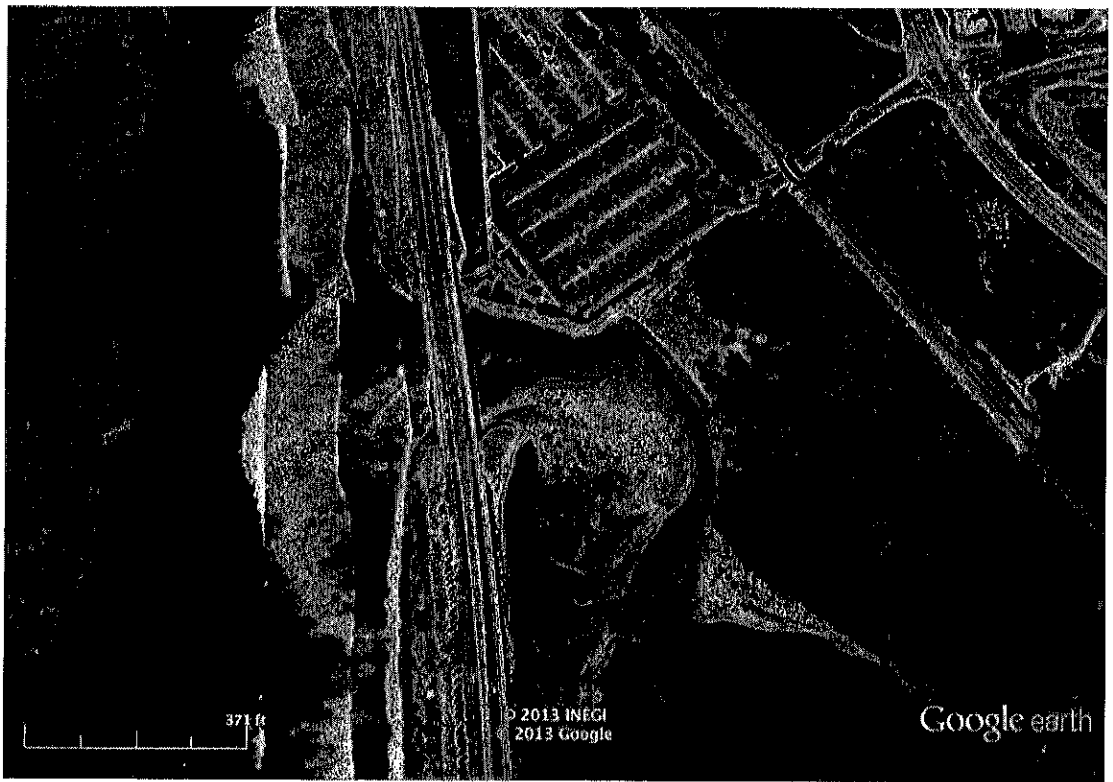
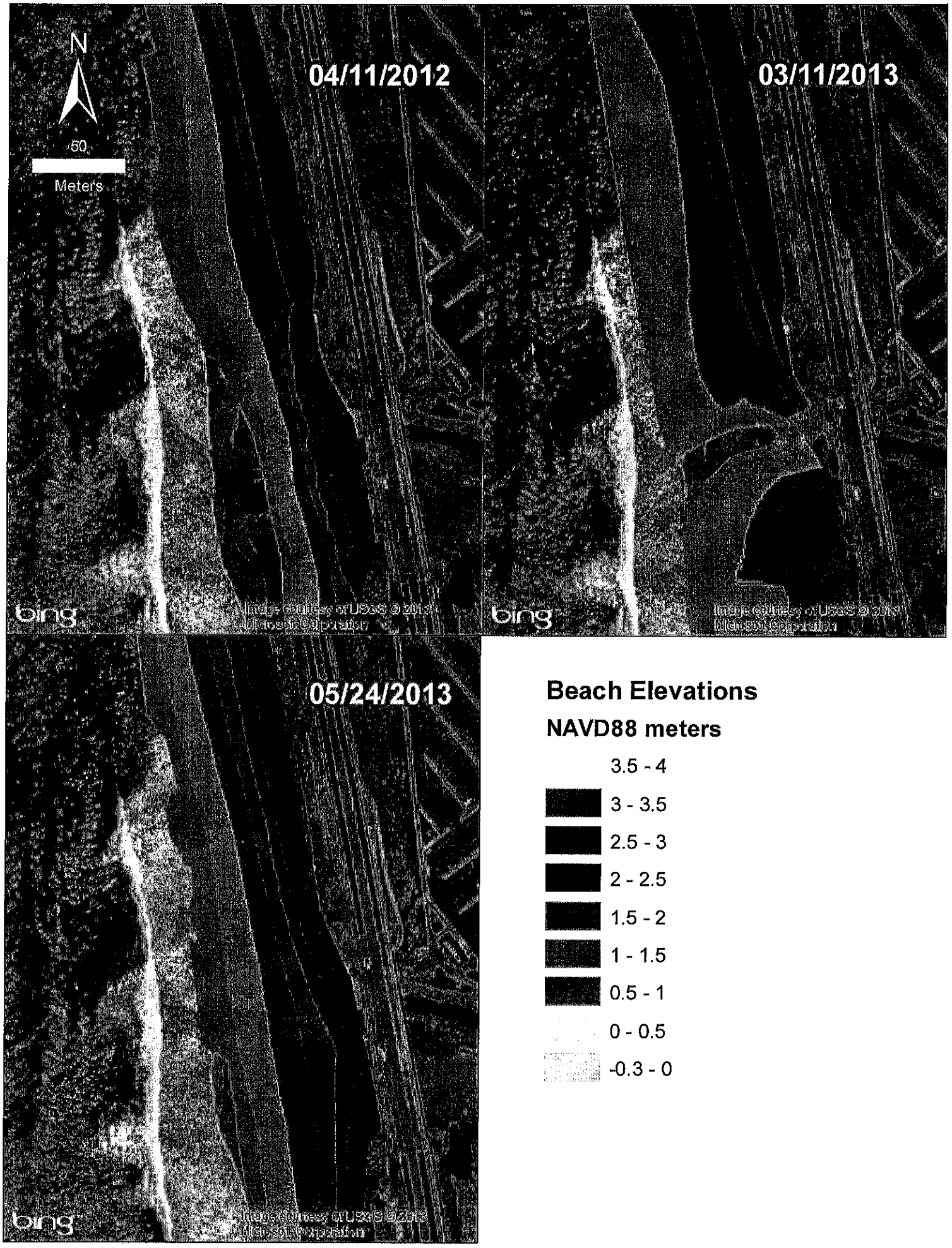


Figure 6. Overview of Los Peñasquitos Lagoon Inlet. November 12, 2012. Note the large, exposed sand spit within the Lagoon that occludes the inlet and restricts tidal mixing.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bing
Beach Elevations
NAVD88 meters
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3 - 3.5
2.5 - 3
2 - 2.5
1.5 - 2
1 - 1.5
0.5 - 1
0 - 0.5
-0.3 - 0

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November 8, 2013

Delivered via email

To: Larry Simon
California Coastal Commission
45 Fremont St, Suite 2000
San Francisco, CA 94105

Re: Item Th11a: Consistency Determination No. CD-0203-13 for Commission Meeting of November 14, 2013

Dear Mr. Simon,

In July of 2013 the Coastal Commission rejected the Army Corps of Engineers (ACOE) proposed Encinitas/Solana Beach Storm Damage Reduction Project ('proposed project' or 'project'). The project remains largely unchanged in this most recent submission to the Coastal Commission, so it should again be rejected for the following reasons:

1. Despite the reduced sand amounts in the proposed project, the predicted impacts to surfing and the nearshore environment continue to exceed what our Chapter and membership feels is acceptable for a project of this scope and cost. Those impacts are essentially the same as they were back in July when the Commission rejected this project.
2. The proposed project continues to be flawed by a lack of understanding of the local surfing breaks.
3. The proposed project underestimates the number of surfers and therefore their economic importance to these beaches and communities.
4. There is no record to suggest the ACOE can employ "Adaptive Management" to modify components OF a project of this scale
5. The proposed project mainly protects private property, rather than protecting public infrastructure.

The Surfrider Foundation San Diego County Chapter recognizes beaches as a public resource held in the public trust. Beaches provide affordable recreational access available to everyone. As human activities and development in coastal areas increase, preservation of these areas becomes more important. Our chapter is supportive of regional beach nourishment projects which are designed with realistic parameters. We recognize the reality that our beaches lose more sand than they gain, and that some sand replenishment is better than no sand on our beaches.

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1. Reduced Sand Does Not Result in Reduced Impacts to Surf Breaks

In response to the previous rejection of this project by the Coastal Commission, the ACOE did modify the project to include reduced volumes of sand placement and beach widths. However, the impacts to surfing and the reef environment are virtually the same. Recharacterizing a break in Encinitas from a reef break to a beach break does not avoid impacts. Furthermore, Table Tops and Pillbox & Southside reef breaks in Solana Beach would still have 'likely impacts' beyond the 2-year point after the initial sand replenishment project. This is not acceptable.

2. Project Demonstrates Lack of Understanding of Local Surf Breaks

As we have pointed out in numerous written and oral comments, impacts to surfing are not taken seriously and underestimated throughout the Draft Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) for this project. While the Draft EIR/EIS does report 'likely' impacts to the Table Tops and Pillbox & Southside reef breaks, it neglects to even analyze potential impacts to other reef breaks, such as Cherry Hill, Rockpile or Secrets in Solana Beach.

As another example of this project's disregard for the health of the surfing environment in these cities, the ACOE simply changed the classification of Stonesteps in Encinitas from a reef break to a beach break to hide the projected 'likely' impacts to this break. This is disingenuous and incorrect. These breaks in Encinitas are reef breaks, and would be impacted by the large volumes of sand proposed by this project. Simply changing the language in the draft EIR/EIS does not change the reality of the surfing environment.

3. Project Underestimates Percentage of Beach-Goers Who Are Surfers

The Draft EIR/EIS underestimates the number of surfers as a percentage of people who go to the beach, and therefore underestimates their economic value to the local communities. A Land Lease/Recreation Study prepared for the city of Solana Beach in 2010 (available at http://ecocerf.files.wordpress.com/2012/01/solana-beach-draftlandlease-revised.pdf) found that in Solana Beach 26% of people that go to the beach go to surf (page 3-7, Table 3-6), shows 26% of attendance is from surfers as opposed to the 10% estimated in the staff report for consistency determination CD-003-13 (*http://documents.coastal.ca.gov/reports/2013/7/W12a-7-2013.pdf*):

> "In a response to a May 2013 Commission staff inquiry regarding potential project impacts to surfing identified in the Feasibility Study, the Corps stated that:

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> *"...given that surfing visits presently make up a relatively small share of total beach visitations to the study area estimated at less than 10% of total visits to the study area shoreline, the overall impact to recreation values from surfing is not expected to affect plan selection..."*

These numbers fluctuate widely by season; in the winter it is likely a much higher percentage of beach-goers are surfers. By underestimating the number of surfers at the beaches, the ACOE is attempting to minimize the impacts that these drastic volumes of sand would have on overall recreation at the beach.

4. There Is No Record To Suggest The ACOE Can Employ "Adaptive Management" To Modify Components OF A Project Of This Scale

The ACOE has trumpeted the use of adaptive management in public meetings and conference calls to alleviate impacts to surfing and near-shore environment. Unlike locally controlled and managed sand replenishment projects (such as the recent RBSP II project in San Diego), the ACOE will not have the latitude or ability to change the project significantly once it has been approved. To publicly state that the ACOE will employ adaptive management techniques to prevent destruction of surf breaks and the environment as this project proposes to do is disingenuous and misleading.

