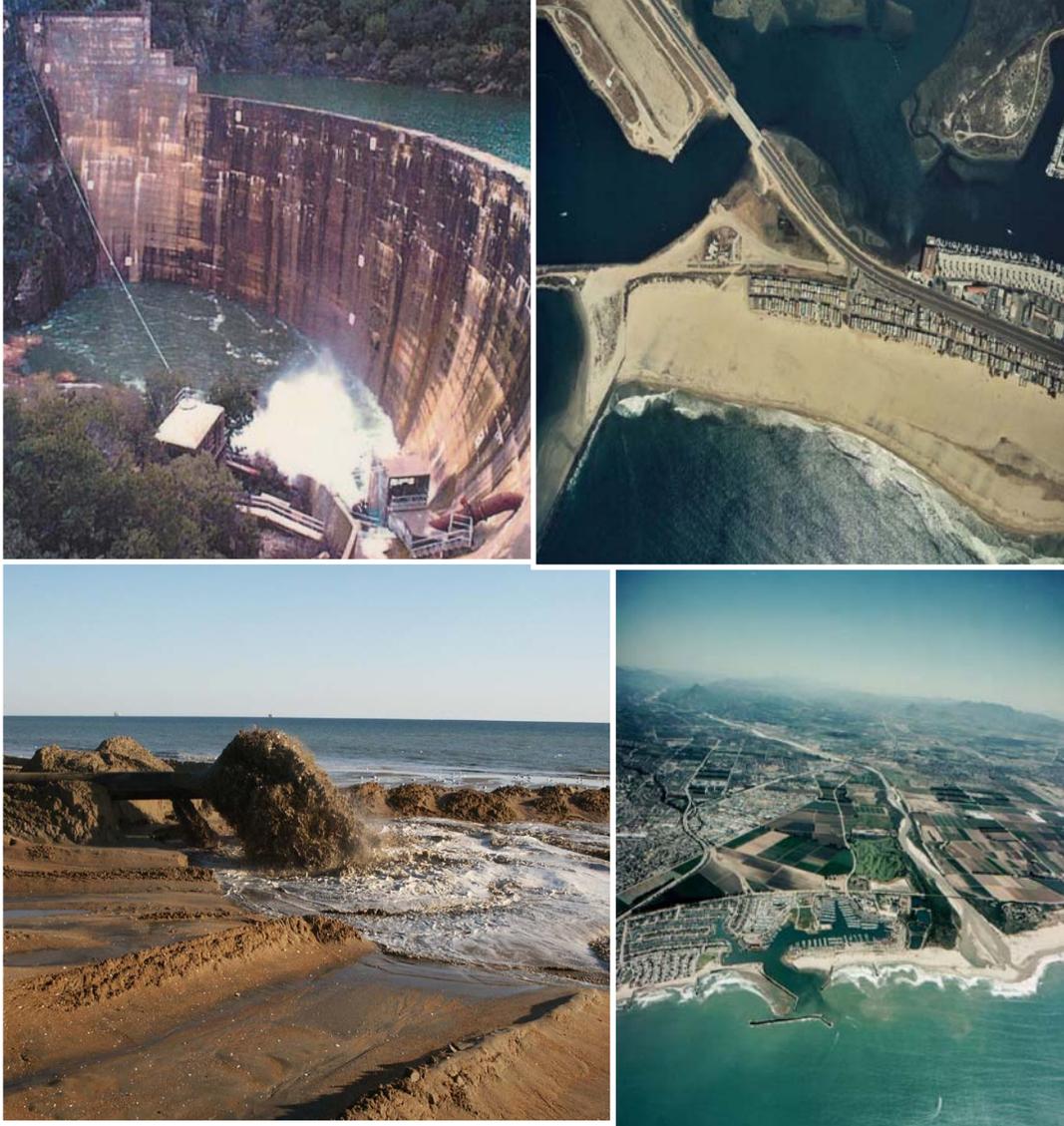


THE CALIFORNIA COASTAL SEDIMENT MASTER PLAN Status Report



Prepared By

California Coastal Sediment Management Workgroup
<http://www.CDBW.ca.gov/csmw/default.aspx>

June 2012

IMPORTANT NOTE

This status report documents the on-going activities of the California Coastal Sediment Management Workgroup (CSMW) in its efforts to compile the California Coastal Sediment Master Plan (SMP). Funding for this program was initiated by a \$1,200,000 grant from the National Oceanic and Atmospheric Administration (NOAA) Coastal Impact Assistance Program (CIAP) administered by the Natural Resources Agency of California (CNRA). A CIAP grant of \$700,000 was also later provided by the Bureau of Ocean and Energy Management, Regulation and Enforcement (BOEMRE). The SMP is funded on an equal (50/50) cost-share basis between the CNRA and the U.S. Army Corps of Engineers (USACE).

