

# California Coastal Sediment Master Plan

## 905(b) Reconnaissance Report



Los Angeles District, U.S. Army Corps of Engineers



November 2003

# California Coastal Sediment Master Plan, California

## Section 905(b) (WRDA 86) Analysis

### 1. Study Authority

This Section 905(b) analysis was prepared under the following authority:

- a. House Committee on Transportation and Infrastructure Resolution 2672, May 22, 2002

“California Coastal Sediment Master Plan resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, in accordance with Section 110 of the River and Harbor Act of 1962, the Secretary of the Army is requested to develop a comprehensive plan for the management of sediment in coastal California for purposes of reducing shoreline erosion and coastal storm damages, providing for environmental restoration and protection, increasing natural sediment supply to coast, restoring and preserving beaches, improving water quality along coastal beaches, beneficially using material dredged from ports, harbors and other opportunistic sediment sources, and related purposes.”

Funds in the amount of \$100,000 were appropriated in FY03 to conduct the reconnaissance phase of this study.

### 2. Study Purpose

California’s beaches and coastal areas provide a valuable habitat resource for a wide variety of marine life and endangered species. Additionally, it’s sandy beaches, meandering bicycle paths, seaside residences; ports, harbors, surf and beautiful sunsets are a determinant for California’s economy and quality of life.

From an economy too small to measure before the Gold Rush, California has emerged as the eighth ranked economy in the world, becoming the first state whose gross product exceeded the trillion-dollar mark in 1997. Coastal tourism is an integral part of the state and local economies. In 1998 the State of California Department of Boating and Waterways conducted studies that estimated California’s beach economy was responsible for \$14 billion in direct spending, generating \$1 billion in state taxes and more than 500,000 jobs.

Coastal sediments that comprise California’s beaches today have historically originated from inland sources, through a series of physical processes and mechanisms, involving terrestrial erosion, hydraulic transport and finally deposition within rivers, coastal lagoons/estuaries and exposed shorelines. Once reaching the coast, these sediments again undergo the cycle of erosion, transport and redistribution. California has approximately 1,100 miles of coastline, 86 percent of this valuable resource is actively eroding due to natural and human induced alterations in the sediment’s cycle. Navigation and shoreline structures, along with implementation of water control projects, have contributed significantly in affecting total yield and movement of sediments to and along the coast.

It is clearly understood that there is a strong interdependency amongst coastal sediments and the wide array of today’s coastal resources issues. Recreation, public and aquatic ecosystem health, water quality, navigation safety, storm damage reduction, shoreline protection, sand rights and economic vitality are prime examples of areas of

public interest which are directly impacted by the transport and distribution of coastal sediments. In the past, coastal resources issues within the State of California have been addressed and compartmentalized at either site or project specific levels. However, state and Federal agencies are now looking, in an era of limited resources, for an efficient blend of scientific evidence and public policy to facilitate regional inter-agency cooperative initiatives to protect, enhance and restore California's important coastal resources through a system-wide sediment management approach. As a result, the U.S. Army Corps of Engineers and the State of California through the California Resources Agency have established a formal collaborative relationship to address these issues at a "super-regional" scale under the Coastal Sediments Management Workgroup, which has cumulated in the initiation of a comprehensive and adaptive Master Plan to programmatically manage California's coastal sediments.

The California Coastal Sediments Master Plan's integrated approach to sediment management will maximize Federal, State and local investments by developing "super-regional" solutions to coastal resources problems and providing lasting benefits by allowing agencies to efficiently work together by leveraging financial and technical resources. The Master Plan will provide coastal managers, planners and engineers with the information needed to develop best management practices and optimize strategies to realize environmental and economic benefits for the State of California and the Nation. Among the main objectives for the Master Plan is to generate information to identify and prioritize sediment-related projects; review regulatory coordination; develop opportunistic sand programs; and assess the cumulative impacts and benefits of sediment-related projects at regional levels. The information will be developed to allow the State and other local agencies to be able to comply with the Federal NEPA and State CEQA requirements as part of future decision-making.

The purpose of the California Coastal Sediments Master Plan is to determine if there is a Federal interest in a cost-shared feasibility study to provide framework for storm damage reduction, environmental restoration, navigation, recreation, and related purposes along the California coast. The Master Plan will consolidate information on the historic, present, and project future conditions related to coastal resources along the California coast; develop and analyze coastal processes; and provide a framework for the State of California and other interests managing the coastal resources along California. This could include identifying problems, needs and opportunities; developing localized and regional solutions; prioritizing solutions; and developing common databases. The purpose of this Section 905(b) (WRDA 86) Analysis is to document the basis for this finding and establish the scope of the study. As the document that establishes the scope of the study, the Section 905(b) (WRDA 86) Analysis is used as the chapter of the Project Management Plan (PMP), which presents the reconnaissance overview and rationale for plan formulation.

### **3. Location of Study, Non-Federal Sponsor and Congressional District**

a. The study area covers the entire California region approximately 1,770 kilometers (1,100 miles) of shoreline along the Pacific Ocean coastline. The State of California, the third largest state in the United States, has a total area of 411,469 sq km (158,869 sq mi), including 6,929 sq km (2,674 sq mi) of inland water and 575 sq km (222 sq mi) of coastal waters over which it has jurisdiction (Attachment 1).

With 12 physiographic regions from high mountains, foothill woodland, chaparral, moist forests, and an alternating rocky and sandy coast, California has high topographic diversity, including the highest land in the continuous 48 states (Mt. Whitney's elevation

is 4,406 meters). Large differences in daily and annual temperatures, precipitation, and evaporation lead to differing vegetation patterns and centers of plant endemism. Where rivers and smaller drainages reach the coast, there may be protected bays, salt marshes, and coastal dunes.

In the past, the dominant source of sediments to the coast has been rivers and streams. These were the transport mechanisms that moved sediment from the mountains and uplands to the lowland basins and nearshore systems. However, over the last thirty or forty years most of the rivers in Southern California have been tamed through the construction of large dams (more than 1,200), trapping all but the finest sediments being transported downstream.

Damming rivers has cut off more than 50 percent of the sand supply. As a result, the beaches of California have undergone substantial erosion since the construction of these dams. Only in northern California is there a constant supply of sediments to the nearshore as there wasn't a need to dam the streams and rivers in the early days and now the Wild and Scenic Rivers Act of 1972 protect them. (Kenzer, et. al., 1992)

Other human induced factors to consider in this equation are the impacts over tourism industry and Californian's quality of life. As much as 85 percent of the state's population live within 50 miles to the coastline. This results in significant urbanization pressures, which impact coastal resources.

Residents and visitors enjoy California's beaches; more than 100 million visitors come to the California beaches annually, almost 60 million visitors in Los Angeles County alone. These beach users are generating millions of dollars in taxes to local, state and Federal level. (Kenzer, et. al, 1992)

California is now the eighth ranking economy in the world, about the size of Mainland China, and larger than Brazil, Canada or Spain. California's gross product exceeded the trillion-dollar mark in 1997, the first state to achieve this record. In 1999, California was the first state to top \$1 trillion in personal income. (California Department of Finance [http://www.dof.ca.gov/HTML/FS\\_DATA/HistoryCAEconomy/index.htm](http://www.dof.ca.gov/HTML/FS_DATA/HistoryCAEconomy/index.htm))

In 1999, the California Department of Boating and Waterways commissioned San Francisco State University to ascertain the impact of beaches on California's economy. The results showed that in 1995, it was estimated that the state's beaches were responsible for \$10 billion in direct spending (updated to 1998 to \$14 billion), \$1 billion in state taxes and more than 500,000 jobs. The spending, with a multiplier effect, was almost 3 percent of the economic activity in the state in 1995. Beach-related jobs constituted 3.5 percent of the state's employment. (King and Potepan, 1997)

This is important at both the Federal and State levels. A strong California economy reflects in California taxpayers sending a record \$23 billion windfall to Washington in 1999, and maintained its donor state status for a 13th straight year by November 2000. Demonstrating that protecting California coastal resources (closely related with the economy's strength) is directly linked to Federal benefits. (California's Balance of Payments with the Federal Treasury FY 81-99 The California Institute for Federal Policy Research <http://www.calinst.org/pubs/bop2000.htm>)

In order to preserve and restore our remaining coastal shorelines, wetlands and watersheds there is a need to develop a comprehensive sediment master plan that utilizes a regional systematic approach to resolving coastal sediment management issues.

b. The non-Federal Sponsor for the feasibility phase of this Master Plan Study is the California Department of Boating and Waterways.

1) The study area lies within the jurisdiction of Congressional Districts as detailed in **Attachment 2**.

2) United States Senators representing California, Barbara Boxer and Diane Feinstein, are also interested in this study.

#### **4. Prior Reports and Existing Projects**

a. The following reports have been reviewed as part of this study.