5. The Proposed Project Mainly Protects Private Property, Not Public Infrastructure

Appendix E of the Solana Beach-Encinitas Shoreline Study (http://www.spl.usace.army.mil/Portals/17/docs/civilworks/encinitas_solanabeach_appendixEdraft.pdf) does show some small benefit to local parks and Highway 101, but these benefits pale in comparison to the benefit to private property. San Elijo and Cardiff State beaches, low-lying beachfront regions of Highway 101, and beachfront restaurants and businesses in Cardiff lie in Reaches 6-7 (between Swamis and TableTops surf breaks). Minimal benefit to storm damage reduction is predicted for Reaches 6-7, and no benefit is predicted for Reaches 1-2 (between Grandview and Stonesteps). Page E-50 of Appendix E state the following about Reaches 1-2 and 6-7:

> "We have recreation data for Reaches 1-2 and Reaches 6-7; however, we were not provided erosion rates owing to the lack of feasible alternatives in those reaches. Recreation values were developed for all reaches that could reasonably be expected to generate sufficient damages to justify project alternatives."

Table 4.8-6 does not demonstrate any economic benefit to these reaches:

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Table 4.8-6 Nominal Recreation Values by Reach by Decade

Low SLR							
	2010	2015	2020	2030	2040	2050	2060
REACH 3	$727,000	$991,000	$1,012,000	$928,000	$995,000	$1,044,000	$994,000
REACH 4	$4,389,000	$4,831,000	$4,993,000	$5,383,000	$5,702,000	$5,900,000	$5,900,000
REACH 5	$1,277,000	$1,709,000	$1,783,000	$1,627,000	$1,665,000	$1,748,000	$1,748,000
...	...	...	...	...	...	...	...
REACH 8	$90,000	$115,000	$121,000	$108,000	$117,000	$123,000	$123,000
REACH 9	$481,000	$616,000	$536,000	$587,000	$628,000	$656,000	$656,000
TOTAL	$6,964,000	$8,262,000	$8,446,000	$8,634,000	$9,107,000	$9,473,000	$9,423,000
Segment 1	$6,393,000	$7,532,000	$7,789,000	$7,938,000	$8,362,000	$8,692,000	$8,642,000
Segment 2	$571,000	$731,000	$658,000	$696,000	$745,000	$781,000	$781,000
High SLR							
	2010	2015	2020	2030	2040	2050	2060
REACH 3	$715,000	$807,000	$845,000	$779,000	$719,000	$757,000	$706,000
REACH 4	$4,312,000	$4,736,000	$4,841,000	$3,965,000	$3,197,000	$3,145,000	$2,921,000
REACH 5	$1,273,000	$1,417,000	$1,413,000	$1,381,000	$1,234,000	$1,299,000	$1,214,000
...	...	...	...	...	...	...	...
REACH 8	$90,000	$94,000	$99,000	$105,000	$81,000	$86,000	$81,000
REACH 9	$481,000	$511,000	$534,000	$414,000	$442,000	$466,000	$441,000
TOTAL	$6,871,000	$7,565,000	$7,732,000	$6,643,000	$5,672,000	$5,752,000	$5,363,000

Section 4.7.7 also outlines the project's lack of protective benefit to Reach 7. This area has a number of popular beaches (including but not limited to Cardiff and San Elijo State Beaches), therefore demonstrating this project's bias toward protecting private property over public infrastructure.

> "As shown in Figure 4.7-2, the expected annual damages (EAD) start near $18,000 in the base year and grow gradually under low sea-level rise conditions but accelerate under high sea-level rise conditions. However, even with accelerated growth expected annual damages remain below $50,000 in the final year of the study period, 2064. The average annual damages are $18,692 under the low sea-level rise scenario and $28,985 under the high sea-level rise scenario. This is primarily a result of the limited value of the structures in Reach 7, which is the only low-lying reach in the study area. Since there are only three structures in this reach and lack of space for new development and environmental concerns would likely restrain any future structure growth, the Project Delivery Team determined that the expected annual damages are not large enough to support any project alternatives. Therefore no project alternatives were formulated for detailed analysis to address wave-overtopping in Reach 7."

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Table 4.1-1 shows that in Reaches 1-2 and 6-7, there is limited economic benefit under either the low or high Sea Level Rise (SLR) scenarios. Any economic benefit found in Reaches 1-2 is largely due to damage to seawalls, not public infrastructure (San Elijo State Park or beachfront restaurants) (pages E-28 to E-29):

> "Results under the low sea-level rise scenario show that reaches 1 and 2 have moderate damage that is primarily the result of maintenance and repair to existing seawalls...
>
> "...Reach 6 consists predominantly of San Elijo State Park and has few structures. As a result damages are minimal. Reach 7 does not have coastal bluffs and is a low-lying lagoon with several restaurants."

Table 4.4-1 Armoring Average Annual Damages by Reach & Segment

Low SLR		
Reach	**Expected Values**	***Std Deviation***
1	$156,000	*4,000*
2	$291,000	*40,000*
3	$558,000	*108,000*
4	$1,124,000	*92,000*
5	$1,510,000	*195,000*
6	$28,000	*18,000*
7	n/a	n/a
8	$1,028,000	*251,000*
9	$1,680,000[26]	*377,000*
Total	**$6,375,000**	
Segment 1	$3,192,000	
Segment 2	$2,708,000	*324,000*
High SLR		
Reach	**Expected Values**	***Std Deviation***
1	$159,000	*5,000*
2	$357,000	*30,000*
3	$534,000	*121,000*
4	$1,200,000	*149,000*
5	$1,682,000	*267,000*
6	$108,000	*15,000*
7	n/a	n/a
8	$987,000	*287,000*
9	$2,177,000	*389,000*
Total	**$7,204,000**	
Segment 1	$3,415,000	*487,000*
Segment 2	$3,184,000	*697,000*

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Limited economic benefit attributed mostly to private property protection rather than public infrastructure protection for reaches 1-2 and 6-7 is further supported under the Retreat Scenarios for both low and high SLR as outlined in on page E-33 and Table 4.5-2:

> "Results in Table 4.5-2 under the low sea-level rise scenario show that reaches 1 and 2 have moderate damage that is primarily the result of maintenance and repair to existing seawalls."

Table 4.5-2 Retreat Average Annual Damages by Reach & Segment

Low SLR		
Reach	Expected Values	Std Deviation
1	$156,000	4,000
2	$182,000	12,000
3	$660,000	36,000
4	$946,000	65,000
5	$1,353,000	132,000
6	$13,000	6,000
7	n/a	n/a
8	$1,006,000	72,000
9	$2,824,000[35]	226,000
Total	**$7,120,000**	
Segment 1	$2,959,000	159,000
Segment 2	$3,830,000	292,000
High SLR		
Reach	Expected Values	Std Deviation
1	$156,000	4,000
2	$289,000	11,000
3	$788,000	42,000
4	$1,466,000	76,000
5	$1,892,000	154,000
6	$90,000	5,000
7	n/a	n/a
8	$1,257,000	80,000
9	$3,599,000[36]	242,000
Total	**$9,541,000**	
Segment 1	$4,148,000	190,000
Segment 2	$4,856,000	295,000

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Table 5.3-7 continues to show no economic benefit to Reaches 1-2 and 6-7, further demonstrating this project's preference for protection of private property over public infrastructure:

Table 5.3-7 Calculation Example for 200-foot/16 yr Alternative

Nominal Recreation Values by Decade for Sand Placement and Hybrid Alternatives ($1000s)								
Low SLR	2010	2015	2020	2030	2040	2050	2060	2064
REACH 3	$715	$1,064	$1,298	$1,366	$1,517	$1,611	$1,575	$1,611
REACH 4	$4,389	$5,088	$6,207	$6,373	$7,189	$7,699	$7,221	$7,699
REACH 5	$1,273	$1,825	$2,224	$2,337	$2,610	$2,759	$2,728	$2,759
...								
REACH 8	$90	$154	$352	$385	$415	$437	$437	$437
REACH 9	$481	$843	$1,928	$2,102	$2,271	$2,392	$2,381	$2,392
TOTAL	$6,948	$8,974	$12,010	$12,563	$14,002	$14,898	$14,342	$14,898
Segment 1	$6,377	$7,978	$9,730	$10,076	$11,317	$12,069	$11,624	$12,069
Segment 2	$571	$996	$2,280	$2,487	$2,686	$2,829	$2,818	$2,829

Despite this project's title 'Coastal Storm Damage Reduction', there is actually a negative economic benefit to Coastal Storm Damage Reduction (CSDR) as shown by Table 6.2-1. Only when the incorrectly calculated 'Total Recreation Benefit' value is applied, does the project result in positive economic impacts. Had this project properly taken into account the economic benefit of surfing resources, and valued benefits to public infrastructure more than benefits to private infrastructure, sand could have been distributed more appropriately to preserve surfing and environmental resources.

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Table 6.2-1 NED Plan Specifications

Low SLR	SEGMENT 1	SEGMENT 2
Type	Beach Fill	Beach Fill
Initial Added Width	100 ft	200 ft
Initial Volume Dredged	819,000 cyd	1,177,000 cyd
Nourishment Interval	5 yr	13 yr
Nourishment Volume Dredged	336,000 cyd	500,000 cyd
Net Annual Benefits		
Expected Value (full Recreation Benefits)	$1,435,000	$1,114,000
Expected Value (up to 50% Rec Benefits)[76]	$1,201,000	$860,000
Expected Value (CSDR Benefits only)	-$234,000	-$345,000
Standard Deviation	*988,000*	*1,103,000*
Long-run probability Net Benefits >0	86%	80%
BCR (incl full Recreation Benefits)	1.71	1.63
BCR (incl Rec Benefits up to 50% of CSDR Benefits)	1.53	1.43
BCR (CSDR Benefits only)	0.83	0.76
High SLR	**SEGMENT 1**	**SEGMENT 2**
Type	Beach Fill	Beach Fill
Initial Added Width	100 ft	300 ft
Initial Volume Dredged	885,000 cyd	2,070,000 cyd
Nourishment Interval	5 yr	14 yr
Nourishment Volume Dredged	403-476,000 cyd	998-1,119,000 cyd
Net Annual Benefits		
Expected Value (full Recreation Benefits)	$3,217,000	$1,665,000
Expected Value (up to 50% Rec Benefits)	$1,700,000	$1,196,000
Expected Value (CSDR Benefits only)	-$249,000	-$531,000
Standard Deviation	*1,468,000*	*1,165,000*
Long-run probability Net Benefits >0	85%	86%
BCR (incl full Recreation Benefits)	2.32	1.52
BCR (incl Rec Benefits up to 50% of CSDR Benefits)	1.66	1.37
BCR (CSDR Benefits only)	0.83	0.75

The Surfrider Foundation is a non-profit grassroots organization dedicated to the protection and enjoyment of oceans, waves and beaches through a powerful activist network. Founded in 1984 by a handful of visionary surfers in Malibu, California, the Surfrider Foundation now maintains over 50,000 members and 90 chapters worldwide. For an overview of the San Diego Chapter's current programs and events, log on to our website at http://sandiego.surfrider.org/ or contact us at info@surfridersd.org or (858) 622-9661.

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Summary

The Staff report says the Commission's previous concerns have been alleviated in this modified proposal. As we point out above, this is untrue. For future sand replenishment projects, it would be more appropriate to move forward with a locally managed RBSP III project that would balance the needs of the environment, surfing community, and recreation while still providing a reasonable amount of sand to our beaches.

Our Beach Preservation policy establishes the Chapter's position on the preservation and restoration of San Diego County's natural beaches, wavecut platforms, nearshore environment, and sandstone bluffs. The policy goal is preservation of San Diego's remaining natural coastline and restoration of the coast to its natural, unarmored state, including the landward migration of the shoreline due to the natural geology of the San Diego coast and sea level rise. As part of this policy, depending on the circumstances we may support:

> Beach replenishment projects that bring properly sized and constituted sand to San Diego County. These projects are strictly for strategic periodic maintenance, and should not be the cornerstone of the coastal management policy of San Diego County. Projects should provide maximum benefit for the beach going public, taking into account all natural and recreational resource impacts. Where necessary, such environmental impacts will be mitigated in their entirety.