This triannual report updates the May 2009 Status Report and details the CSMW's efforts and accomplishments since the last report. Current information can also be obtained from the CSMW Web site at <http://www.CDBW.ca.gov/csmw/default.aspx>.

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EXECUTIVE SUMMARY

Problem Statement: Coastal Sediment

Human activities over the past 150 years have altered the natural supply of sediment (e.g., gravel, sand, silt, clay/mud) to the coast, as well as the transport of sediment along the coast. Flood control projects, primarily dams, trap sediment moving through coastal streams and rivers and reduce peak stream flows, both of which reduce downstream transport of sediment. Inappropriately-conducted timber harvesting (e.g., roads and crossings) and land development can increase the amount of fine-grained sediment being transported over that produced from natural stream profile development. Stream channels and land covered by roads, buildings or other impermeable surfaces can reduce the volume of sediment available for beaches far below the natural conditions. Similarly, seawalls reduce the natural contribution of coastal bluffs and dunes to beach sediment. In-stream and coastal sand and gravel mining operations, while supplying a societal need for aggregate materials, have removed a significant amount of sediment that might have otherwise been available to beaches. Groins and breakwaters alter the transport of sediment along the coast, while harbors and related maintenance activities both trap sediment and modify sediment transport patterns through dredging and disposal practices. Coastal wetlands, particularly in southern California, are being inundated with sediment because of lessened flushing capabilities associated with reduced flow and, possibly, sea level rise, further reducing the amount of sediment reaching the coast.

The activities described above are not intended to adversely affect California's 1,100 mile long coastline, but often they do. Beaches require an ongoing source of sediment to maintain their width, but many of California's coastal beaches have lost width over time because of an inadequate natural supply of sediment. This is a significant problem because California's coastal beaches are a highly valued resource, providing access to the open ocean, recreational areas, and habitat for numerous coastal species. In addition, coastal beaches provide a natural buffer or transition zone between the ocean and the land. This buffer is extremely important because it provides coastal protection during storms when public infrastructure or private homes are threatened and this natural buffer also reduces the need to armor the shoreline.

In other areas, sediment is either too abundant or is a construction by-product, such as from flood control maintenance projects, harbor expansion or maintenance projects, and coastal wetland restorations. Unfortunately, a common misperception of developers and regulatory agencies is that this excess coastal sediment is a waste product requiring disposal rather than a resource that, if wisely managed, can benefit public infrastructure, habitat, and recreational needs.

The historical approach by federal, state, and local agencies towards these sediment deficit, or supply, problems has been a project-by-project approach that focuses solely on solving site specific problems. Consequently, these agencies have historically implemented many projects to optimize cost benefit per individual project, rather than attempting to resolve regional sediment imbalances. This inability to consider excess sediment at one location as beneficial use at another has contributed significantly to the perception that excess coastal sediment is a waste.

Furthermore, the “lowest cost alternative” typically used to determine locations for placement of dredged materials often only considers cost rather than the full suite of potential benefits, including environmental restoration, increased economic benefits, associated with sediment placement locations.

Regional Sediment Management

Over the past several years, a new paradigm for addressing coastal sediment supply-related problems and imbalances has emerged throughout the nation, including California. This approach, known as Regional Sediment Management (RSM), systematically addresses sediment supply and imbalances on a regional basis rather than on a site-specific one. RSM also optimizes the beneficial use of sediment by recognizing that sediment is a valuable resource rather than a waste product. RSM incorporates the restoration or augmentation of natural processes whenever and wherever possible.

As an example, a dredging project to deepen a navigational channel at a port can provide the sand needed to replenish an eroded coastal beach or finer grained sediment to restore a coastal wetland. Scientists and resource managers will evaluate the costs and benefits of moving sediment from the channel to the beach site and wetland site. They might conclude that one site is a more feasible and appropriate location to receive sediment because of economic, environmental, and engineering factors and concerns. Scientists and resource managers have determined that the RSM approach is the best way to balance coastal sand movement within self-contained regional areas, known as littoral cells.

A littoral cell is a discrete coastal and nearshore area within which sand moves to and then along the coast, temporarily residing on a beach, and then exits through a “sink” (e.g., submarine canyon, large embayment, deep water). Typically, sand does not move from one littoral cell to an adjacent one.