1) *Beach Erosion at Santa Barbara*, U.S. Army Corps of Engineers, House Document 552-75th Congress, 3rd Session, 1938. The earliest Federal study within the area concerned with shoreline processes was completed on January 15, 1938. Summarizing serious erosion along the coast from Santa Barbara point to the Carpinteria Creek, the field study recommended that the dredged material from Santa Barbara harbor be placed on East Beach for beach restoration. Subsequent supplementary studies were conducted in 1941, 1942, and 1946 to assess the effectiveness of beach restoration by artificial nourishment that was performed in 1940.

2) *Shore protection report on proposed harbor improvements at Ventura and Hueneme*, U.S. Army Corps of Engineers, May 20, 1940. A shore protection report to assess the probable effect of proposed harbor improvements being considered at Ventura and Port Hueneme was prepared to in 1940. Field survey data that was collected indicated that shoreline advances between Ventura and Point Hueneme occurred. Northwest of this area the mountainous coastline was concluded to be gradually receding. The shoreline between Port Hueneme and Point Mugu was considered to be stable.

3) *Harbor and Shore protection in the vicinity of Port Hueneme, California*, U.S. Army Corps of Engineers, October 1948. A report regarding harbor and shore protection in the vicinity of Port Hueneme was published pursuant to Public Law 525, House Resolution 6407 as approved by the 79th Congress on July 24, 1946. The report was prepared to investigate the serious beach erosion downcoast of Port Hueneme that occurred as a result of jetty improvements constructed at the entrance in 1940. A beach nourishment program with an initial fill of 3.1 million cubic meters (4 million cubic yards) and biennial replenishment of 766,000 cubic meters (one million cubic yards) was concluded to be the preferred mitigation alternative. The report further recommended that a small-craft harbor be constructed upcoast with a sand trap in order to provide sand storage and support the beach maintenance program.

4) *Beach-Erosion Control Report on Cooperative Study of Pacific Coastline of the State of California from Point Mugu to San Pedro Breakwater*, U.S. Army Corps of Engineers, Los Angeles District, September 1950. This comprehensive study analyzes data acquired from previous investigations in the regions of the California coastline between Point Mugu in Ventura County and the San Pedro breakwater located in Los Angeles County. This report represents the earliest and most extensive historical database regarding the volumes and directions of alongshore littoral transport, historical shoreline orientation, wave dynamics, fluvial watershed discharges, and beach morphology. The findings indicate that the littoral material reaching Santa Monica Bay appears to be principally derived from sources upcoast from Point Mugu and that local tributary streams contribute relatively small amounts of materials to the beach. The direction of transport was found to be generally downcoast except for the region

between Torrance Beach and Rocky Point where there appeared to be a local reversal in the net littoral transport direction. The report indicates that the artificial beach fill alternative would afford the best means of beach erosion protection in the Santa Monica Bay.

5) *Beach Erosion Control Report on cooperative study of pacific coastline of the state of California, Carpinteria to Point Mugu*, U.S. Army Corps of Engineers, February 1951. In 1951, a beach erosion control study was conducted on the Santa Barbara/Ventura coastline from Carpinteria to Point Mugu. A report was prepared to assess the characteristics of littoral drift within this coastal segment. It was concluded that the littoral drift was predominantly downcoast at a rate ranging from 191,000 m<sup>3</sup>/yr (250,000 cy/yr) at Carpinteria to 765,000 m<sup>3</sup>/yr (1,000,000 cy/yr) along the Oxnard plain. Fluvial delivery was estimated to be 191,000 m<sup>3</sup>/yr (250,000 cy/yr) from streams between Carpinteria and Ventura River and 917,400 m<sup>3</sup>/yr (1,200,000 cy/yr) from the Santa Clara River respectively. The report proposed that a groin field be constructed adjacent to Ventura Pier to stabilize an eroding beach condition.

6) As part of Public Law 286, 84th congress, approved July 28, 1956, Federal assistance was authorized for protection of publicly owned shores with provisional assistance available for privately held areas. As a result of the Act, the Corps inaugurated a continuing cooperative study of the coast of southern California between Cape San Martin and the Mexican border. The purpose of the Study was to determine areas of active or potential erosion, obtain wave and shore process data, evaluate attempts to solve beach erosion problems, and generally determine the overall shoreline conditions within the study limits.

7) Two interim reports (*Beach Erosion Control Report on Cooperative Study of Coast of Southern California, Point Conception to Mexican Boundary, Appendix VII, Interim Report*, U.S. Army Corps of Engineers, Los Angeles District Corps of Engineers, April 5, 1960. and *Beach Erosion Control Report on Cooperative Study of Coast of Southern California, Point Conception to Mexican Boundary, Appendix VII, 2nd Interim Report with Appendixes*, U.S. Army Corps of Engineers, Los Angeles District Corps of Engineers, August 24, 1962), a special interim report on Ventura area (*Special Interim Report on Ventura Area, Beach Erosion Control Report on Coast of Southern California, Appendix VII*, U.S. Army Corps of Engineers, August 10, 1961), a final report (*Beach Erosion Control Report on Cooperative Study of Southern California, Cape San Martin to Mexican Boundary, Appendix VII, Final Report*, U. S. Army Cops of Engineers, Los Angeles District Corps of Engineers, June 1967), and two three-year reports (*Beach Erosion Control Report on Cooperative Research and Data Collection Program of Coast of Southern California, Cape San Martin to Mexican Boundary, Three Year Period, 1964-1965-1966*, U.S. Army Corps of Engineers, Los Angeles District Corps of Engineers, 1969 and *Beach Erosion Control Report on Cooperative Research and Data Collection Program of Coast of Southern California, Cape San Martin to Mexican Boundary, Three Year Report, 1967 – 1969*, U.S. Army Corps of Engineers, Los Angeles District Corps of Engineers, December 1970) were prepared. These reports, generally described the shoreline conditions along the Santa Barbara and Ventura coastline and indicated the following findings: 1) the beaches downcoast of Santa Barbara Harbor are dependent upon sand bypassing from the maintenance dredging; 2) severe erosion has occurred at Sandyland Cove (Padero Lane) and remedial protection measures are necessary; 3) Carpinteria Beach State Park is a wide sandy beach that has maintained its stability over the past few years; 4) between Rincon Point and Ventura River, most of the beaches are covered with exposed cobbles, and in some areas a thin layer of sand; 5) the shoreline

between the Ventura Pier and the Ventura Harbor is currently a wide stable beach due to the construction of a groin field; 6) the beach between the Santa Clara River and Channel Islands Harbor is relatively stable; 7) the shoreline between Port Hueneme and Point Mugu is generally stable, except at the U.S. Navy facility where erosion is occurring; and 8) most of the shoreline beyond Point Mugu to the Ventura-Los Angeles County line is rocky with a few stretches of unstable sandy beach.

8) *Inspection Tour of Shoreline-Santa Barbara to Imperial Beach*, Department of Water Resources, U.S. Corps of Engineers, June 1966. This report provides aerial photographs, design specifications, and improvement plan formulations for increased shore protection between Point Mugu and the San Pedro Breakwater.

9) *Beach Erosion Control Report on Cooperative Research and Data Collection Program of Coast of Southern California-Cape San Martin to Mexican Boundary Three-Year Report -- 1964-1966*, U.S. Army Corps of Engineers, December 1967. This report presents the results of a three-year research and data collections program for the California coastline, south of San Luis Obispo County, to identify areas of active or potential erosion. The data collections, specifically for Los Angeles County, include aerial and ground photographs, hydrographic surveys, numerous sand samples, descriptions of beach morphology, and a step-resistant wave gage located at the end of the Ventura Pier. Trends of severe erosion were found to occur at Westward Beach, upcoast of Point Dume, at Redondo Beach, downcoast of the Redondo Submarine Canyon, and along several pocket beaches located on the Palos Verdes Peninsula.

10) *Beach Erosion Control Report on Cooperative Research and Data Collection Program of Coast of Southern California-Cape San Martin to Mexican Boundary Three-Year Report- 1967-1969*, U.S. Army Corps of Engineers, December 1970. This second three-year report presents the results of a research and data collections program for the California coastline, south of San Luis Obispo County, for identifying areas of active or potential erosion. With regards to Los Angeles County, the report includes analysis from data obtained through beach inspections, aerial and ground photographs, hydrographic surveys, sand samples, one wave gage, offshore sand sources, shoreline conditions, evaluation of wave refraction models and beach profiles.