Our policy is consistent with the California Coastal Act Sections 30210, 30211, 30212, 30220, 30221 and Section 4 of Article X of the California Constitution in promoting free and open access to the coastline. For our full Beach Preservation policy, please see http://sandiego.surfrider.org/beach-preservation-policy-of-surfrider-foundation-san-diego-county-chapter.

In conclusion, we are still of the opinion that it would be disastrous to trade these precious surfing resources for increased towel space, which is the only recreational benefit this project pursues.

Sincerely,

Tom Cook
Co-chair of the Beach Preservation Committee Member, San Diego County Chapter of the Surfrider Foundation

Surfrider Foundation, San Diego County Chapter
9883 Pacific Heights Blvd, Suite D
San Diego, CA 92121
Phone (858) 622-9661 Fax (858) 622-9961

Kristin Brinner
Beach Preservation Committee Member, San Diego County Chapter of the Surfrider Foundation
Resident of Solana Beach

Julia Chunn-Heer
Campaign Coordinator, San Diego County Chapter of the Surfrider Foundation
Resident of Encinitas

Jim Jaffee
Co-chair of the Beach Preservation Committee Member, San Diego County Chapter of the Surfrider Foundation
Resident of Solana Beach

The Surfrider Foundation is a non-profit grassroots organization dedicated to the protection and enjoyment of oceans, waves and beaches through a powerful activist network. Founded in 1984 by a handful of visionary surfers in Malibu, California, the Surfrider Foundation now maintains over 50,000 members and 90 chapters worldwide. For an overview of the San Diego Chapter's current programs and events, log on to our website at http://sandiego.surfrider.org/ or contact us at info@surfridersd.org or (858) 622-9661.

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California State Senate

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THIRTY-EIGHTH SENATE DISTRICT

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November 5, 2013

Ms. Mary Shallenberger, Chair
California Coastal Commission
7575 Metropolitan Drive, Suite 103
San Diego, California 92108

Re: Support for Item #11a, CD-0203-13 (U.S. Army Corps of Engineers, San Diego County) – 50 Year Coastal Storm Damage Reduction and Beach Nourishment Project, Encinitas and Solana Beach

Dear Chairwoman Shallenberger:

As the Senator for the 38th District representing over 1 million constituents, including those in the cities of Encinitas and Solana Beach, I strongly encourage your support for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project that will be heard before the California Coastal Commission (CCC) on November 14, 2013 (Item Thu-11a). At the request of the CCC, both cities have reduced the size of the project and are proposing to place smaller volumes of sand both initially and during all subsequent re-nourishment cycles. This project is important because it will reduce coastal storm damages to public infrastructure, provide a wider recreational beach, and improve public safety by reducing the threat of bluff erosion.

The local sponsors of this project, the City of Encinitas and the City of Solana Beach, have been working with the U.S. Army Corps of Engineers for more than ten years to identify, evaluate, and implement a long term solution to the critical coastal erosion problem in these cities. Coastal erosion is expected to worsen with sea level rise and this project would implement a recognized adaptation strategy outlined in the "*Sea Level Rise Policy Guidance*" issued by the CCC just last month.

Both cities have worked diligently with local stakeholders and regulatory agencies to develop a comprehensive and long-term beach nourishment program that incorporates an extensive monitoring program for biological and cultural resources and surfing. The project also includes adaptive management strategies that would modify the size, location and timing of smaller nourishment fills in the future, if determined to be necessary.

More than two decades ago, the coastlines of these cities were identified in the *State of the Coast Report* (1991) as an area of high coastal erosion risk in California. The project has received consistent state support and funding through the Department of Boating and Waterways via the California Public Beach Restoration Act. In addition, this project will implement the San Diego Coastal Regional Sediment Management Plan (2009), which recognized that the Solana Beach and Encinitas shorelines would benefit from regional sediment management programs involving beach restoration such as this.

I strongly urge your support for this project when it comes before you on November 14, 2013. Thank you for your thoughtfulness as you consider how to best preserve our beautiful beaches and precious coastline.

Sincerely,

Mark Wyland

MARK WYLAND
Senator, 38th District

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SCRIPPS INSTITUTION OF OCEANOGRAPHY

LA JOLLA, CALIFORNIA
92093-0209

November 6, 2013

Larry Simon
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105

Re: Federal Consistency Hearing, CD-0203-13

Dear Mr. Simon,

I am Professor of Oceanography at Scripps Institution of Oceanography, University of California San Diego. I am a specialist in surfzone and nearshore physical oceanography which encompasses waves, wave-induced circulation (currents), and transport and fate of pollutants and sediment. As a leader in the field, I have published in high-impact-factor peer reviewed journals on these topics for 15 years, developed numerical models of nearshore processes and conducted large field experiments in Orange and San Diego county.

I have reviewed the US Army Corp of Engineers Draft Integrated Feasibility Study & Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project. I have a number of concerns particularly regarding the Solana Beach aspect of the project. These concerns, in summary form, include:

- The sediment transport and coastal morphological evolution modeling that is applied to the proposed nourishment is woefully out of date. The GENESIS model that is used (Appendix H) is essentially 1980's technology. There are much more sophisticated models that include many more physical processes in standard Coastal Engineering practice today such as Delft3D, MIKE21, and the COAWST model.
- The GENESIS model is a very simple model that only solves for the "shoreline" position. It makes a number of assumption and is not intended to be applied in cases where there are cliffs behind the beach, where there are reefs, or where the depth-of-closure may be very far offshore due to sand loss into deep canyons. It cannot accurately give the future evolution of the the cross-shore distribution of the nourished sediment.
- In Southern California, much coastal morphological change (erosion) is driven by extreme wave events. The wave climatologies that were used as inputs to the GENESIS model are representative of average south swell or west swell conditions, but not the extreme conditions.

Therefore, I find that the Solana Beach impacts given in the EIS/EIR are *speculative* at best. Given the scope and cost of the proposed project, the modeling work on the impacts of the proposed project could be done with modern Coastal Engineering tools. This would constrain the project impacts to ecosystems and recreation to a level that where informed decisions could be made.

Please do not hesitate to contact me if you have any questions. Thank you.

Prof. Falk Feddersen
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Assembly
California Legislature

TONI ATKINS
MAJORITY LEADER
ASSEMBLYMEMBER, SEVENTY-EIGHTH DISTRICT

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October 31, 2013

Ms. Mary Shallenberger, Chair
California Coastal Commission
7575 Metropolitan Drive, Suite 103
San Diego, California 92108

Support for Thu-11a: USACE Federal Consistency CD-0203-13, Encinitas-Solana Beach Coastal Storm Damage Reduction Project

Dear Chairwoman Shallenberger and Members of the Coastal Commission:

This letter is in support of the Encinitas-Solana Beach Coastal Storm Damage Reduction Project on the California Coastal Commission agenda for November 14, 2013, Item Thu-11a. As requested by the Commission, both cities have reduced the size of the project and are proposing to place smaller volumes of sand both initially and during all subsequent re-nourishment cycles. The project will reduce coastal storm damage to public infrastructure, provide a wider recreational beach, improve public safety by reducing the threat of bluff failures and enable the cities to adapt to future for sea level rise.

The cities of Encinitas and Solana Beach are the local sponsors of the project and have been working with the U.S. Army Corps of Engineers for more than a decade to identify, evaluate and implement a long term solution to the critical coastal erosion problem in these cities.

Coastal erosion threatens key public facilities, public access to the coast, public facilities and infrastructure and homes. Coastal erosion is expected to worsen with sea level rise and the project implements a recognized adaptation strategy outlined in the draft "*Sea Level Rise Policy Guidance*" issued by the Coastal Commission in October 2013. The cities have worked diligently with local stakeholders and regulatory agencies to develop a comprehensive and long-term beach nourishment program that incorporates an extensive monitoring program for biological and cultural resources and surfing. The project also includes important adaptive management strategies to modify the size, location and timing of smaller re-nourishment fills if required in the future.

More than two decades ago, the coastlines of these cities were identified in the *State of the Coast Report* (1991) as an area of high coastal erosion risk in California. The project has received consistent State support and funding through the Department of Boating and Waterways via the California Public Beach Restoration Act. The project will implement the San Diego Coastal Regional Sediment Management Plan (2009), which recognized that the Solana Beach and Encinitas shorelines would benefit from regional sediment management programs involving beach restoration.

I urge the Commission's support of this important project. Thank you for your consideration.

Warmly,

TONI ATKINS
Majority Leader
78th Assembly District

TA:ds

Lynn and Russell Marr
434 La Veta Avenue
Leucadia, CA 92024
760-436-0129

November 1, 2013

Re: Consistency Determination: **In Opposition to sand replenishment at new levels**
CD-0203-13 (U.S. Army Corps of Engineers, San Diego Co.), Item No: TH11a

Attn: Larry Simon
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Josephine R. Axt, Ph.D
Chief Planning Division
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Attn: Mr. Larry Smith (CESDL-PD-RN)
Los Angeles, CA 90053-2325

Please accept the following as public comment re the sand replenishment program that is being reviewed for Encinitas. Even though the amount of sand to be placed on our beaches as an armor for naturally eroding bluffs has been reduced from the original proposal, there is still more harm than good that would result from the scaled down version of the project. The mitigation is not sufficient for the environmental damage that would be a consequence of dumping excessive sand. Plus, as taxpayers we object that the project would not be cost effective; the sand replenishment project, as now "reformatted," is not balanced with respect to achieving a realistic cost-benefit ratio, including protecting our environmental heritage, and mitigating damage to precious, sometimes irreplaceable natural resources.

We feel that excessive sand would destroy valuable flora and fauna. There are signs posted on our beaches warning us not to pick up sand dollars, etc., including at D Street beach access and the Cardiff Tidepools. Yet the recent SANDAG dredging project first smothered the flora and fauna, destroying the environment. Then winter storms washed all the sand away.

We feel the only viable option is "Managed Retreat." I have used Dennis Lee's post on Encinitas You Need Us on February 3,2012, http://encinitasyouneedus.blogspot.com/ to compile the following remarks.

Mitigation or viable alternatives for "impacts to nearshore resources in the ACOE EIS/EIR for its proposed Encinitas/Solana Beach protection program are insufficient in your report.

In addition to eliminating a discussion on managed retreat, the ACOE document doesn't address environmental or fisheries impacts in the borrow sites at all. In fact, the only mention of "borrow sites" was to mention that a cultural resources survey will be conducted prior to dredging.

It is likely, based on research conducted in nearshore waters, that biological resources in these areas vary substantially. However, studies assessing potential impacts to these habitats have failed to address this variation or adequately evaluate the ecological value of any of the proposed borrow sites and use the differences in ecological value as a criterion for site selection. These evaluations should be used to ensure that any dredging that occurs avoids the areas of highest ecological value, as demonstrated by intensive surveys by qualified benthic ecologists with experience in this habitat. Basically, previous studies have evaluated the "weeds" in the system, i.e., the ephemeral organisms living in the upper few inches of the sand, rather than the "trees", i.e., the long-lived organisms that live down to 2 or more feet deep in the sand (and equal to dredging depth) and contribute the most to fisheries. A consequence of this flawed approach is that the potential effects of dredging and the projections for recovery times are grossly underestimated.

In the past, agencies have not understood these issues and have accepted this approach. However, we are seeing changes in agency philosophies regarding the approaches for evaluating borrow sites and beach restoration programs. The California Coastal Commission is now starting to request studies addressing the issues involving the "weeds" and the "trees", which is the approach taken in discussions of nearly every other ecosystem subjected to development activities. (For example, when we assess the effects of clear-cutting in a redwood forest, an activity analogous to the proposed dredging program, we make the decisions based on the long-lived redwoods and other trees in the forest, not on the ephemeral grasses and short-lived shrubs growing on the forest floor.) In addition, the National Marine Fisheries Service appears to be leaning this direction.