Coastal Sediment Management Workgroup

The CSMW is a collaborative effort by federal, state, and local agencies and non-governmental organizations (NGOs) working to address California’s coastal sediment management needs on a regional and system-wide basis. One of CSMW’s main goals is to pursue innovative ways to solve coastal imbalance problems along the California coast, often through beneficial use of sand to fortify eroding beaches. **Figure 1** shows the membership of the CSMW, which is listed below as well.

- California Natural Resources Agency (CNRA)
- California Department of Boating and Waterways (CDBW)
- California Department of Fish and Game (CDFG)
- California Department of Parks and Recreation (CDPR)
- California Coastal Commission (CCC)
- California Geological Survey (CGS)
- San Francisco Bay Conservation and Development Commission (BCDC)
- State Coastal Conservancy (SCC)

- Department of Fish and Game (CDFG)
- State Water Resources Control Board (SWRCB)
- State Lands Commission (CSLC)

Federal membership includes the

- U.S. Army Corps of Engineers (USACE) South Pacific Division (SPD)
 - Including Los Angeles District (SPL) and San Francisco District (SPN)
- U.S. Geological Survey (USGS)
- U.S. Environmental Protection Agency (USEPA)

NGO membership includes the

- California Coastal Coalition (CalCoast)
- California Marine Affairs and Navigation Conference (CMANC).

The CNRA and the USACE jointly chair the CSMW.

Coastal Sediment Management Workgroup
Membership

<p><u>Federal Agencies</u></p> <p>USACE* SPL SPN USEPA</p>	 <small>Coastal Sediment Management Workgroup</small>	<p><u>State Agencies</u></p> <p>Natural Resources Agency* Boating & Waterways Coastal Commission Parks & Recreation Geological Survey Fish & Game Coastal Conservancy BCDC SWRCB</p>
		
<p><u>Advisory</u></p> <p>Cal Coast (local agencies) USGS CMANC (Ports & Harbors)</p>	<p><u>Implementation Assistance</u></p> <p>Regional Planning JPAs</p>	

* Co-chair

Figure 1 CSMW Membership

California Coastal Sediment Master Plan

To facilitate implementation of RSM for the entire California Coast, the CSMW has embarked on a multi-year effort to compile a California Coastal Sediment Master Plan (SMP). The SMP is a dynamic feasibility study that is, ever-changing in response to newly identified coastal management needs and issues along the CA coast. The CSMW's monthly meetings, as well as internal CA SMP Working Group discussions, have identified a multitude of new coastal issues along the way. Coastal issues associated with specific regions of the coast are identified through the CSMW's Coastal RSM Plan (CRSMP) program (discussed in more detail below). As a result, new goals and their solutions have been developed, as reflected by the new tasks and priority documents outlined in this and previous Status Reports. The new undertakings were prioritized and given funds through careful team review and debate of their importance in addressing the new coastal management, policy, and physical process issues arising throughout coastal California over the past decade.

The objectives of the SMP are to implement the CSMW mission and goals by:

- ❖ Promoting the use of RSM to address problems caused by sediment imbalances;
- ❖ Fostering cooperation between agencies involved in sediment management;
- ❖ Support the California Ocean Protection Council (OPC) in the implementation of their Strategic Plan;
- ❖ Developing adaptive regional plans to meet current and future needs of coastal sediment managers and to maintain consistency within those plans across coastal California;
- ❖ Identifying and helping to prioritize critical areas of coastal erosion and sediment accretion;
- ❖ Providing resource managers informational tools and techniques to assist their decision making;
- ❖ Facilitating and coordinating beach and coastal watershed efforts with federal, state, local and public stakeholders;
- ❖ Collaborating with regulatory agencies to provide a consistent permit framework for coastal sediment projects;
- ❖ Demonstrating the value of sediment as a coastal resource for habitat, recreation, shoreline protection, and economics;
- ❖ Supporting requests for funding from local and regional authorities and eliminating inefficient use of public funds; and,
- ❖ Fostering the beneficial use of sediment dredged from navigation channels, harbors, wetlands, and nearshore reservoirs and collected from inland sources.

The SMP is a compilation of tools, strategies, and informational documents designed to assist and guide sediment managers and others in implementing RSM throughout the California Coast. These products fall under three general categories:

- 1) Educational and informational reports and data,
- 2) Computer based tools, and
- 3) A series of CRSMPs that will determine how sediment can be best managed within regions and collectively address differences in local issues across coastal California.

A series of triannual Status Reports are envisioned to document completed, on-going, and anticipated future activities of the CSMW in compiling the SMP. Additions, revisions and other updates will be presented in the appropriate Status Reports. An initial SMP Status Report was released by the CSMW in September 2006 and updated in May 2009. This Status Report provides a

- Discussion on why RSM is needed to address sediment management problems, and
- Descriptions of the various types of products being developed by the CSMW to implement RSM across coastal California.