11) In 1978, the Corps of Engineers (*Inspection Tour of Shoreline Santa Barbara to Imperial Beach*, U.S. Army Corps of Engineers, May 1978 and *Survey Report for Beach Erosion Control, Ventura County, California" Main Report and Appendices*, U.S. Army Corps of Engineers, May 1979) prepared a survey report for Ventura County and performed a shoreline inspection from Santa Barbara to Imperial Beach. The survey report indicated that the shoreline within Ventura County has gradually eroded. The shoreline investigation showed that major problems exist at Faria and Hobson Beach parks, and Emma Wood State Beach where periodic erosion has threatened public and private property. The erosion problems at Faria and Hobson Beach parks occurred soon after completion of the Highway 101 construction at Seacliff in the early 1970s.

12) *Sediment Management for Southern California Mountains, Coastal Plains and Shoreline-Part C: Coastal Sediment Delivery by Major Rivers in Southern California*, William R. Brownlie and Brent D. Taylor, February 1981. This joint study conducted by the Environmental Quality Laboratory at the California Institute of Technology and the Center for Coastal Studies at the Scripps Institution of Oceanography determines the effects human developments have had on the sedimentary processes of Southern California's drainage basins. Fifty three percent of the total drainage area in Southern California has been altered by either major water retention structures, diversion facilities,

channelization, sand and gravel mining operations, percolation basins, ground water pumping, irrigation ditches, or other man-made systems. This report provides detailed information on the sedimentary delivery and transport rates of the major and minor fluvial sources throughout Los Angeles, Orange, and San Diego Counties.

13) *Southern California Coastal Photography and Beach Profile Index*, Coast of California Storm and Tidal Waves Study, U.S. Army Corps of Engineers, February 1986. This report provides an inventory of the available coastal data in the archives located at the Corps of Engineers Los Angeles District Headquarters. The information includes aerial and ground photographs, beach profile data, beach characteristics, historic shoreline changes, and the effects of storms on beach morphology and structures. The report also documents any significant beach and inlet changes along the Los Angeles County shoreline.

14) The City of Carpinteria has prepared an annual summary for its winter protection berm project since 1986. Each year, the city constructs a 1,450-foot sand berm between Linden Avenue and Ash Avenue to provide storm damage protection between the months of December and April. Each annual report includes the project description, sand berm volume calculations, beach profile surveys and biological reports related to the grunion surveys (*Annual Project Summary for Winter Protection Berm Project*, City of Carpinteria, 1986-1996)

15) *Consolidated Plan of Study, Coast of California Storm and Tidal Waves Study*, U. S. Army Corps of Engineers, March 1987. This report presents a consolidated study plan for the entire 1,760-kilometer (1,100-mile) California Shoreline after a plan of study laid out in 1983 and to be completed in 1989 for the San Diego Region. Six shoreline regions are discretized on the basis of scientific and practical consideration. All study efforts shall result in three products: coastal erosion and water level planning map, a coastal planning handbook for the region, and a state-of-the-coast summary report. This consolidated plan defines different levels of study plans based upon a number of practical and scientific reasons. For the South Coast Region including both Los Angeles and Orange Counties, a minimum plan of study is recommended.

16) *Coastal Sand Management Plan; Santa Barbara/Ventura County Coastline*, prepared for Beach Erosion Authority for Clean Oceans and Nourishment (BEACON). *Executive Summary Main Report and Appendices*, Noble Consultants, Inc., July 1989. A coastal sand management plan was prepared by Noble Consultants, Inc. for the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON). The purpose of the study was to develop an understanding of the coastal processes within the Santa Barbara and Ventura County coastline and provide a regionally coordinated program to manage existing sand sources. Offshore sand sources were identified and preferred plans for beach nourishment were recommended in the study.

17) *Rancho Palos Verdes/Rolling Hills, California Reconnaissance Study*, U.S. Army Corps of Engineers, June 1990. This final reconnaissance study report investigates the feasibility of constructing shoreline erosion mitigation measures in order to prevent landslides, provide additional bluff stabilization, and eliminate the transport of debris and sediment to the nearshore and downcoast areas along the Palos Verdes Peninsula. The areas of prime concern include Portuguese Bend, Abalone Cove, and Klondike Canyon. Nine alternative measures are proposed with varying degrees of expected environmental and economic benefits.

18) *Historical Changes in the Beaches of Los Angeles County, Malaga Cove to Topanga Canyon, 1935-1990*, Coastal Frontiers Corporation prepared for County of Los Angeles Department of Beaches and Harbors, 1992. This report presents the effects human intervention has had along the Santa Monica Bay shoreline from Malaga Cove to Topanga Canyon. Beach profile surveys were conducted in May 1989, January 1990, and June 1990, the results of which were compared to historic profile surveys conducted in October 1935, November 1946, and October 1953. The analysis indicates that as a result of the 23.7 million cubic meters (31.6 million cubic yards) of artificial nourishment placed along the beach, 95% of which was placed prior to 1970, and the subsequent departmentalization of the shoreline, beach widths have increased by 45 to 152 meters (150 to 500 feet) throughout the nourished region. Adverse beach erosion impacts as a result of human activities were found to occur downdrift of some of the early constructed coastal structures; however, by nourishing the adjacent beaches at the time of construction, this problem was mitigated.

19) *Malibu/Los Angeles County Coastline Reconnaissance Report, Los Angeles County, California*, U.S. Army Corps of Engineers, April 1994. The purpose of this reconnaissance report is to determine the feasibility of providing shoreline protection against coastal storm flooding along the open coast from the Los Angeles/Ventura County line to Malaga Cove in Los Angeles County. This report outlines the physical characteristics within the study area including the geologic setting, beach morphology, sediment sources, bathymetry, climate, tides and water levels, wave activity, currents, and the basic coastal processes of the region. The project shoreline was divided into 20 reaches on the basis of distinguishing the differences in the beach characteristics and the density of the existing development. In addition, potential erosion prone areas are identified through coastal engineering analysis, and alternative mitigation strategies are proposed.

20) *Review of Alternative Shoreline Erosion Management Strategy, Surfer's Point*, prepared for the City of San Buenaventura, Noble Consultants, Inc., July 1995. The City of San Buenaventura conducted a shoreline erosion study at Surfer's Point. Alternative shoreline erosion management strategies were proposed to address a chronic erosion condition. Subsequently, a conceptual design study was conducted to develop a preferred alternative of managed shoreline retreat to protect a very popular bike path, pedestrian walkway, public parking areas, sensitive dune habitat, and beach access (*Surfers Point Park, Managed Plan for Shoreline Retreat*, prepared for the City of San Buenaventura, Noble Consultants, Inc., December 2000.).

21) *Sand Contribution from Bluff Recession between Point Conception and Santa Barbara, California*, Diener, B. G., Shore and Beach, Vol. 68, No. 2, April 2000. A bluff erosion analysis between Point Conception and Santa Barbara was conducted to estimate the sediment contribution. Based upon historical aerial photographs and other information, it was concluded that bluff erosion supplies approximately 81,000 m<sup>3</sup>/yr (106,000 cy/yr) of sand to the littoral cell between Point Conception and Santa Barbara.

22) *Goleta Beach Demonstration Project, Borrow Site Investigation*, prepared for Beach Erosion Authority for Clean Oceans and Nourishment, Noble Consultants, Inc., October 2001. A beach demonstration nourishment project is currently proposed by BEACON to place approximately 191,000 cubic meters (250,000 cy) of material at Goleta Beach to alleviate a severe erosion condition. Field survey work to locate a suitable source of offshore borrow material was completed.

23) *Goleta Beach County Park, Long Term Beach Restoration and Shoreline Erosion Management, Final Plan*, prepared for the County of Santa Barbara, Moffatt and Nichol Engineers, March 2002. A long-term plan for beach restoration and shoreline erosion management at Goleta Beach County Park was prepared by the County of Santa Barbara. The purpose of this plan study was to 1) maintain a recreational beach and easy beach access; 2) improve environmental conditions within the park including the Goleta Slough; and 3) protect the supporting parking lot, buildings, and utilities infrastructures within the park.

24) *California Beach Restoration Study*, Department of Boating and Waterways and State Coastal Conservancy in 2002 analyzed the future need for beach nourishment in California and the effectiveness of past projects. The report summarized the economic value of beach nourishment projects to the State's economy. In order to restore the State's beaches, a restoration cost of approximately \$120 million for initial construction and \$27 million for annual maintenance was identified. The report also summarized the processes of natural supply of sediment to the coast and ways to reduce current sand delivery deficits caused by historical development and urbanization of the tributary watersheds. Removal of dams or bypassing sand around the barriers was concluded to be a principal action for consideration that would lessen future dependency on artificial beach nourishment.

b. This study is not investigating any potential modifications to existing projects:

Not applicable

## **5. Plan Formulation**

During a feasibility phase study, the formulation of solutions to specific problems is guided by six planning steps set forth in the Water Resource Council's Principles and Guidelines. However, for this California Coastal Sediment Master Plan Study, the planning steps are modified as: 1) specify problems and opportunities; 2) inventory and forecast of coastal use; 3) understanding of regional coastal processes; 4) formulate regional sand management plans; 5) compare alternative plans, and 6) select a recommended regional plan for implementation. The scope of data called for under these six steps shall guide the gathering and presentation of information resulting in the California Coastal Sediment Master Plan Study, to assure that the resulting products can be of use to the local sponsor and other potential coastal planners.