However, the bottom line here is that the ACOE has completely omitted any discussion of Managed Retreat and borrow-site impacts from a proposed 50-year project that would require dredging many times more sand for the beaches in Encinitas and Solana Beach than all the dredging done for beach "nourishment" to date. These omissions are unacceptable. These environmental issues need to be addressed to protect the environment and our fisheries. Moreover, we need to protect the taxpayers. Particularly in light of sea-level rise, this is a battle that we cannot and will not win. We should make a wise decision to cut our losses and put the money into efforts that make sense for ALL taxpayers, not just wealthy landowners and businesses.

Recent comprehensive cost-benefit studies in Monterey Bay have shown managed retreat is the best environmental and economic alternative in the long term. Investigators, led by Dr. David Revell, have been evaluating the costs and short- and long-term benefits of a variety of approaches to shoreline preservation and restoration (beach nourishment, revetments, sea walls, armor rock, artificial reefs, etc.) and has come to some very interesting conclusions. I believe they have concluded that all but Managed Retreat are basically pouring money down a rat hole. Mother Nature will win in the end, whatever we do, and we are just delaying the final outcome at great expense to the taxpayers.

Managed Retreat, however, definitely does not satisfy the influential property and business owners, who are pushing to have their property protected at taxpayer expense.

The footprint for the proposed Encinitas/Solana Beach project is 3-4 times larger than the recently completed beach nourishment program and about two-thirds of it would occur here in Encinitas. The remainder is off San Elijo Lagoon and Solana Beach."

For these reasons we object to the proposed Encinitas/Solana Beach project. Bluff failure does not constitute an emergency situation that necessitates wasting money and degrading our shoreline ecological resources. We have had too much sand, already. The entire bottom flight of stairs at Stonesteps Beach, in Encinitas/Leucadia, has been buried beneath sand, for years. Excessive sand is killing the kelp, affecting the surf, affecting fishing and lobster catches. A few cobbles on the beach are not going to cause economic ruin. We do not have wide, sandy beaches here, naturally, as in Florida.

The Coastal Coalition, under Director Steve Aceti, is part of what we describe as BIG SAND, a group of self-awarding, sand lobbyists that is under contract with the City of Encinitas, the City of Carlsbad, and private bluff top property owners. Many homes have been built on unstable bluffs, and continue to be "intensified" in their use through remodels and expansions. We do not feel that the people, we taxpayers should have our money wasted and our ecological resources, our environmental heritage devastated by excessive sand replenishment, which disproportionately benefit the economic interests of a blufftop property owners. No study has shown that tourist businesses suffered before we began initiating sand replenishment, or that sand replenishment, itself has incurred more sales tax revenues for the City of Encinitas.

We do not want seawalls, and concur with the Coastal Commission policy, as we understand it, that these would only be installed in cases of extreme emergencies, which immediately threaten public health and safety. Permits should not be renewed, once the emergency has been addressed, for

intensification of the variance given for a seawall. A seawall at Beacons is unacceptable.

We would advocate for sand replenishment only after further studies, as part of a process of "managed retreat." This alternative should be further explored and presented to the public in depth, for our review and more comments.

The following is an edited letter that I sent to Encinitas City Council, when consideration of this topic was on our Council Meeting Agenda for 5/8/13, Item No. 7:

I hope you have taken the time to read Dennis Lees' excellent article, which was published in both the Coast News and Encinitas Patch. We feel strongly that our government, on behalf of us, taxpayers and residents, with public participation and input, could develop ways to open up the flow again, exploring ways to unblock the estuaries, possibly through trestles, instead of dumping imported sand, or dredging dirty bottom sand, in the BIG SAND lobbyist/moneymaking process, smothering our natural flora and fauna.

Nature COULD replace sand if we saved our money to explore ways, such as putting in trestles, to open up the estuaries. Dumping imported sand is disastrous to the remaining flora & fauna, because it smothers the habitat. Dumping too much sand is about encouraging MORE development & subsidizing commercial interests on the taxpayer's dime.

What we should be doing is looking at ways to slow growth. We've not had wide sandy beaches, as in Florida. We have a different geological configuration, here, with the bluffs close to the tide line. Over the years, we lost a street! People don't need to be able to walk the beaches at high tide, here. The beaches are part of nature's gift to us. We shouldn't forsake & take advantage of this gift to the detriment of our delicate eco-system, all in the name of increasing tourism, or buttressing structures knowingly built on unstable bluffs.

I've walked the beaches for many years, from Leucadia, north to Carlsbad, & south to Cardiff. I've seen many negative impacts of too much sand. Why should taxpayers in the County, & throughout the State pay for a few elite homeowners & business interests to further erode the delicate balance of nature in order to protect their properties, creating ever-more traffic, congestion & ill feelings amongst pre-existing residents? Bluff top properties should be condemned, when they're no longer livable, due to inevitable bluff erosion. Insurance companies should pay, not taxpayers.

http://www.virtualonlineeditions.com/article/Neighborhood+News/1357399/0/article.html

San Diego Weekly Reader — March 28, 2013

Neighborhood News

IMPERIAL BEACH

Imported sand a threat to estuary

Spreading south of original dumping site, sand could block marsh outlet

San Diego National Wildlife Refuge biologists are monitoring the movement of the 450,000 cubic yards of sand dumped on Imperial Beach shores last fall, worried that southbound sand will block the river mouth as it did in 2010.

"If enough of this comes down here and settled or gets flushed into the river mouth, we've got a serious problem," U.S. Fish and Wildlife biologist Brian Collins said. "The estuary's ability to flush out with the tides is vital to the health of the estuary and all the threatened and endangered species that live here."

The sand sneaking into the estuary is the latest mess arising from the San Diego Association of Governments–financed "beach replenishment" project that dumped 450,000 cubic yards of sand on the beach near the pier in September and October. By December, the uneven dumping of sand left ponds next to buildings on Seacoast Drive, and residents found garages full of water trapped by the Sand bars; those conditions left them worried about the buildings' elevator shafts and foundations.

Repeated rearrangement of the sand and trench-digging — bulldozers on the beach — have not solved the problems, residents say. The estuary's coast front starts south of the affected buildings.

So far, tides and swells have carried the sand 3800 feet — about 3/4 of a mile — south of the original dumping site, creeping toward the mouth of the largest and last undivided wetlands in Southern California. The estuary flushes twice a day with saltwater as the tide rises and drops, creating a unique salt marsh where a half dozen endangered or threatened species of birds make their homes. If the river mouth is blocked, the salt marsh begins to die.

Collins and other estuary staff check the beach north of the river regularly and say the difference between native sand and imported sand is pretty clear.

"The new sand is very coarse and absorbs water," Collins said. "It poses a special hazard to the estuary."

LUCY D. BARKER, MARCH 19

The estuary flushes twice a day with saltwater as the tide rises and drops
IMPERIAL BEACH, NEIGHBORHOOD NEWS
Imperial Beach's imported sand threatens estuary's eco-health

Those 450,000 cubic yards could block marsh outlet
By Lucy D. Barker, March 19, 2013

San Diego National Wildlife Refuge biologists are monitoring the movement of the 450,000 cubic yards sand dumped on Imperial Beach shores last fall, worried that southbound sand will block the river mouth as it did in 2010.

"If enough of this comes down here and settled or gets flushed into the river mouth, we've got a serious problem," U.S. Fish and Wildlife biologist Brian Collins said. "The estuary's ability to flush out with the tides is vital to the health of the estuary and all the threatened and endangered species that live here."

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Collins and other estuary staff check the beach north of the river regularly and say the difference between native sand and imported sand is pretty clear.
"The new sand is very coarse and absorbs water," Collins said. "It poses a special hazard to the estuary."

A similar sand-replenishment project in 2010 left the estuary with no choice but to dredge the river mouth at a cost of about $15,000. The project required the involvement of more than a half dozen agencies; bulldozers worked for two days to reopen the tidal channel.

"The moral of the story is 450,000 cubic yards [of sand] may be too much at one time," Collins said.

http://imperialbeach%20.patch.com/articles/code-compliance-fees-sand-replenishment-update-city-council-meeting

For the first time at a public meeting, on Jan. 23 Imperial Beachians aired their grievances about the impact of recent sand replenishment.

SANDAG will update Imperial Beach officials and residents on efforts to reduce the impact of the project at a City Council meeting Wednesday at 6 p.m.

Since the project was completed last October, residents have complained that water trapped by the new sand has dripped into parking garages and elsewhere in ways they have never seen before.

Last month SANDAG and the city made an agreement that mobilizes heavy equipment after a high tide event to release water trapped in the sand back into the ocean.

Conservationists like WiLDCOAST and state and federal environmental employees warn that the sand could potentially block the mouth of the Tijuana River . If sand blocks the river mouth and prevents water movement in the estuary, the impact could be devastating to the vital ecosystem and threaten birds and endangered species whose breeding season started last week. The City Council meeting will be preceded with a closed session meeting to discuss existing and anticipated litigation as well as continuing talks to discuss price and terms of payment for turning over the Sports Park and Recreation Center to the YMCA.

http://imperialbeach.patch.com/articles/if-sand-closes-the-tijuana-river-ecological-heart-attack-feared

Ecological 'Heart Attack' Feared if IB Sand Closes the Tijuana River
Experts at the Tijuana River National Estuarine Research Reserve are concerned sand from a recent replenishment project could impact flow of the Tijuana River and threaten life supported by Southern California's largest coastal wetland.

By Khari Johnson
Email the author
February 1, 2013

Ponding water that seeps below Seacoast Drive homes and condos after a sand replenishment project has roused residents and beachgoers. But environmental workers are worried, too—that the sand could move south and block the mouth of the Tijuana River. If the sand stopped flow of the river, said the manager of the Tijuana Slough National Wildlife Refuge, it could threaten endangered species and other wildlife in the Tijuana River Valley. "It's like your circulatory system," said Brian Collins, the

refuge manager. "You don't want it blocked. It causes a heart attack. Or like asthma. You want to be able to breathe, and my analogy is you want the water to be able to go in and out."

The potential closure is especially worrisome as threatened and endangered bird species like the Light-Footed Clapper Rail are expected to begin their breeding and nesting seasons this month. "I've seen raptors and other birds already flying around near the pier with nesting material already," Collins said. SANDAG, the regional planning agency, brought 450,000 cubic yards of sand to Imperial Beach in October as part of the Regional Beach Sand Project. According to project engineers from Moffatt & Nichol, once the sand dissipates, the material may move as far north as the mouth of San Diego Harbor and as far south as the U.S.-Mexico border. SANDAG has not answered repeated phone calls for comment on these concerns.

The City of Imperial Beach declined to state its position until the city could have more conversations with estuary staff. "My reaction is to get their thoughts directly and go from there," said City Manager Gary Brown. "The estuary has had blockage problems at this river mouth for years so I'm not sure how this is any different than it's been for a long time. " Collins, a U.S. Fish and Wildlife Service employee, said sand has closed the river mouth twice in recent history–once in 1984 and partially in 2010. Warm waters during a 1983 El Niño generated extreme sea levels and storms that flooded areas of the city near the estuary and ocean.

Damage caused by those storms contributed to the closure of the Tijuana River the following year, said a study by Joy Zedler published by the Ecological Society of America. From April to December 1984, a lack of tidal flushing decimated cordgrass. As a result, the endangered light-fooled clapper rail lost its nesting habitat, food and protection from prey. "This salt marsh-dependent bird either died or emigrated when nontidal conditions altered their habitat," the study stated. Closing river flow can cause water to be too salty or too fresh. The result can be a lack of oxygen or nutrients in the water, pollution and eventually a die-off of plant and animal species, said estuary researcher Jeff Crooks. "The bird population just crashed after that; they recovered, but it took some time," he said.

The estuary, specifically the Oneonta slough near Seacoast Drive homes, hosts the second-largest population of the Light-Footed Clapper Rail in the world, Crooks said. Support to respond if sand stops river flow is much different from 1984, Collins said. The area received National Wildlife Refuge federal protection in 1981, and in 1984 there was no Visitor Center or on-site staff and less monitoring.