### **a. National Objectives**

1) The development and preparation of products under the California Coastal Sediment Master Plan will be pursued considering the national or Federal objective of water and related land resources planning. This national objective is to contribute to the national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to National Economic Development (NED) are increases in net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct benefits that accrue in the planning area and the rest of the nation. Considering this objective will assure that study data is complete and adequate for whatever purposes it may serve in the future.

2) The Corps of Engineers has added a second national objective for Ecosystem Restoration in response to legislation and administration policy. This objective, which will also be considered during the course of the study, is to contribute to the nation's

ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

b. Public Concerns

A number of public concerns have been identified during the reconnaissance study. Initial concerns were expressed in the study authorization. Additional input was received through coordination with the State Resources Agency and its member agencies. The public concerns related to the establishment of planning objectives and planning constraints are:

1) Preservation and maintenance of sandy beaches is a high priority. To that end, it is desirable to better understand the regional coastal processes so that the performance of beach nourishment projects and management of existing sand bypass facilities can be improved.

2) Episodic storm events along the coastline result in repeated damages to public and private facilities and pose additional public safety concerns.

3) Degradation of existing conditions adversely impact recreational beach opportunities and fosters the continued nearshore encroachment of public and private structures.

4) Shoreline management strategies should be implemented that are not detrimental to the existing marine resources.

c. Problems and Opportunities

The evaluation of public concerns often reflects a range of needs perceived by the public, and described in the context of problems and opportunities that can be addressed through water and related land management plans. For each problem and opportunity, the existing conditions and the expected future conditions are described, as follows:

1) Problems

- i. Loss of beach width and/or water quality degradation results in the loss of recreational opportunities. Sedimentation of navigation channels results in navigation safety issues for boaters.
- ii. Loss of beach width may result in an increase in coastal storm damage due to exposure of structures to direct wave attack, runup, and inundation.
- iii. Loss of coastal wetlands due to land changes and sedimentation in wetlands and estuaries.
- iv. Loss of Fish and Wildlife habitat for species such as grunion, snowy plover, least tern, steel head, as well as coastal marsh, wetlands, etc.
- v. Lack of agency coordination amongst Federal, State and Local can lead to regulatory conflicts, redundancy in study and project efforts, failure to leverage funds for projects that are mutually beneficial to both State and Federal agencies.
- vi. Coastal Navigation Safety can be impacted by shoaling and lack of dredge disposal sites.
- vii. Sedimentation behind dams causes a loss of flood control and water supply capacity.

- viii. Loss of Beneficial Reuse Opportunities of Sediments Due to Lack of Consensus on Physical Compatibility (80/20 Rule). Lack of compressive knowledge about sediment characteristics/process/impacts relationships.
- ix. Anthropogenic interference and growth on sediment transport with regard to sand rights and Total Maximum Daily Loads (TMDLs).
- x. Cost and impacts of transporting beach quality sediments from the source to the coastline.
- xi. Regulators desire for greater than 90 percent coarse sand for beach nourishment projects, yet most natural sources of sand are approximately 60 percent coarse sand.
- xii. Surveys of existing grain size distributions along California beaches are needed to establish sediment compatibility with existing conditions
- xiii. NTU-based turbidity standards are very hard to deal with due to changing marine conditions and may not be the best method of analysis.
- xiv. Educational tools are needed for regulators and project proponents to provide general information on coastal processes and basis for variances from the current 80/20 coarse/fines ratio typically required for beach nourishment projects.
- xv. Regional sediment movement patterns need to be known to provide a framework for site-specific studies to determine where the fines are being transported.
- xvi. Standardized and approved regulatory sampling protocols for turbidity and grain size distribution in beach/nearshore/offshore areas are needed.
- xvii. Beach nourishment projects require comprehensive monitoring plans that produce scientifically defensible products, yet plan requirements often vary significantly across jurisdictional boundaries.
- xviii. Project reporting requirements produce time delays that often result in loss of opportunities to use opportunistic sand sources for beach nourishment materials.
- xix. Sand mining from rivers and use of dredged sands for construction materials reduces the amount of sand available for beaches.
- xx. Areas of high geologic hazard need to be identified to support decisions about armoring, feasibility of other protective devices, coastal/planned, hazard avoidance retreat and economics of beach nourishment. Coastal geologic hazards include actively eroding areas, landslides, active fault zones, earthquake shaking/toppling and tsunami run-up zones.

## 2) Opportunities

- i. Leverage of State and Federal Agencies technical expertise and financial resources for site-specific projects.
- ii. Eliminate redundancy of projects, studies and technical efforts and optimize the efficiency and effectiveness of coastal zone projects through improving Federal, State and Local coordination, cooperation and investments.
- iii. Streamline the coastal zone project permitting through the development of processes frameworks for the local applicant. Potential for a "Single permit" considering all conditions imposed by all regulatory agencies with jurisdiction. Use the DMMO model and develop a committee/organization whose role

would be to evaluate sediment management activities to determine in advance whether project proponents had all necessary information required by agencies with jurisdiction, thereby streamlining the permit obtainment process.

- iv. Establish relationships between Federal and State recreational benefit analyses. Currently, the Federal and State analyses account for recreation benefits in different ways. The State's argument is that the Federal analysis does not optimally account for recreational benefits and thereby discounting important benefits for the Nation.
- v. Develop regional benefits associated with critical shoreline areas by determining the differential benefits (i.e., taxes, recreation, storm damage reduction) as a result of better regional sediment management practices for critical shoreline areas.
- vi. Examine or evaluate proposed coastal zone uses strategies, which would be analogous to the benefits to beneficial uses of water.
- vii. Establish sediments and resources relationships (i.e., how do sediments either benefit or adversely affect nearshore habitat).
- viii. Identify mechanisms to streamline implementation of Federal coastal resources related projects. Evaluate the need for adjusting the Continue Authority Projects (CAP) to reflect current cost for small projects. In addition, consider the need for a special CAP authority to address coastal resources needs for California (i.e., similar to the Everglades).
- ix. Develop a programmatic strategy for the management of coastal zone sediments consistent with NEPA and CEQA. Develop a programmatic EIS/EIR to reduce the time frame, if consistent with the Sediment Master Plan, to begin site-specific projects.
- x. Integrate, manage and visualize all coastal zone related spatial data through GIS Applications for decision-making purposes. Use maps to show decision makers relationships among sediment functions, sediments sources and distribution. Improve the decision making process through the use of a web accessible (IMS) decision support tools.
- xi. Facilitate access of coastal zone sediments data for the use by the general public, agencies and research facilities.
- xii. Beneficially reuse material dredged from ports, harbors and other opportunistic sediment sources, to provide continued safe transit of recreational, commercial and military maritime traffic.
- xiii. Establish consensus on the physical compatibility of opportunistic sediment sources for beneficial reuse. Review the existing 80/20 rule of thumb for beach compatible material; determine localized site specific grain-size ratio and distribution criteria; and reevaluate habitat impacts due to 1-foot per year burial rate).
- xiv. Review sand rights and potential to develop a mitigation bank for promoting transport of beach quality sediments to the coast.
- xv. Provide a resources management information tool and technical resources to support individual projects.

- xvi. Review existing Acts and Policies (i.e., National Sediment Resources Sustainability Management Act) to determine any inconsistencies.
- xvii. Investigate the existing transportation infrastructure and determine if there is any potential for improving transportation distribution of sediments between source and sink. Develop a system wide transportation network to optimize the distribution of sediments between sources and sinks.
- xviii. Statewide GIS system will allow project proponents and other users to quickly identify natural resources that could be impacted by sediment management activities in their local areas.
- xix. Regional and project based sediment transport information provides for understanding of the potential impacts of sediment management on water quality and natural resources.
- xx. Educational “workshop” information could be placed on compact discs for distribution to interested parties
- xxi. Protocols for 3-dimensional sampling standardized across jurisdictional boundaries could facilitate acceptance of variable compatibility requirements.
- xxii. Development of a comprehensive stockpile and transport network could increase the amount of opportunistic sand that reaches the beaches.
- xxiii. Development of Coastal Hazard Zones to guide development and nourishment activities/priorities could be conducted by the Federal (U.S. Geologic Survey) or State (California Geologic Survey) geological organizations.

d. Planning Objectives

The standard objectives of conventional feasibility studies of coastal problems do not apply to the products mandated under California Coastal Sediment Master Plan Study authorities and guidelines. The planning objectives for the California Coastal Sediment Master Plan Study are specified as follows:

1) To develop an integrated coastal processes database including the quantification of controlling coastal processes and potential long-term shoreline evolution trends to aid in future study and project implementation.

2) To implement a regional shore protection and sand management plan to preserve and/or enhance existing beaches and mitigate coastal erosion and storm damage potential.

3) To reduce coastal storm-related damage to public and private properties and increase recreational beach opportunities.

4) Increase recreational values by restoring and improving area beaches.

5) Preserve and improve environmental resources to the maximum extent practicable.

e. Planning Constraints

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. Planning constraints which should be factored in the study products, are as follows:

1) Compliance with State Resource Agency goals and objectives and applicable Local City Coastal Plans.

2) Compliance with various regulatory agencies must be included in study products. The agencies include the California Coastal Commission, California State Lands Commission, California Regional Water Quality Control Boards, California Department of Fish and Game, U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and regulations and planning guidelines of the Corps of Engineers.

3) Synchronization of local, State and Federal funding sources for near term and out-years.

4) Program limitations imposed by State and Federal coastal resources management programs (State of California Beach Restoration Program AB64 and Section 103 Corps)

5) Policies and priorities conflicts among State and Federal policies addressing shoreline management and allocation of resources to individual projects related to the coastal resources management.

6) Existing subjective guidelines regarding the physical suitability of sediments for beneficial reuse

7) Potential adverse environmental impacts from the sediment transport removal and disposal for beneficial re-use purposes.

8) Differing goals and objectives for the California State Agencies, other Federal Agencies, non-profit organizations, and the public related to coastal zone uses and management.

f. Tasks to Address Planning Objectives

The study area's California coastal morphology and land uses are diverse. The character of the shoreline varies from non-existent beaches and rocky coast to expanses of wide sandy berms. Incident wave energy, the principal driving force of the littoral sediment, similarly varies from full open coast exposure to semi-protected conditions. Land uses range from non-populated reaches to metropolitan areas. The urbanized coast along the western edge of the study area was developed within the past century. The population growth and infrastructure development has in some cases altered the natural system and created a dependence of continued human intervention to maintain healthy beaches. Thus, a number of important issues and questions exist that require a better understanding of the relevant coastal processes, quantification of the key physical processes, and formulation of appropriate shoreline management strategies. The study products that are intended to respond to the planning objectives, include:

1) Data and Information Collection

The goal of the data collection effort is to characterize California coastal sediment systems using existing and ongoing studies. The initial step will be to catalogue prior reports and ongoing studies for specific coastal sites and regional studies as available. Data and information collection will focus on the physical properties of coastal sediment systems, affected natural resources, and regulations and policies that impact sediment management. This data collection effort also will identify data gaps that will be used as guidance for subsequent original data collection efforts.

Coastal sediment system characterization includes an inventory and assessment of:

- a) Sand sources (wetland restoration projects, coastal bluffs, opportunistic sand projects, port and channel dredging, inland sources, and offshore sites);

- b) Fluvial and estuarine barriers to sediment transport (jetties, groins, dams, transportation infrastructure, mines, etc.;
- c) Impaired water bodies (for assessment of regulatory constraints to fluvial transport of sediment);
- d) Natural and artificial littoral barriers (headlands, reefs, submarine canyons, etc.);
- e) Fluvial and littoral physical processes such as spatial/temporal sand movement patterns;
- f) Known information on grain size distribution on California beaches, and distributions used for beach nourishment projects as well as any observed end results;
- g) Beach nourishment needs along the California coast;
- h) Known information on transport and depositional fate of fine grained materials traveling within turbidity plumes;
- i) Short term, ephemeral or seasonal impacts on natural resources from the seasonal movement of sand from the nearshore to beach and back;
- j) Recolonization rates of benthic organisms after beach nourishment or storm events;
- k) Coastal geomorphologic changes; and
- l) Coastal sediment budgets.

Natural resources affected by coastal sediment systems, such as nearshore habitats, beaches, dunes, and estuarine and riparian wetlands, also will be inventoried and characterized during the master plan development. Characterization of affected natural resources might include location, human use, tolerance to sediment influences, and seasonal and annual persistence. Characterization of affected natural resources will provide important information for the prioritization of coastal sediment management problems.

Regulations and policies that affect coastal sediment management will be identified and a set of characterization criteria will be determined. Part of the identification process will include an inventory of agency jurisdictions and responsibilities for specific sediment-related resources and geographic areas. An analysis of policy and regulatory effects on coastal sediment management will be conducted in the master plan development. This analysis would include regulation compatibility, interagency coordination, rectification of any regulatory inconsistencies, and how to streamline the regulatory process, develop a reference that identifies the ongoing and planned activities of agencies with jurisdiction over California's coast, and develop informational guides illustrating the beach nourishment process for interested parties.

## 2) GIS Database Development

A GIS database will be the central depository of geo-referenced sediment management data that will be the basis of many analytical tasks to be conducted during development of the master plan and during implementation of priority projects. Determination of database hosting and database maintenance responsibilities are two key issues that must be resolved to ensure effective application of GIS tools and analysis. A significant component of the data-gathering task identified above will be the

collection, quality review, and assembly of existing GIS data. All original data collection will utilize geo-referencing to the fullest extent possible to ensure the broadest application of GIS based tools and analysis.

### 3) Information Dissemination

Information dissemination will be conducted through the institutionalization of inter- and intra- agency networks, development of a GIS-based Internet map server, and public information outreach. Considering that the planning horizon of the master plan is long-term, network institutionalization would provide more established and more lasting links among agencies and stakeholders than other personality-based networks. The definition and structure of institutionalized inter- and intra- agency networks would be determined and implemented in the master plan development. Establishment of these networks will support subsequent phases of master plan development and will be instrumental for master plan implementation.

A GIS-based Internet map server will be developed to ensure agency and stakeholder access to GIS-based tools and analysis. As with the development of the GIS database, determination of server residence and maintenance responsibilities are critical tasks that must be accomplished to ensure fullest utilization of this analytical tool. The Internet map server will be linked to the coastal sediment management master plan website that will be developed for general public and agency use.

The main purpose of the coastal sediment management master plan website will be to educate and update government agencies, non-government organizations, and the public about coastal sediment systems. A consistent public outreach theme will be the importance of regional planning for sediment management that incorporates and addresses local needs, rather than developing isolated site specific sediment management plans. The website will be a focal point of internet based communication for all coastal sediment management related issues, agencies, and stakeholders. Determination of server residence and website maintenance are critical issues that must be resolved, as has been noted for other shared information resources.

The master plan development also will include a public involvement strategy that coordinates all outreach efforts including public meetings, printed matter, press releases, and Internet based information access.

### 3) Templates for Opportunistic Sand Programs

Develop guidance for statewide applications that facilitates the management of sand on a regional (i.e., littoral cell) basis. This template will identify how to define conditions adequately such that the use of geologic materials that contain between 51 and 80 percent sand sized particles for beach nourishment can be considered. Checklist examples include project size, harbor entrance, proximity to rivers, project type, time of year, resources in area, etc. Sediment movement patterns would be identified. If such information were not already available, then monitoring to obtain such data would be appropriate.

Protocols to establish conditions of potential nourishment sites and sources of nourishment sediment that would facilitate comparison for compatibility would be included, such as: 3-dimensional sampling for borrow and receiver sites standardized across jurisdictional districts; consistency in sampling requirements between source and destination sediments; sampling and data collection in the offshore, nearshore, beach and inland source and receiver locations,

#### 4) Evaluate Fate and Transport of Sediments

Evaluate the impacts and fate of fine-grained material within and/or deposited from turbidity plumes. Things to consider include: review of historical data; standardize method(s) for turbidity sampling; assess what level of turbidity monitoring during sediment management activities is needed to more directly relate turbidity levels to biological effects; type and level of comprehensive pre- and post-project monitoring plan required to evaluate project performance and impacts; assess the duration of natural and anthropogenic turbidity plumes; acquire data on the fate and transport of fines during natural events of turbidity; objective analyses of the fate and transport of fine sediment from rivers; assess whether there may be beneficial use of those fines; and assess whether there are scientifically valid ways to compare the effects of storm water runoff, depositing a large volume of fine-grained material over a very large area, to what occurs in the relatively narrow nearshore band during beach replenishment.

Develop information as to where the fines have and are being transported, by: evaluating the use of potential "tracers" (radioactive dyes, "passive" geologic materials); assess various models that predict dispersion and transport of fines; and evaluate and quantify suspension versus deposition.