Today estuary staff can tell if the river is blocked with instruments that give real-time indications of salinity, tidal flow, water and dissolved oxygen levels and more. Once permits are approved and heavy equipment is in place, the river could be reopened within a matter of days, Crooks said. When a large winter storm pushed sand into the river's path in 2010, crews using heavy equipment were able to clear the way within a matter of days, Collins said.

If sand disrupted or stopped flow of the river tomorrow, Collins said, a plan is in place to call the Army Corps of Engineers and San Diego Regional Water Quality Control Board and request emergency permits, but the estuary doesn't have the money to carry out the dredging work, Collins said. "At this stage, we're cautiously keeping an eye on it, and if we do think we're going to have a problem with it, we'll pursue discussions with SANDAG, [because] our budget is not enough to do anything right now," he said.

Estuary management also would need to call state regulators since threatened or endangered species may be impacted. It's possible you could have least terns and snowy plovers nest near the project site," Collins said.

In the past, the river mouth has naturally moved or closed, and sediment from across the 1,750-square-mile watershed replenished local beaches, Collins said. But dams and other man-made action have changed the river's characteristics, polluted the water and taken away much of California's coastal wetlands.

"It's very difficult to let it do that now for all sorts of different reasons," Crooks said. "The water isn't clean and it needs to be flushed out, and because of what we're managing for now, it needs to be open. " The Tijuana River National Estuarine Research Reserve is the largest remaining coastal wetland in Southern California, providing habitat to endangered species and more than 370 species of birds, so the critical habitat cannot afford closures that may have naturally occurred in the past. Since the Tijuana estuary is so unique, though a closure would be unfortunate, it may provide valuable research data, he said. Using Jet Skis, GPS devices and other instruments, Scripps Institution of Oceanography professor Bob Guza studies how sand is distributed on San Diego beaches and teaches courses on how waves and sand interact at the coast.

Like Collins and Crooks, Guza thinks there is a potential for sand to close the river mouth. A chance exists flooding could occur upstream if the mouth is closed, and a chance water will find another way to the ocean or punch through the sand and reopen the river mouth if there is heavy river flow. Predicting whether that happens is like predicting the weather a month ahead of time, Guza said.

"You can't make a prediction any more than you can make a prediction about what the temperature's going to be in a few months," he said. "The distance is not so far that it's impossible. It's close enough, and that's a lot of sand. 450,000 cubic yards is a lot of sand.

"Is it going to clog the mouth? I don't think it will actually—but that's speculation."

Guza said he and graduate students have been on the beach in IB to quickly monitor the recent replenishment project but can only make fairly simple observations: The sand is moving, no big storms have moved the sand very far away and the beach is wider. Only thorough monitoring—to observe where sand moves after it hits the shore and disappears under the waves after a replenishment project—can that question be answered. And that requires time and money, Guza said. In most instances, that money goes to sand, not research.

Even if sand closed the mouth of the river next month, where the sand came from cannot be proven without studies like the kind Guza is conducting in Solana Beach and Cardiff, one of eight beaches to receive replenishment as part of the Regional Beach Sand Project.

`If it happens, we won't know for sure what caused it because nobody's making the detailed observations,' he said."

Because there is insufficient mitigation, because Managed Retreat should be further studied and publicly implemented, and because the amount of sand to be dredged and dumped on our beaches would still be excessive, we ask that you deny the application. If more "towel space" were an issue, the City of Encinitas should not have built a lifeguard garage on our natural bluff at Moonlight Beach, when we had nearby parking space at a fire station or our Public Works Yard, a few blocks from Moonlight. There is no evidence that tourism and tax dollars would decrease with less sand. Except for Moonlight Beach, other Encinitas Beaches, including Swamis, Stonesteps, El Portal and Grandview have never had wide sandy beaches. Sandstone cliffs are naturally eroding at high tide.

The proposed project does not make good sense environmentally. It also does not make good sense, financially, as the margins are now cut too close for a positive cost benefit ratio. Taxpayer dollars could be more effectively spent elsewhere, particularly working toward opening up more of our estuaries, and implementing statewide managed retreat programs to benefit natural sand replenishment. Our primary and mutual concerns are to protect our environmental heritage, to preserve natural flora and fauna, while equitably and compassionately balancing the needs of public and private interests.

Lynn and Russell Marr
434 La Veta Avenue
Leucadia, CA 92024

760-436-0129

Lynn Marr
Russell Marr

Simon, Larry@Coastal

From: Dennis Lees <dennislees@cox.net>
Sent: Friday, November 01, 2013 2:19 PM
To: Simon, Larry@Coastal
Subject: Two issues for your consideration
Attachments: SMCA, SO-5 & SO-6 borders.pdf

Hi, Larry,

I finally got the coordinates for the corners of the borrow sites from SANDAG and the Corps yesterday so I was able to look at cumulative effects and compare the areas of the borrow sites listed in the EIS/EIR with the footprints indicated by the coordinates they sent me.

Regarding cumulative effects, you can see in the figure below that, since we are really talking about delayed recovery of the long-lived infaunal assemblages in these areas, I've only worked up the data for SO-5 and SO-6. Currently, ≈303 acres of habitat are in recovery at those two sites. If the Corps is permitted to proceed, that will increase to 475 acres for the next 50 years, at least. Bear in mind, again, the is prime real estate in terms of forage for fisheries. This conclusion, and my discussion of "weeds" and "trees", are backed up by discussions and conclusions in the following draft report to Bureau of Ocean Energy Management (BOEM):

Michel, J., A.C. Bejarano, C.H. Peterson, and C. Voss 2013. Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand. U.S. Department of the Interior, Bureau of Ocean Energy Management, Herndon, VA. OCS Study BOEM 2013-0119. 236 pp. (This document is available on line if desired.)

Another issue that obtaining the coordinates for the borrow sites brought to light is that the Corps does not appear to be providing accurate information to the agencies or the public about the area of impact in the borrow sites. In the EIS/EIR, they claim the footprint for dredging will be 44 acres in SO-6 and 124 acres in SO-5, for a total of 168 acres. When I use the coordinates they provided me, I calculate that these footprints are ≈70 acres in SO-6 and ≈261 acres in SO-5, for a total of 331 acres. This represents a 97% increase in the area above what they claim in the EIS/EIR, and a 59% increase in the Swami's SMCA. I can send you the spread sheet with these calculations if you wish.

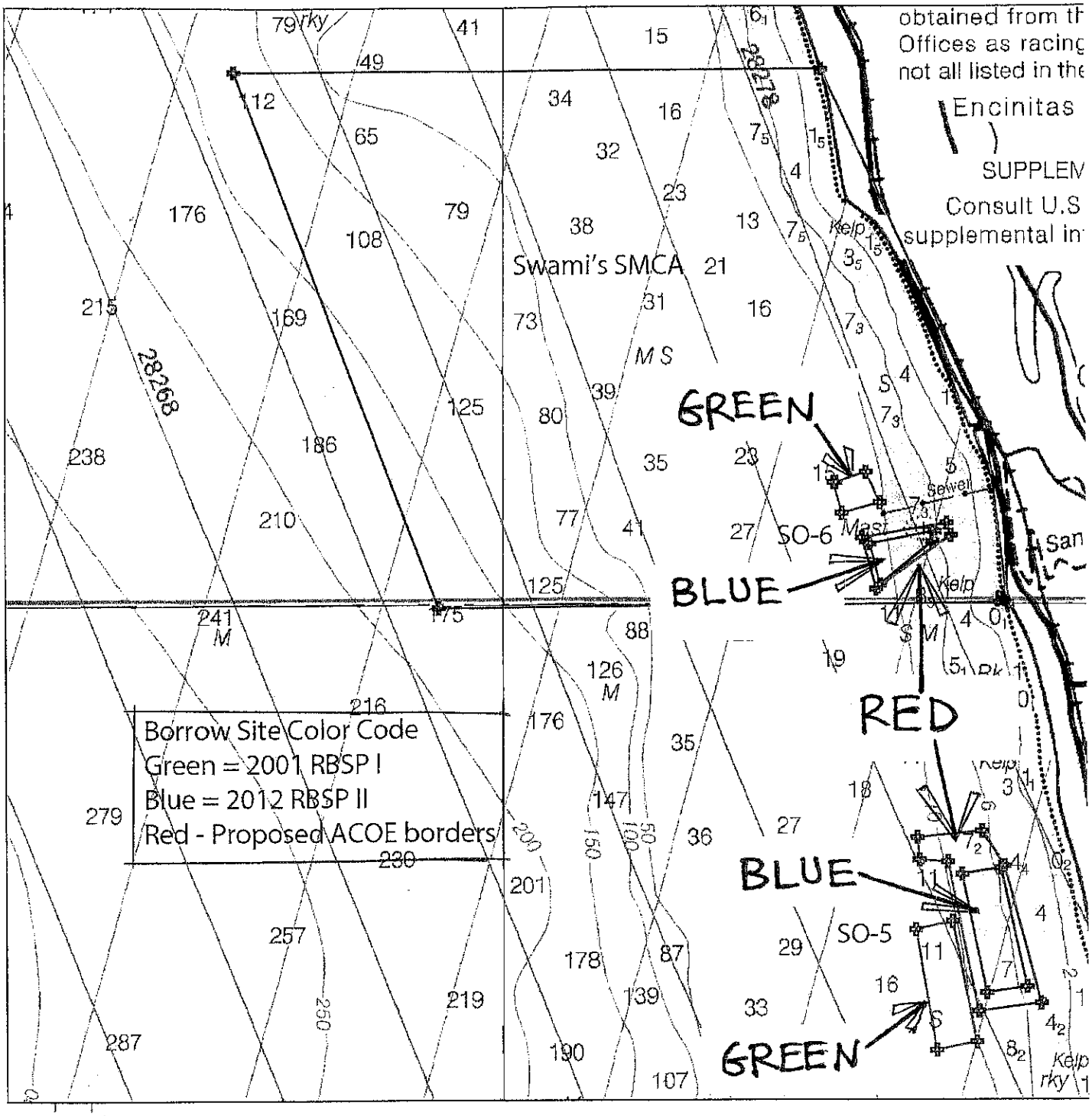
I know the Corps claims that the area of impact is proportionately small, but when the area of kelp beds and other rocky habitat is deducted from the area within the 60-foot isobath (the area of maximum productivity) and the relative productivity of the various stretches of coast are considered, it is likely that the importance of the footprints of SO-5 and SO-6 are considerably more important than acknowledged in the EIS/EIR. And, under the proposed program, these footprints may be turned into dead zones but will definitely be taken out of service for >50 years. This is environmentally unacceptable when one considers that far less sensitive areas are available.

I hope you will consider this information.

Cheers, Dennis Lees

Littoral Ecological & Environmental Services
1075 Urania Ave.
Leucadia, CA 92024
Business: (760) 635-7998
Cell: (760) 707-7324
www.LittoralEcological.com

We haven't inherited the earth, we have just borrowed it from our children!!



0.2 n. miles
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Mercator

On 11/01/2013 the
magnetic declination is
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SERVICES

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1075 Urania Ave.
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Phone Numbers:
(760) 635-7998
dennislees@cox.net
31 October 2013

Mr. Larry Simon
Federal Consistency Coordinator
Energy, Ocean Resources and Federal Consistency Division
California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105

Agenda Item No. Th11a
CD-0203013 (U.S. Army Corps of Engineers, San Diego Co
Dennis Lees, representing lobster fishermen, opposing the project

Dear Mr. Simon:

I have one additional comment that I wish to submit. It relates to a problem that commercial lobster fishermen have encountered in the vicinity of SANDAG's 2012 RBSP II. The following complaint was relayed to me through an intermediary from a specific fisherman, Markus Medak.