The study will also be designed to evaluate the major littoral sediment budgets along the California Coast, to provide a framework for and guidance on project-based studies. The study should determine, in conjunction with the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), California Coastal Commission (CCC) and Regional Water Quality Control Boards (RWQCB), the necessary elements that should be considered in regional- and project- based sediment transport/budgets, including: summaries of available information on methodology and historical and present day values; variations and standard deviations between individual years and decadal cycles; volume and rate of sediment transport; residence time of sediments; vector patterns of sediment movement; ultimate sinks of sediments; and inaccuracies in accounting.

#### 5) Compile Information on Biological Impacts

Compile known information relating to the potential impact that beach nourishment activities may have on sensitive biological organisms, to begin addressing resource manager concerns. Potential areas of study include: what is the comprehensive list of species that are potentially threatened by beach nourishment activities along the entire California coast; what are the concerns for these species and can such concerns be supported scientifically; what are the scientific bases for various prohibition zones surrounding bird nesting areas and do these zones reflect the actual impact range for each species; do nesting season limitations reflect the actual time that the area is used for nesting, or should the length of time or areas under limitation be revised; can the effects of turbidity on the foraging capabilities of fish and birds be quantified; how do beach nourishment profiles evolve over time as the profiles are exposed to wave action; does the beach profile readjust as a wedge of sediment that buries or smothers biota, or as a thin layer of sediment that allows biota to adapt; what are the differences in beach profiles for sand-sized sediment and fine-grained materials; how are kelp beds, herring eggs and salmon runs, eelgrass and other critical species affected by turbidity plumes; is there a critical volume or rate of sedimentation that causes an adverse impact to resources; and are there habitats that lie dormant during particular times of year, such that activities conducted during the dormant periods have potential to affect marine resources.

## 6) Economic Analyses:

Identify and describe the economic elements related to sediment extraction/dredging, disposal and transportation along the coast of California. While each coastal watershed might not contain all of the elements identified through this task, the list of elements should include all elements that might be found in coastal watersheds. Elements might include: income from in-stream sand and gravel mining revenues, beach-related tourism and recreation, water reservoirs/dams; costs of sediment disposal, transportation or separation; and costs of beach nourishment and of dredging sediment from ports, harbors and debris basins.

Assess the public and private monetary costs and benefits of each element, and identify competing interests for sand. Prepare a final report that summarizes findings and recommends actions (for individual elements) based on those findings.

## 7) Priority Project List Development

Existing research and on-going studies have identified sediment management “hot spots” and recommended actions for local projects. The scoping of problems and objectives and the public outreach components of master plan development also will identify priority locations and problem activities. During the master plan development, these existing analyses and prioritized projects will be evaluated from a regional perspective to assess potential solutions based on environmental impacts, cultural impacts, and economic benefits and costs. Prioritization criteria will be developed and applied to identify projects to create a prioritized list of sediment management actions that may be implemented prior to completion of master plan development.

The prioritization will be the basis for a more extensive and inclusive list of coastal sediment management and restoration needs. The master plan development will fully catalogue and assess potential regional solutions to coastal sediment management problems. Solutions may include Corps of Engineers ecosystem restoration projects, feasibility studies, or projects pursued under the Corps’ continuing authorities program. Identify potential project funding sources, partnerships, and project implementation schedules.

## 8) Filling Data Gaps

The purpose of data collection effort is to characterize California coastal sediment systems using existing and ongoing studies and to identify information gaps that need to be filled by original data gathering. Original data gathering efforts will be conducted to complement and verify existing data, address data gaps, and complete the characterization of California coastal sediment systems. As with all data and information collected as a part of the master plan, the data gathered will be geo-referenced to the fullest extent possible and made publicly available through the master plan website and the GIS based internet map server. Data and information collected will be used to update the priority project list.

## 9) Habitat Impact Assessments

The purpose of the habitat impact analysis is to characterize coastal sediment impacts on habitats at a regional scale. These might include impacts to riparian and estuarine wetlands, beach and dune habitats, and estuarine and nearshore open water habitats. The habitat impact analysis would look at impacts of increased sedimentation and lack of sediment nourishment. Impacts related to turbidity and fine sediment suspension also would be addressed in this analysis.

Currently, there is little analytical data concerning sediment impacts on habitat. Habitat impact analysis would focus on statewide expansion of the natural resource mapping demonstration project to map habitat for sediment management planning. Monitoring will be coordinated with the regulatory community to look at natural high flow events and the controlled beach fill projects.

#### 10) Policy and Regulation Assessment

The master plan development includes an inventory of agency jurisdictions and responsibilities for specific sediment-related resources and geographic areas. An analysis of policy and regulatory effects on coastal sediment management will be conducted for the purpose of addressing regulation compatibility, interagency coordination, and rectification of any regulatory inconsistencies. This analysis also will look for opportunities to support coastal sediment management through non-structural measures such as sand banks, tax or fee structures, and mitigation.

#### 11) Establishment of Project Partnerships

Information gathered during the assessment of agency jurisdictions and during the development of the priority project list, will be used as the basis for identifying and establishing agency-to-agency and organization-to-agency partnerships for priority project development and implementation. Establishment of project partnerships is a preliminary step towards identification of financial sponsors for projects identified on the priority project list. The establishment of project partnerships provides opportunities for multi-agency and multi-organization input into project development and implementation.

#### 12) Establishment of Project Funding Sources

Comprehensive coastal sediment management in California requires a long-term commitment of resources, multi-agency cooperation, and strong public support. Projects of the magnitude likely to be placed on the priority project list are often cost-shared among multiple project sponsors. Development of funding streams for large, multi-phased, multi-sponsor projects is a critical and time-consuming component of project development. The master plan development will identify existing and develop potential funding sources for priority projects. The purpose of this task is to have funding opportunities identified and, to the extent possible, have funds allocated for coastal sediment management in general and to individual projects in particular.

#### 13) Sediment Transportation Infrastructure Assessment

Natural and man-made sediment transport barriers exist throughout California's coastal watersheds. Bringing trapped sediments to California's beaches is expected to be a major component of coastal sediment management. Sediments may be transported by rivers and streams once barriers are removed or by-passed. There also may be situations in which fluvial transport is not feasible and alternative transport mechanisms must be considered. The sediment transportation infrastructure assessment will identify non-fluvial transportation alternatives such as barges, trucks, pipelines, etc., and develop a set of criteria that can be used in selecting a sediment transportation mode for a specific project.

#### 14) Regional Sediment Management Impact Analyses

The topics to be covered by regional sediment management impact analyses are recreation, habitat, economics, and real estate. These analyses will collect and review existing studies of sediment dependent or sediment-related impacts. The purpose of these analyses is to establish existing conditions, identify trends, and forecast regional

impacts of sediment management alternatives. Since the analyses will be regional in scope and based upon existing information, the forecasts of expected future conditions will be suitable for large-scale planning purposes and would not replace feasibility and NEPA-level analyses that are required for individual projects. The information gained from these analyses will be used to increase public awareness, information, and education.

For the analysis of regional sediment management impacts on recreation, the focus mainly would be on beach, nearshore, and estuarine recreation. Impacts may include sedimentation of estuarine waters that reduces recreational fishing or shell fishing opportunities, lack of beach nourishment that reduces beach area available for access or use, or offshore deposition that creates or disrupts favorable surf conditions. The analysis would differentiate between residential and tourism-related impacts. Recreational impacts may be measured in user-days or in the economic value of the recreational experience.

The analysis of economic impacts would be based, in part, on existing conditions and trends identified in the recreation and habitat impact analyses. Economic impacts would include effects on regional economies and effects on individual values for recreational uses of natural resources, such as fishing and beach use. As with the other impact analyses, the economic impact analysis would be based upon existing data on current conditions, trends, and potential future conditions.

The real estate impact analysis would identify and categorize coastal watershed property ownership according to five ownership types: Federal, state, county, municipality, and private. To the extent possible, ownership types would be geo-referenced and input into the GIS database. The real estate impact analysis also would conduct a preliminary assessment of sediment related property damages based upon studies in the existing literature. The future potential for sediment related property damage also would be assessed from information contained in the existing literature and would include potential impacts related to sea level rise and climatic change.

#### 15) Relative Sea Level Rise And Climatic Changes

The master plan development will assess the relationships among sediment management, sea level rise, and climatic change. This assessment will identify the significant issues and review the existing literature to assess the way that sediment management would be affected by alternative sea level rise and climatic change scenarios.

##### g. Preliminary Effort

Preliminary effort under the 905(b) Reconnaissance Study indicates that the proposed study will result in significant progress toward understanding the regional coastal processes that affect the stability and dynamic evolution of the California coastline. This understanding will allow important predictive models to be developed. These tools will also allow simulation of the nearshore coastal responses to be performed for a variety of input conditions. As a result of a better understanding of the episodic and cyclical nature of the region's coastal dynamics can result, and more enlightened predictions and engineering proposals can be made that will form the foundation of a detailed regional sediment management and monitoring program. The study results will determine the effectiveness of beach nourishment as a shoreline management tool and appropriate measures to prolong the longevity of individual placements.

## **6. Federal Interest**

The proposed feasibility study shall review the US Army Corps of Engineers regional reports on the Coast of California under the authority of Section 208 of the Flood Control Act of 1965 and other pertinent reports, with a view toward development of a comprehensive regional management plan for the State of California's 1,100 mile coastal zone to address the restoration, protection and preservation of sediment resources; reduce damages associated with shoreline erosion and coastal storms; increase natural sediment supply to the coast; restore and preserve the beaches for recreation; improve water quality within the coastal nearshore; restore and preserve ecological systems; beneficially reuse dredged material from ports, harbors and other opportunistic sediments sources; and, other related purposes. There is Federal interest in continuing the study into the feasibility phase. The proposed study will evaluate an array of technical, economic, environmental and policy variables to develop regional management and monitoring plans for coastal sediments, along with identifying and formulating potential inter-relatable projects for ecosystem restoration, dredged material disposal management and beneficial reuse, recreation, and coastal storm damage reduction consistent with current planning policies and guidelines.

## **7. Preliminary Financial Analysis**

As the non-Federal Sponsor, the California Department of Boating and Waterways will be required to provide 50% of the cost of the feasibility phase study. A letter of intent from the California Department of Boating and Waterways stating willingness to pursue the Feasibility Phase Study and share in its cost, and an understanding of the cost sharing that is required for future actions is included as **Attachment 3**.

## **8. Assumptions and Exceptions**

### **a. Feasibility Phase Assumptions.**

The following critical assumptions will provide a basis for the feasibility study:

1) Policy Exceptions and Streamlining Initiatives. The study will be conducted in accordance with the Principles and Guidelines and Corps of Engineers regulations. No exceptions to established guidance have been identified, which will streamline the feasibility study process without adversely impacting the study quality. No policy exceptions are anticipated as a result from the approval of the Section 905(b) Analysis by HQUSACE.

2) No Environmental Impact Statement (EIS) will be prepared.

3) This study is similar to watershed studies and that plans will be developed only to a conceptual level of detail.

4) Potential for spin off project specific feasibility study based on the Master Plan findings for Federal participation under a current Corps program.

### **b. Other Approvals Required.**

No other items such as studies and new benefit categories require HQUSACE approval.

## 9. Feasibility Phase Milestones

The total duration of the proposed Study is estimated to be 5 years. The following table lists the schedule of key milestones for this feasibility study. A detailed milestone description for each task will be provided in the Project Management Plan (PMP).

Milestone	Description	Duration (mo)	Cumulative (mo)	Month
Milestone F1	Initiate Study	0	0	May-04
Milestone F2	Public Workshop/Scoping	1	1	Jun-04
Milestone F3	Study Scoping Meeting	4	5	Jan-05
Milestone F4	Sediment Management Plan Review Conference	34	39	Apr-08
Milestone F4A	Sediment Management Plan Formulation Briefing	4	43	Aug-08
Milestone F5	Draft Study Report	6	49	Feb-09
Milestone F6	Final Public Meeting	1	50	Mar-09
Milestone F7	Study Review Conference	1	51	Apr-09
Milestone F8	Final Report to SPD	4	55	Aug-09
Milestone F9	DE's Public Notice	1	56	Sep-09
-	Chief's Report	N/A	N/A	N/A
-	Project Authoriztion	N/A	N/A	N/A

## 10. Feasibility Phase Cost Estimate

The estimated cost of this Study is summarized in the following table.

WBS#	Description	Cost
JAA00	Feas - Surveys and Mapping except Real Estate	500,000
JAB00	Feas - Coastal Studies/Report	2,000,000
JAC00	Feas - Geotechnical Studies/Report	200,000
JAE00	Feas - Engineering and Design Analysis Report	1,550,000
JB000	Feas - Socioeconomic Studies	400,000
JC000	Feas - Real Estate Analysis/Report	200,000
JD000	Feas - Environmental Studies/Report (Except USF&WL)	1,200,000
JE000	Feas - Fish and Wildlife Coordination Act Report	150,000
JF000	Feas - HTRW Studies/Report	80,000
JG000	Feas - Cultural Resources Studies/Report	300,000
JH000	Feas - Cost Estimates	200,000
JI000	Feas - Public Involvement Documents	300,000
JJ000	Feas - Plan Formulation and Evaluation	600,000
JL000	Feas - Final Report Documentation	400,000
JLD00	Feas - Technical Review Documents	100,000
JM000	Feas - Washington Level Report Approval (Review Support)	50,000
JPA00	Project Management and Budget Documents	200,000
JPB00	Supervision and Administration	180,000
JPC00	Contingencies	1,740,000
L0000	Project Management Plan (PMP)	100,000
Q0000	PED Cost Sharing Agreement	0
Total		\$10,450,000

## **11. Views of Other Resource Agencies**

Because of the funding and time constraints of the reconnaissance phase, only limited and informal coordination has been conducted with other resource agencies. Based upon the current data deficiencies and limited knowledge regarding the coastal processes of the entire California coastline, views from various local municipalities include the desire to preserve beaches, minimize use of structural shoreline stabilization measures, and protect nearshore marine habitats.

The Coastal Sediment Management Workgroup (CSMW) was established as a partnership between the USACE and the California Resources Agency to facilitate regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through Federal, State and local cooperative efforts. The ultimate goal of the CSMW is provide coastal beach and watershed management. Key to achieving this goal is creating a comprehensive, statewide, California Coastal Sediment Master Plan. Participants in this CSMW include the Army Corps of Engineers South Pacific Division, the San Francisco and Los Angeles Districts, the California Resources Agency, the CA Department of Boating and Waterways, the CA Department of Fish and Game, the CA State Lands Commission, the CA Coastal Commission, the CA State Coastal Conservancy, the CA Department of Parks and Recreation, CA Geological Survey, USGS, and CalCoast, an advocacy organization representing many coastal cities and counties.

## **12. Potential Issues Affecting Initiation of Feasibility Phase**

a. Continuation of this study into the cost-shared feasibility-level study phase is contingent upon an executed Feasibility Cost-Sharing Agreement (FCSA). Failure to achieve an executed FCSA within 18 months of the approval of the Section 905(b) Analysis will result in termination of the study. There are no apparent issues at this time that impact on the implementation of the feasibility phase.

b. The schedule for signing the Feasibility Cost-Sharing Agreement is April 2004. Based on the schedule of milestones, completion of the California Coastal Sediment Master Plan report would be in April 2009.

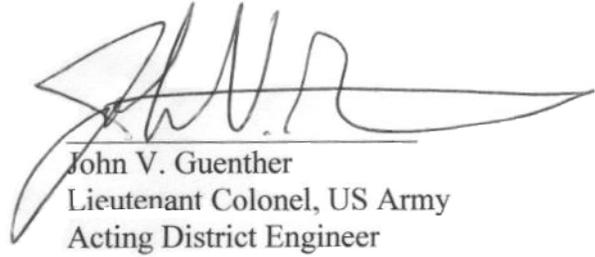
## **13. Project Area Map**

A map of the study area is shown in **Attachment 1**.

#### 14. Recommendations.

I recommend that the California Coastal Sediment Master Plan proceed to the feasibility phase. The feasibility phase will continue the investigation of coastal sediment management and related issues along the California coast. The California Department of Boating and Waterways has expressed interest in cost sharing the feasibility level study and initiation the Feasibility Cost Sharing Agreement (FCSA) upon completion of the Project Management Plan.