"*I think this may be outside your turf but I was wondering if you have a contact for the coastal commission staff that may be working on beach nourishment projects along the north coast of San Diego County (i.e., Del Mar to Oceanside). My husband is a lobster fisherman and he thinks the lobster were absolutely devastated by the beach nourishment projects that took place last year. The sand all washed off the beach and filled in all the lobster habitat making them easy prey for sheepheads et al. On the opening day of lobster season he caught 1/3 of his lowest opening day catch ever. He is in the process of moving [h]is traps south to Pt. Loma, where no beach nourishment projects took place and the lobster catch appears unaffected.*

It is not just the lobster that are hurt by the beach nourishment projects. It is the entire invertebrate food base that gets covered by sand. I am hoping the coastal commission is taking a close look at these projects. Your help would be greatly appreciated."

This is an example of the value of Local Ecological Knowledge (LEK) in decision-making. One of the reasons the USACE was able to achieve a positive Cost: Benefit Analysis is that the consultants didn't identify any Lost Resources. What this fisher (and, I assume, his fellow fishers) encountered represents a substantial Lost Resource and lost

revenue. These fishers, who make their living on the sea, definitely have greater knowledge of the resources and habitats than the consultants preparing the EIS/EIR for the USACE. Their LEK should be considered very carefully.

It should be noted that this effect of the RBSP II probably is not just a single event. Moreover, it is likely other fisheries are involved. Furthermore, it is probable that if the USACE project is implemented, this habitat will be buried for several out of every 5 years, and that the loss of this resource and revenues could occur in two or three (40-60%) of every five years of fishing for the next 50 years.

The reason I am transmitting this message is that the fishermen are two weeks into their lobster season and working 12-16 hours per day at making a living. They cannot take time off to write, especially since some have had to relocate many of their traps while they are fishing others.

Please consider the manner in which the RBSP II beach nourishment affected the environmental and the delayed (nearly a year later) commercial fisheries effects observed by fishermen Moreover, consider the potentially greater effects on fisheries and the environment of the larger USACE program for Encinitas and Solana Beach.

Sincerely,

Littoral Ecological & Environmental Services

Dennis C. Lees
President

October 30, 2013, response by U.S. Army Corps of Engineers to U.S. Fish and Wildlife Service email of October 21, 2013 regarding California least Tern and Western snowy plover (provided as **Exhibit 17** to CD-0203-13 staff report).

The Corps has reviewed and considered the US Fish and Wildlife Service's (FWS) views regarding the California least tern and western snowy plover, including the FWS email communication of 21 October 2013 (Attachment 1). Each species is discussed in turn.

California least tern (*Sternula antillarum browni*, hereafter CLT)
The Corps has studied the proposed project's potential effect on CLT. We have determined there would be no effect to CLTs based in part on studies of potential affects to CLT from dredging and beach nourishment activities (report in final preparation) and on specifics of the proposed project. We have determined that there would be no effect to CLTs from dredging or beach fill activities proposed for this project. We considered distance from nest sites, the composition of the material being dredged and placed, and the open coastal nature of the project area.

The nearest borrow site is located 1,900 feet offshore. Dredging activities at the borrow site would influence a very small area in the immediate vicinity of the dredge. CLT generally forages substantially closer to the shore in the vicinity of the surf zone. Further, this small affected area is dwarfed by the extent of the area left unaffected that the CLTs can use for foraging with no change in activity levels. Therefore, we have determined dredging activities would not affect CLT.

Turbidity from beach fill activities would affect a relatively small area within and near the surf zone during construction of the initial L-shaped berm using dredged material, an activity that would impact the immediate discharge point and a short distance down current. The RBSP I & II projects constructed a berm similar to that proposed by the Corps for this project. The RBSP projects were monitored for potential effects to CLT, and no effects on CLT foraging were observed. As such, we anticipate the proposed project would similarly have no effect on CLT foraging.

A no-effect determination made by the federal action agency does not require concurrence by the FWS. We have complied with section 7 of the Endangered Species Act.

Western snowy plover (*Charadrius nivosus nivosus*, hereafter WSP)
The FWS identified two areas of concern for this species. The first is related to the Seaside parking lot (hereafter Seaside) located within south Cardiff State Beach, a proposed staging location for the initial fill as well as all renourishment events. The second concern pertains to renourishment events located at the two beach fill areas.

Seaside
Recently, the city of Solana Beach indicated the refurbished Fletcher Cove staging area described in the Draft EIS/EIR for the Solana Beach Segment may not have adequate area. In light of this development, the Corps proposes to retain the option to use Seaside as a staging area for the initial fill and renourishment events. The Seaside staging area would be confined to the existing parking lot and access routes from the parking lot to the beach fill site. The parking lot would host a construction trailer, vehicle maintenance and refueling, serve as pipeline storage, and would provide parking for contractor and Corps employees working on this beach fill segment. The staging area would provide access for sand distribution and project equipment.

Activities within the staging area would not affect WSP as impacts would be similar to current beach activities. While the Corps is of the opinion activities in the parking lot would not affect WSP, we agree to incorporate as part of the project the recommendations made by the FWS regarding minimization of night lighting to the lowest illumination necessary for human safety, selectively placed, shielded, and directed away from natural habitats. Safety considerations, however, do not allow us to completely eliminate it from the parking lot. Additionally, employees will be required to strictly limit their activities, vehicles, equipment, and construction materials to the marked staging area within the parking lot.

The Corps agrees with the FWS the access route may affect the WSP, which is a post-breeding and wintering population at Cardiff State Beach. Roosting and foraging WSP were documented at Cardiff State Beach in recent years from July through May. Measures described below would be implemented in the event Seaside staging area is utilized and monitoring indicates presence of WSP at Cardiff State Beach. The Corps must maintain authority over the construction contract, but will confer with FWS on specific avoidance measures and will share information, including relevant reports generated, during contract performance, as described below. With inclusion of monitoring and protection measures in the project description to prevent adverse impacts to WSP, the access route would not likely to adversely affect WSP.

Avoidance and minimization measures consist of the following:

- The project impact limits, including the access route and paved staging area, will be temporarily marked with flagging or orange fencing. The final construction plans, including photographs of the marked project impact limits will be provided to the FWS prior to mobilization for their review. Temporary markers will be removed upon project completion.
- A project biologist will be responsible for overseeing compliance with protective measures for the plover. The project biologist will be qualified to monitor WSP. The project biologist's name, address, telephone number, and work schedule on the project will be submitted to the FWS prior to initiating project impacts. The project biologist will perform the following duties:
    - Monitor compliance with all avoidance and minimization measures
    - Oversee installation of the temporary marking
    - Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented by construction personnel. At a minimum, training will include:
        - the purpose for resource protection;
        - a description of the plover and their habitat;
        - measures that should be implemented during project construction to avoid impacts to the WSP, including strictly limiting activities, vehicles, equipment, and construction materials to the marked project footprint;
        - the protocol to resolve conflicts that may arise; and
        - the general provisions of the Endangered Species Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act.
    - Halt work, if necessary, for any project activities not in compliance with avoidance and minimization measures. The project biologist will report any non-compliance issues to the Corps within 24 hours of its occurrence. The Corps will

confer with the FWS to ensure the proper implementation of species and habitat protection measures.

- Submit weekly compliance reports, with photographs of impact areas, to the Corps to document authorized impacts were not exceeded and compliance with all avoidance and minimization measures. Copies of the compliance reports will be forwarded to the FWS.
- Submit a report to the Corps within 48 hours if an impact occurs outside of the approved project limits. Copies will be forwarded to the FWS as soon as possible.
- Submit a biological monitoring report to the Corps after project completion that includes: as-built construction drawings with an overlay of areas that were impacted and other relevant information documenting that authorized impacts were not exceeded and that general compliance with the avoidance and minimization measures was achieved.

- At all times while on Cardiff State Beach, a qualified WSP monitor will walk ahead of the vehicle(s) and equipment to assure that all WSPs are out of harm's way before the vehicle(s) or equipment can proceed.
- The number of vehicle trips on Cardiff State Beach shall be minimized to the extent practicable during equipment and dredge pipeline mobilization, inspection and maintenance, and demobilization.
- Vehicle use on approved beach areas is authorized only for activities associated with the various discharge operations.

Beach fill segments

The two beach fill segments (Encinitas and Solana Beach) are typically heavily eroded and do not provide habitat for WSP. Therefore, the initial fill would not affect this species. The Corps made its initial no effect determination for renourishment events based on the assumption that beaches would be equally eroded prior to each renourishment event. The FWS noted it is possible that future conditions at the beach fill segments may be sufficient to support WSP, and project activities may affect WSP. The Corps proposes to monitor the beach fill segments prior to mobilization to determine if WSP are present. If WSP are not present, then no further measures would be taken. If WSP are present, the same avoidance and minimization measures described above for Seaside would be applied to those beach segments with WSP. With inclusion of monitoring and protection measures in the project description to prevent adverse impacts to WSP, the beach fill activities would not likely to adversely affect WSP.

The Corps will initiate informal consultation with the FWS for the WSP immediately after the Commission concurs with the current Consistency Determination (CD). We want to ensure that all conditions of the CD are included in the informal consultation. This should allow conclusion of the informal consultation prior to agency review of the Final Integrated Report.

Limitations

Some measures suggested or supplied by FWS as examples would not be possible for the Corps to undertake because they are unrelated to the project. These measures include crow predator control at the San Elijo Lagoon salt panne; restoration, placement of permanent barriers (e.g., post and cable or fencing), and installation of snowy plover information signage at the vacant lot

adjacent to the Seaside (including basic exotic plant removal and lay-back/reduction of a portion of the existing steep slopes facing the beach).

The following general measures would be added to aid in avoiding impacts to WSP, but which would also reduce other impacts as well. These measures would be implemented independent of possible affects to WSP; i.e. they would be implemented even if the project does not use Seaside and/or if no WSP show up on segment beaches for any of the renourishment events.

- If night work is necessary, night lighting will only be used in the surf fence construction/ maintenance zone and will be of the lowest illumination necessary for human safety, selectively placed, shielded, and directed away from natural habitats.
- Employees will strictly limit their activities, vehicles, equipment, and construction materials to the marked impact limits
- The project site will be kept as clean of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site
- Pets of project personnel will not be allowed on the project site
- All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will occur in designated areas outside of waters of the U.S. within the fenced project impact limits. These designated areas will be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering waters of the U.S., and will be shown on the construction plans. Contractor equipment will be checked for leaks prior to operation and repaired as necessary. "No-fueling zones" will be designated on construction plans.

Consistency Determination No.: CD-0203-13
Encinitas and Solana Beach,
San Diego County, California
Coastal Storm Damage Reduction Project

CCC Hearing
November 14, 2013

US Army Corps of Engineers

A copy of these briefing materials has been provided to CCC staff.

Project Description

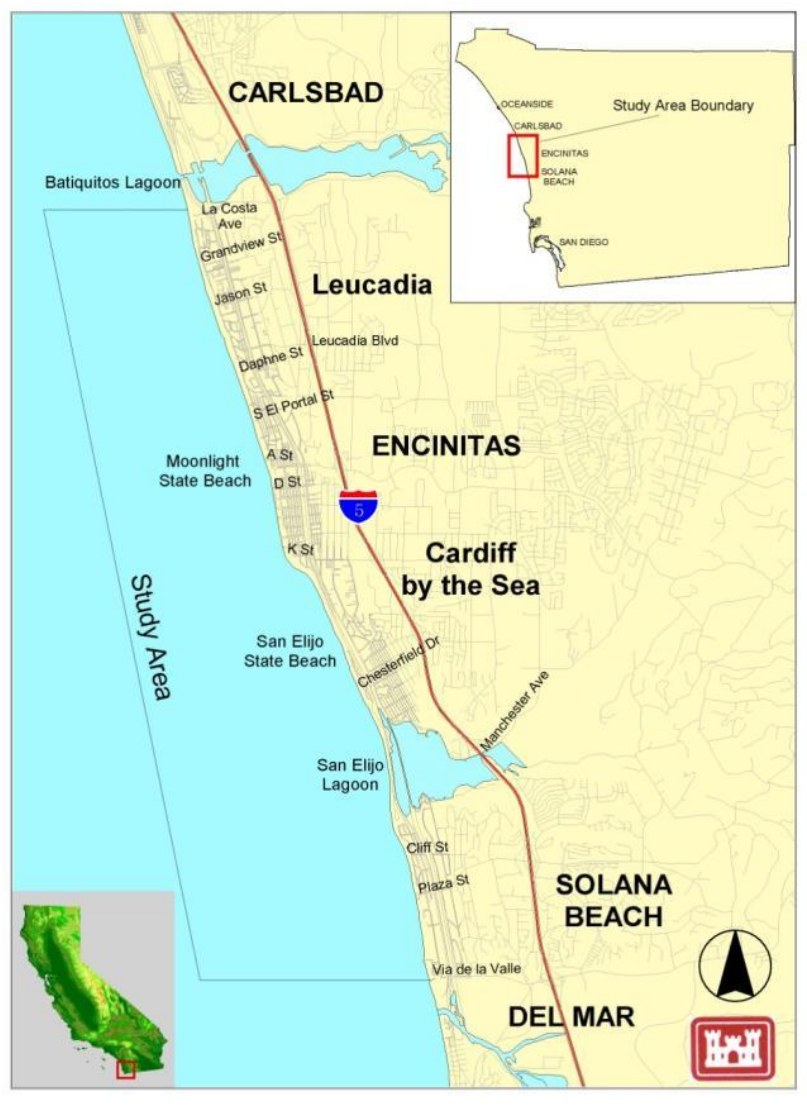
- The USACE Consistency Determination for Encinitas-Solana Beach Coastal Storm Damage Reduction Project is a 50-year effort to protect more than 8 miles of coastline in Encinitas and Solana Beach with sand dredged from offshore borrow sites.