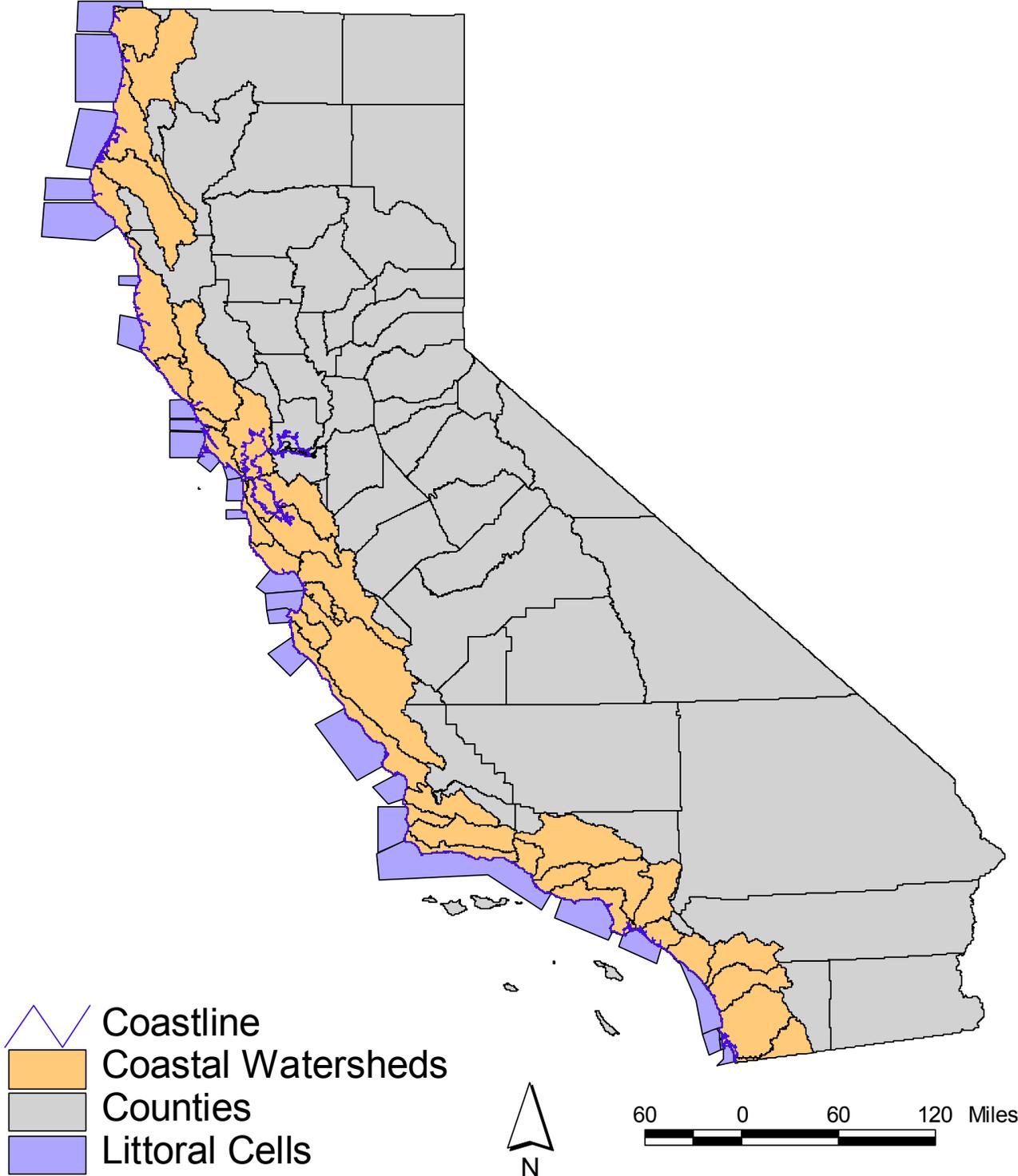
26 Nov 2003  
Date:



John V. Guenther  
Lieutenant Colonel, US Army  
Acting District Engineer

**Attachment 1**

# Figure 1: California Coastal Watersheds and Littoral Cells



**Attachment 2**

Congressional District	Congressional Representative
01	Mike Thompson (D)
03	Doug Ose (R)
06	Lynn C. Woolsey (D)
07	George Miller (D)
08	Nancy Pelosi (D)
09	Barbara Lee (D)
10	Ellen O. Tauscher (D)
11	Richard W. Pombo (R)
12	Tom Lantos (D)
13	Fortney Pete Stark (D)
14	Anna G. Eshoo (D)
15	Michael M. Honda (D)
17	Sam Farr (D)
22	Lois G. Capps (D)
23	Elton Gallegly (R)
24	Brad Sherman (D)
29	Henry A. Waxman (D)
36	Jane Harman (D)
37	Juanita Millender-McDonald (D)
38	Stephen Horn (R)
39	Edward R. Royce (R)
45	Dana Rohrabacher (R)
47	Christopher Cox (R)
48	Darrell E. Issa (R)
49	Susan A. Davis (D)
51	Randy "Duke" Cunningham (R)

**Attachment 3**

**DEPARTMENT OF BOATING AND WATERWAYS**

2000 Evergreen Street, Suite 100  
SACRAMENTO, CA 95815-3888  
Tele: (916) 263-8157  
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November 25, 2003

Colonel Richard G. Thompson  
District Engineer, Los Angeles District  
U.S. Army Corps of Engineers  
P.O. Box 532711  
Los Angeles, CA 90053-2325

**Subject: California Coastal Sediment Master Plan**

Dear Colonel Thompson:

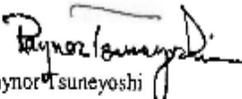
The State of California Department of Boating and Waterways (DBW) supports the on-going efforts of the U.S. Army Corps of Engineers reconnaissance study to assess potential Federal participation in the California Coastal Sediment Master Plan. At this time, DBW is willing to support the recommended feasibility study that will possibly result in a comprehensive plan for the management of sediment in coastal California for purposes of reducing shoreline erosion, and coastal storm damages, providing for environmental restoration and protection, increasing natural sediment supply to the coast, restoring and preserving beaches, improving water quality along coastal beaches, beneficially using material dredged from ports, harbors and other opportunistic sediment sources, and related purposes.

DBW has reviewed the 905 (b) Analysis Reconnaissance Report and is interested in entering into a cost sharing agreement with the U.S. Army Corps of Engineers subject to DBW's final review and approval of the Project Management Plan. DBW understands that a Feasibility Cost Sharing Agreement will have to be signed prior to initiating the feasibility study. DBW also understands that a feasibility study must be cost shared 50 percent Federal and 50 percent non-Federal, and of the 50 percent non-Federal share, of which, the non-Federal share can be up to 100 percent in-kind services.

The California Department of Boating and Waterways looks forward to working with the U.S. Army Corps of Engineers, Los Angeles District in completing the feasibility study.

If you have any questions, you can contact Mr. Kim Sterrett at (916) 263-8157.

Sincerely,

  
Raynor Tsuneyoshi  
Director



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS  
WASHINGTON, D.C. 20314-1000

REPLY TO  
ATTENTION OF:

05 MAY 2004

CEMP-SPD (1105-2-10b)

MEMORANDUM FOR Commander, South Pacific Division (CESPD-CM-P)

SUBJECT: California Coastal Sediment Master Plan, 905(b) Reconnaissance Report

1. References:

a. CESPL-PD e-mail, dated 21 January 2004, subject: California Coastal Sediment Master Plan - 905(b) Analysis Reconnaissance Report, transmitting the section 905(b) analysis to Headquarters for review and approval.

b. CESPD-CM e-mail, dated 29 January 2004, subject: California Coastal Sediment Master Plan - 905(b) Analysis Reconnaissance Report, providing SPD concurrence with the 905(b) analysis.

2. The section 905(b) analysis for the California Coastal Sediment Master Plan and letter of intent are approved for proceeding into feasibility phase of planning. This analysis demonstrated the potential Federal interest in storm damage reduction, ecosystem restoration, and navigation (beneficial uses of dredged material) that could result from development of a comprehensive sediment master plan. The 905(b) analysis indicates that the feasibility phase planning effort will be similar to a watershed study that develops plans only to a conceptual level of detail, but there is strong potential for spin-off project-specific feasibility studies under other Corps programs.

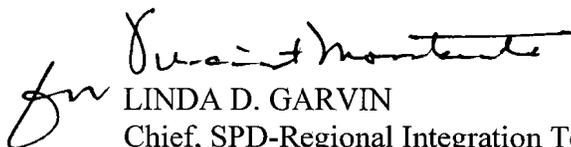
3. The preliminary cost estimate for the California Coastal Sediment Master Plan feasibility study included in the 905(b) analysis is indicative of a large, complex study. In the development of the project management plan and feasibility cost sharing agreement, the district will need to work with the sponsor to scope the feasibility investigations to properly account for past studies as detailed in the 905(b) report, and reflect both Federal and non-Federal budget limitations. If possible, the study should be structured to provide for interim, usable products should future funding become an issue. In addition, we recommend coordination with sediment master planning efforts ongoing in the North Atlantic and South Atlantic Divisions, to potentially reduce costs and avoid duplication of effort. Although the result of this study is a master plan and not a construction project, it seems there could be a significant follow-on maintenance component to the plan, to ensure that the collected data and developed databases remain current and useful to the anticipated spin-off studies. These potential Operations and Maintenance activities should be addressed in the feasibility report.

CEMP-SPD (1105-2-10b)

SUBJECT: California Coastal Sediment Master Plan, 905(b) Reconnaissance Report

4. Submission of the model feasibility cost sharing agreement is not required, provided no deviations are requested. The district should plan to convene an in-progress review meeting early in the study to ensure the study is focused and tailored to meet the specific objectives. Based on results of the in-progress review, the project management plan may need to be revised to better define the depth of analysis required and/or refine study constraints.

FOR THE COMMANDER:

  
LINDA D. GARVIN  
Chief, SPD-Regional Integration Team  
Directorate of Military Programs