Purpose: To reduce wave-induced coastal erosion at the base of the bluffs and reduce the need for additional armoring, thereby protecting public safety and infrastructure and improving coastal access.

Project Objectives

- ***Reduce coastal storm damages*** to property and infrastructure along shoreline and bluff top, prior to need for emergency action/shoreline armoring.
- ***Improve public safety*** by reducing threat of life-threatening bluff failures caused by wave action against the bluff toe.
- ***Reduce coastal erosion and shoreline narrowing*** to improve recreational opportunities for shoreline users.

Project Location



Cities of Encinitas and Solana Beach, San Diego County

State Parks in Project Area:

- Moonlight State Beach
- San Elijo State Beach
- Beacons State Beach
- South Cardiff State Beach

Project Need

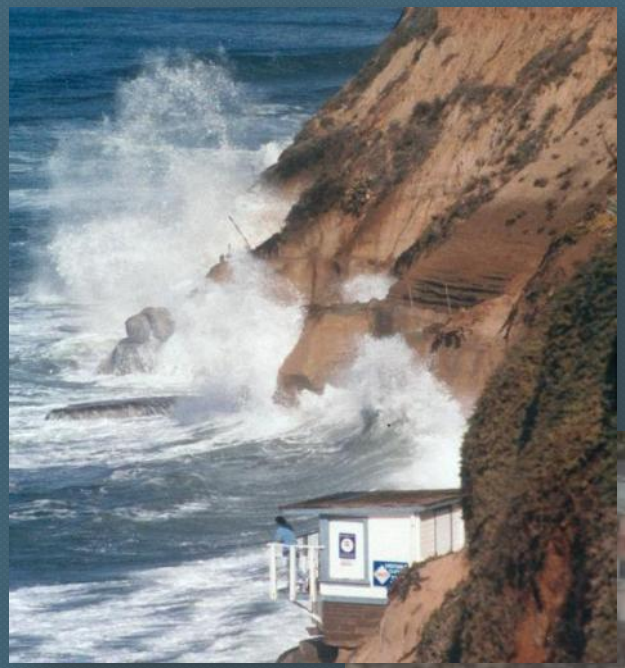
- Sand transport blocked by inland development, construction of roads, Highway 101, railroad and some coastal structures such as harbors and jetties.
- Coastal erosion since has steadily resulted in the loss of the public beach and created an eroding coastline.
- Encinitas and Solana Beach considered areas of concern by the *California Regional Sediment Management Plan*.
- Without beach nourishment, additional shoreline armoring will be needed to protect existing structures.
- Beach replenishment is also the preferred response to future sea level rise instead of shoreline armoring.

Project Need: Loss of Public Beach

Project Need: Bluff Failures

BLUFF FAILURE
SOUTH OF TIDE PARK, SOLANA BEACH

Project Need: Structural Damage and Public Safety



Project Need: Structural Damage and Public Safety


STONE STEPS BEACH

FLETCHER COVE COMMUNITY CENTER


CARDIFF RESTAURANT ROW

HIGHWAY 101

Project Need: Public and Private Infrastructure At Risk

City of Encinitas:

Coast Hwy 101 (Emergency evacuation route and I-5 alternative)
18" gas line under Hwy 101 & other utilities
Sewer pump station at Cardiff State Parking lot
Restaurants (Beach House, Charthouse, Pacific Grill)
Cardiff State Beach Parking Lot
Cardiff State Beach Campground
Public beach access ways/staircases:

- 10 staircases for San Elijo State Beach campground
- State lifeguard access road (north end of day use parking lot)
- Swamis
- D Street
- Stonesteps
- Beacons
- Seabluff

Moonlight Beach Lifeguard Tower
Public roads

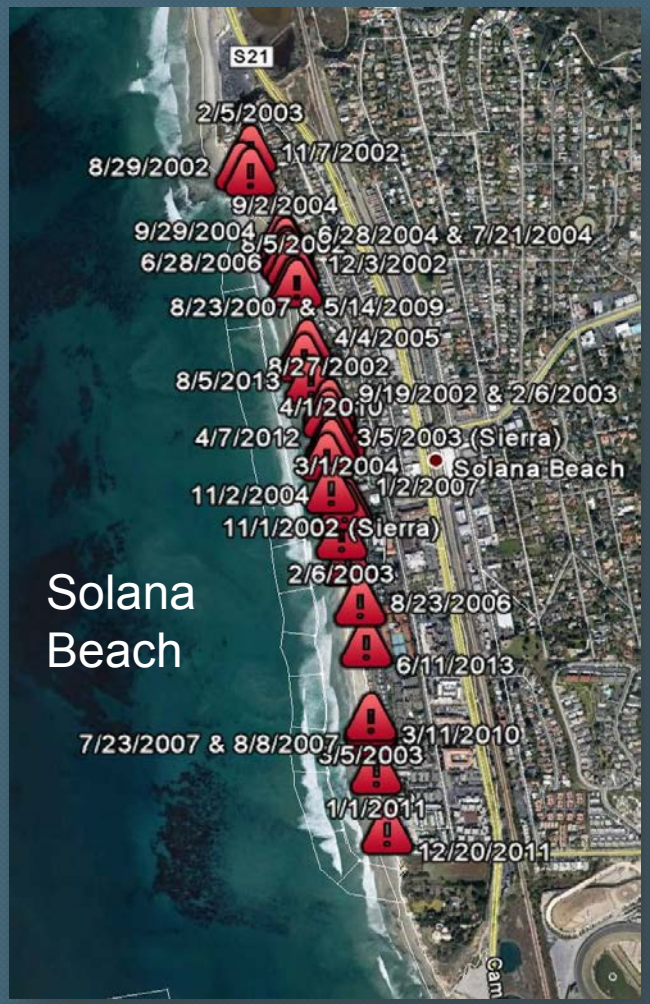
City of Solana Beach:

Public beach access stairways at Tide Park, Fletcher Cove and Del Mar Shores
All public shoreline and beaches in the City, including Tide Park Beach and Fletcher Cove Beach
Fletcher Cove Community Park
Solana Beach Marine Safety Headquarters
Fletcher Cove Community Center
Lifeguard stations at Tide Park Beach and Del Mar Shores
Stormwater interceptor facilities
Fletcher Cove public access ramp
Multiple public beach parking lots proving free public beach parking
Public roadways
Numerous wet and dry utilities located on or in the bluffs including sewer lines, electric distribution lines, natural gas lines, and existing stormwater facilities

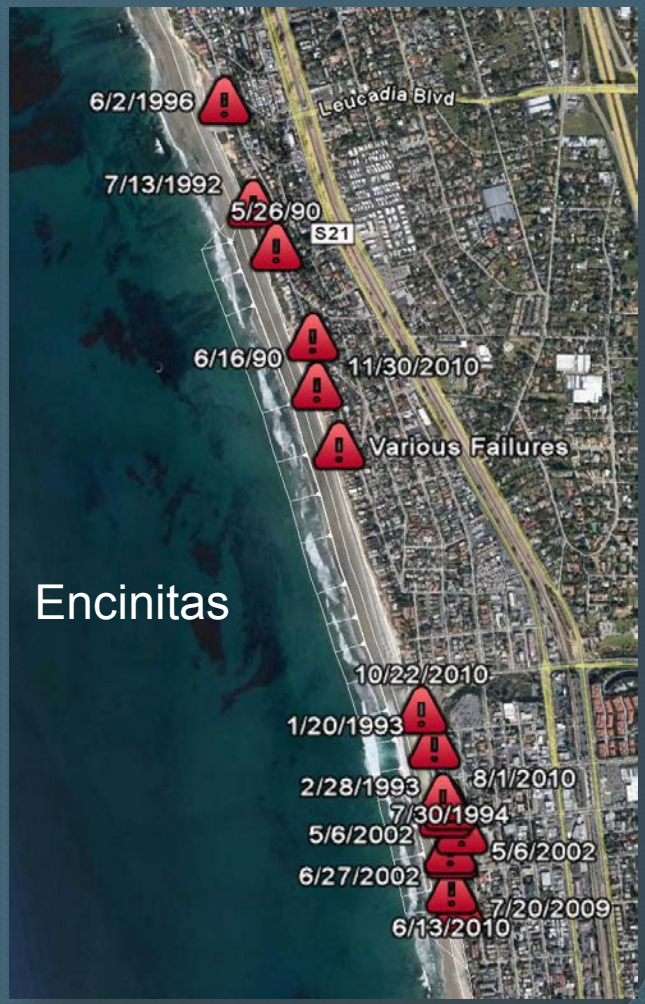
Project Need: Avoidance of More Shoreline Armoring

Source: Coastal Records Image 201312222

Project Need: Ongoing Bluff Failures



- Five deaths in region due to bluff failures
- Bluff failures on-going (large and small
- Public hazard exists at public beaches



Project Need: Prepare for Future Sea Level Rise

- Proposed beach replenishment project designed to be resilient to sea level rise over 50 year life – various sea level rise scenarios evaluated in EIR/EIS using National Research Council data recommended by CCC.
- CCC Draft Sea Level Rise Policy Guidance document released 10/14/13 recognizes beach nourishment as preferred sea level rise adaptation strategy.
  - *"Maximize natural shoreline values and processes and embrace green infrastructure and living shorelines; avoid the perpetuation of shoreline armoring."* Page 6
  - *"Require "soft" or "living" shorelines such as beach nourishment as an alternative to shoreline protection devices."* Page 53
  - *"Establish a beach nourishment program and protocols"* Page 54

Alternatives Analysis

- Comprehensive Alternatives Analysis conducted:
  - Initial evaluation of structural and non-structural solutions
  - Dismissed hard structures from further analysis (seawalls, breakwaters, groins, revetments)
- Final Array in EIR/EIS:
  - No Action Alternative (future emergency armoring)
  - Beach nourishment at widths ranging from 50’ – 200’
  - Beach nourishment at various widths plus notch fills
- Identified SB-1A and EN-1A as tentatively selected in Draft Feasibility Report for best meeting objectives.
- Revised SB-1B and EN-1B to respond to CCC concerns.
- <u>Preferred project is comprehensive beach nourishment.</u>

Project Revisions

- Proposed Project has been modified in important ways to address comments of the Coastal Commission and other agencies and stakeholders.

  - ✓ Reduction of project sand volumes in both Cities:
    - Encinitas beach width reduced from 100’ to 50’;
    - Solana Beach beach width reduced from 200’ to 150’;
  - ✓ Addition of physical monitoring in between the receiver sites as requested by the CCC;
  - ✓ Addition of biological monitoring at borrow sites as requested by the CCC;
  - ✓ Addition of archaeological resource field work at Moonlight State Beach to determine western extent of resources as requested by State Parks;

Project Revisions

- ✓ Addition of two new lagoon monitoring transects as requested by the Los Penasquitos Lagoon Foundation;
- ✓ Additional surfing monitoring as requested by the Surfrider Foundation; and,
- ✓ Inclusion of additional avoidance measures and protections for least terns, snowy plovers and grunion as requested by USFWS

- These important project revisions are *in addition* to prior environmental commitments and protection measures.

Environmental Commitments

- Habitat Monitoring Plan
- Biological Mitigation and Monitoring Plan
- California Grunion Monitoring and Avoidance Plan
- Snowy plover Avoidance Plan
- Cultural Resources Plan Monitoring
- Shoreline Monitoring Plan
- Water Quality Monitoring Plan
- Noise Monitoring Plan
- Surfing Monitoring Plan
- Stormwater Pollution Prevention Plan (SWPPP)
- Oil Spill Prevention and Response Plan (OSPRP)
- Borrow Site Monitoring Plan
- Safety Plan
- Staging Plan

Reductions in Volumes and Width

PARAMETERS	Original Project (EN-1A)	Reduced Project (EN-1B)	Original Project (SB-1A)	Reduced Project (SB-1B)
Initial Placement Volume (cy)	680,000	340,000	960,000	700,000
Re-Nourishment Volume (cy)	280,000	220,000	420,000	290,000
Re-Nourishment Cycle	5-year	5-year	13-year	10-year
Total Placement Volume (cy over 50 Years)	3,200,000	2,320,000	2,210,000	1,860,000
Added Beach MSL Width	100’	50’	200’	150’
Benefit to Cost Ratio	1.53	1.2	1.43	1.47
Residual Risk	32%	62%	45%	56%

Future Review of Renourishment Events

As a Federal Agency, USACE is a partner with the California Coastal Commission in upholding the CZMA.

- USACE has made a Federal Consistency Determination for the 50-yr project and seeks concurrence from the CCC.
- Project is comprised of several events, evaluated as a complete project in the EIR/S and Federal Consistency Determination.
- USACE will continue to coordinate with CCC over the project life:
  - All reports will go to CCC prior to each renourishment event.
  - CCC can request remedial actions or a Supplemental CD if CCC identifies substantial project changes or coastal effects substantially different than described.
- If project substantially changes or has substantially different coastal effects than described, **USACE has independent responsibility** to ensure compliance with CZMA and prepare a Supplemental CD.

Encinitas Receiver Site

- 50’ added beach width
- 7,800 linear feet
- Initial Volume = 340,000 cy
- Renourishment Volume = 220,000 cy

Beach Sand Replenishment Sites, Encinitas, California

Solana Beach Receiver Site

- 150' added beach width
- 7,200 linear feet
- Initial Volume = 700,000 cy
- Renourishment Volume = 290,000 cy

Beach Sand Replenishment Sites, Solana Beach, California

USACE and Regional Sand Replenishment Project Comparison

Average Beach Widths Added

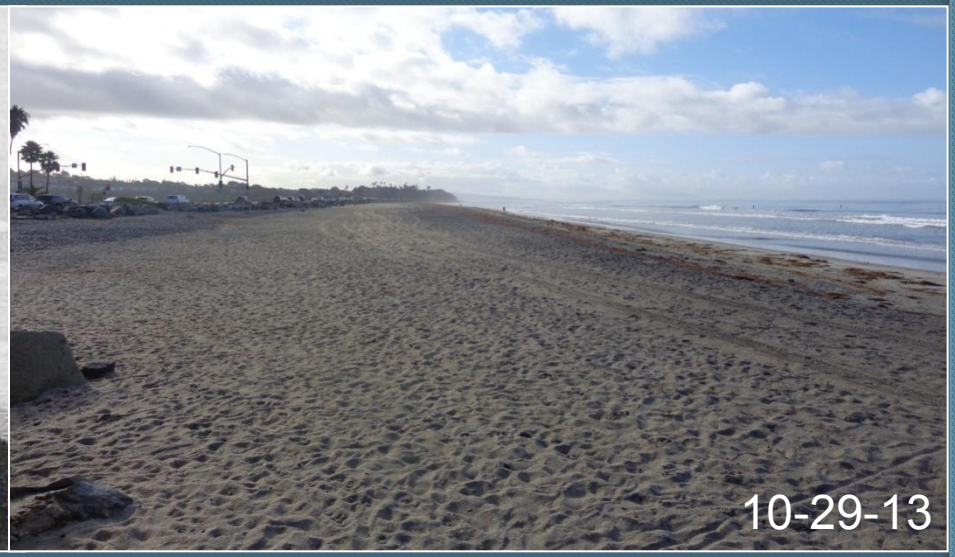
2012 SANDAG Regional Beach Monitoring Annual Report

Project	Year	Average Added Beach Width
RBSP 1	**2001**	180 feet: Encinitas 70 feet: Solana Beach
RBSP 2	**2012**	230 feet: Encinitas 220 feet : Solana Beach
USACE Project	**Proposed**	50 feet: Encinitas 150 feet: Solana Beach

Completed Sand Replenishment Projects

PRE-RBSP 1 (1998)

POST-RBSP 2 (2013)



- Since 2001, over 1 million cubic yards have been added to the intertidal zone off Encinitas and Solana Beach.
- Restored habitat for grunions, shorebirds, sand crabs which was non-existent prior to the regional beach sand projects.
- Re-created some surfbreaks and improved surfing. Surfer Magazine rated Encinitas as #3 Best Surf Town in America in 2009.

State Marine Conservation Area

- Beach nourishment allowed within Swami's SMCA.
- Moonlight Beach receiver site was located in SMCA without adverse impacts to surfing or habitat w/RBSP 1 or 2.
- EIR/EIS Technical Review: Determined no potential for significant impacts to biological resources in the SMCA.
- Extensive monitoring will be conducted for surfing and biological resources following implementation.

Public Access & Safety Benefits

- Increased public safety along the public beaches
- Creates new public beach areas (+ 35 acres)
- Protects public beach and coastal access ways

Benefit Cost Ratio (BCR)

- Federal government assesses benefit-to-cost ratio (BCR) for each project as part of selection / funding process
- Must weigh infrastructure protection and safety benefits versus total project costs
- Minimum allowable BCR is 1.0
- Solana Beach BCR reduced to =~1.47
- Encinitas BCR reduced to =~1.2
- Residual risk (metric of project effectiveness)
- Federal competition for funding based on BCR

Benefit Cost Analysis Components

- Benefits of constructing this Project Include:
  - Avoidance of a certain amount of seawall construction
  - Decrease in structure/public stairway/content loss
  - Decrease in land loss
  - Increase in demand & attendance along beaches
- Costs of constructing this Project Include:
  - Dredging and all related construction costs including Constructing Monitoring
  - Mitigation measures
  - Monitoring (Physical and Environmental/Biological)
  - Contingency

Economic Benefits of Beaches

- Beaches are important low and no-cost destinations for California residents and visitors.
- California's beaches contribute $73 billion to the national economy and generate $14 billion in tax revenues for the federal government.
- In comparison, California only received $10 million in federal shore protection appropriations in FY95-99.
- California receives less than one tenth as much in Federal appropriations as New York and New Jersey, states which have fewer miles of beaches.

Source: ***The Fiscal Impact of Beaches*, by Philip King, Ph.D.**
Prepared for the California Department of Boating and Waterways (1999)

Broad Base of Support

- Division of Boating and Waterways/State Parks
- SANDAG
- City of Oceanside Harbors & Beaches Department
- California Coastal Coalition
- Beach & Bluff Conservancy
- SeaCoast Preservation Association
- U.S. Senator Diane Feinstein
- U.S. Senator Barbara Boxer
- U.S. Representative Darrell Issa
- Senator Marty Block
- Senator Mark Wyland
- Assemblymember Toni Atkins
- COOSA
- Leucadia 101
- Cardiff 101

Project History

• USACE Feasibility Study Begins	2001
• Release of Draft EIR/EIS	2005
• Additional study and reformulation of alternatives	2005-2012
• Development of Integrated Feasibility Report/EIR/EIS	2011-2012
• Resource Agency Coordination	2011-2013
• New Draft EIR/EIS released for Public Review	Dec 28, 2012
• Public Workshop and EIR/EIS Comment Period	Dec – Feb 2013
• CCC Review	Jan – July 2013
• CCC Hearing	July 2013
• CCC Approval of Findings	August 2013
• Added monitoring measures and addressed issues	July-Sept 2013
• Submitted revised reduced size project	Sept 2013
• **Revised project consideration by CCC**	**Nov 14, 2013**
• Congressional Authorization (WRRDA)	2014

Coordination

- Technical Reviews
  - Centers of Expertise
  - Independent External Peer Review
  - Multiple Agency Technical Reviews
  - Economic and Environmental Model Reviews
- Resource Agencies
  - Nearshore Impacts
  - Functional Assessment
- Public Meetings
  - NOP Scoping Meetings May 2012
  - Public Meetings Feb 2013
  - City Council Meetings
- Stakeholder Meetings

Conclusion

Project is consistent with California Coastal Management Program and the California Coastal Act.

USACE, City of Encinitas and City of Solana Beach request that the Commission concur with consistency determination #CD-0203-13.

US Army Corps of Engineers

Thank you

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

November 12, 2013

Planning Division

Dr. Charles Lester
Executive Director
California Coastal Commission
ATTN: Mr. Larry Simon
45 Fremont, Suite 2000
San Francisco, California 94105-2219

Dear Dr. Lester:

In regard to the letter that your office received from Professor Falk Feddersen of Scripps Institution of Oceanography (SIO) concerning the U.S. Army Corps of Engineers (Corps) coastal storm damage reduction project within the cities of Encinitas and Solana Beach, the Corps would like to address the concerns raised by Professor Feddersen.

The Corps has an approval process that our engineering models must go through before we are able to use them in a decision document that will be presented to Congress. The GENESIS model is on our current approved list of modeling software and is the preferred model for use in shoreline modeling during Planning and Pre-construction, Engineering and Design. Of the three models that Professor Feddersen mentions, MIKE21 has been approved for use by the Corps, but is not the preferred model and Delft3D is not an approved model. According to the United States Geological Survey's website, COAWST is an "experimental product."

USACE has its own newer versions of shoreline models, such as GENCADE, but these have only recently been released and are still considered developmental. We acknowledge that there are newer technologies that can be applied. However, a relatively simple model like GENESIS is still appropriate, and when interpreted with the long history of beach profiles and shoreline change data in the northern San Diego, gives a reasonable evaluation of expected project performance and impacts. The evolution of the cross shore distribution of sand in the Feasibility Study is not from GENESIS but from the analysis of many years of repetitive beach profiles.

With regard to extreme wave events, the time series used in the model were created from an offshore hindcast for the period from January 1979 thru December 2001, with transformations to "local deepwater" using the transformations developed by SIO's Coastal Data Information Program (CDIP) team. The wave climate does in fact include the severe ENSO/El Nino winters of 1983 and 1998.

GENESIS has been used in the design and evaluation of many beach fill projects throughout the country, and has been used in southern California to evaluate projects like the SANDAG Regional Beach Sand Projects, the Batiquitos Restoration beach fill and the Bolsa Chica Restoration beach fill. While not the complete answer in itself, used as a tool with other information like historic beach profiles and monitoring data of prior beach fills along with the

rich set of wave information, GENESIS can provide reasonable evaluations of the beach fills' probable response.

If you have any questions related to this or any aspect of the Project, please don't hesitate to contact me at (213) 452-3783, or your staff can contact Ms. Susie Ming at (213) 452-3789.

Sincerely,

Josephine R. Axt, Ph.D.
Chief, Planning Division

CC: David Ott, City of Solana Beach
Gus Vina, City of Encinitas