Efforts Completed During This Reporting Period

In addition to those reported in the previous SMP Status Reports, the CSMW has completed the following efforts related to the SMP:

- Programmatic Environmental Impact Report for the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON)
- California Beach Erosion Assessment Survey (CBEAS) 2010
- Regional Sediment Management — Offshore Canyon Sand Capture
- Geographic Information System (GIS) User's Survey
- Sensitive Shoreline and Natural Resources GIS Data, Ventura/Santa Barbara Counties
- The Economic Costs of Sea Level Rise to California Beach Communities
- Description of Proposed Action and Alternatives for the San Diego Association of Governments (SANDAG)
- Coastal Habitat Survey for SANDAG
- Tijuana Estuary Sediment Study/Demonstration Project

1 The Coastal Sediment Problem in CA

1.1 Problem Statement

Portions of California's coastline are actively eroding, often leading to economic losses, reduced recreational opportunities, and habitat destruction. California's coastal beaches are a highly-valued resource, providing access to the open ocean, areas for recreation, and habitat for numerous coastal species. In addition, beaches provide a buffer or transition zone between the ocean and the land, expanding and contracting over the seasons in response to waves and sand supply.

Over millennia, natural processes, including wind, rain, and stream flows, have mobilized and transported sediments (e.g., gravel, sand, silt, clay/mud). Coastal beaches have benefited from much of this natural transport, receiving sand from coastal streams and rivers, sea cliff or bluff erosion, gullies incised by rainfall runoff, and dunes built and deflated by wind. Human activities over the past 150 years have significantly altered both these natural supplies of sediment to the coast and the transport of materials along the coast. Dams block the transport of sediment through coastal streams and rivers and reduce the peak stream flows, which in turn reduces the downstream transport of beach material. Major land-clearing projects, primarily timber harvesting and commercial development, if not properly constructed, can mobilize volumes of sediment much larger than that produced from the natural land. If the cleared land is subsequently covered by roads, buildings, or other impermeable surfaces, the volume of sediment available for mobilization will drop far below the natural conditions. Sand and gravel mining, while meeting a societal need for aggregate materials, has removed a significant amount of material that might have otherwise been available to California's coastal beaches. Coastal structures, like groins and breakwaters, alter the alongshore transport of sediment. Harbors can trap sediment, and maintenance operations modify the transport patterns through dredging and disposal practices. Coastal wetlands, particularly in southern California, are being inundated with sediment caused by lessened flushing capabilities associated with reduced flow and possibly sea level rise, further reducing the amount of sediment reaching the coast. While many of these activities are not intended to alter beaches, the net effect often is an alteration of the coastline. **Figure 2** illustrates the ways in which human actions affect the supply of sediment to the coast.

Most sediment supply-related problems can be associated with societal failure to recognize, communicate, and implement regional solutions to sediment-related projects. For instance, the approach to addressing sediment imbalances by state and federal agencies has historically been project by project with a narrow focus on solving a local problem rather than looking at the impact to the entire littoral cell. Further, state and federal agencies would typically implement sediment projects to optimize cost benefit per individual project, rather than attempting to resolve the regional imbalance that was producing either the sediment excess or deficit. This approach has led to the unfortunate perception that coastal sediment is a waste product requiring disposal, rather than a potential beneficial resource. It has also led both to a lack of

understanding of the regional benefits of sediment management and to lost opportunities for beneficial use.

The Problem – Human Modifications Have Altered Processes and Impacted Uses

Humans have substantially altered natural sediment transport processes within California's coastal watersheds, reducing storm protection, habitat, and recreation along the coast. Dams, which were built to control floods and store water, also trap sediment in their reservoirs and reduce peak flows that would move most of the coarse sediment to the coast. Sand and gravel are mined from stream systems for use in construction, removing materials that would eventually replenish coastal habitats. Timbering, grading, and earth moving strip off vegetation, which exposes the watersheds to excessive erosion. Conversely, construction of concrete-lined channels, roads, and buildings hardens the watershed, reducing bank erosion and associated amounts of coarse sediment available for delivery to the coast via streams. Some coastal structures such as harbors, jetties, groins, and breakwaters alter movement of sediment along the shoreline, while other coastal structures such as riprap and seawalls reduce bluff and cliff erosion, which decreases the amount of sediment supplied directly to the shoreline. Anthropogenic impacts to the coastal watersheds and shorelines of California have resulted in

- Beaches undergoing accelerated erosion, reducing recreational opportunities and coastal access, contributing to loss of habitat, and increasing the probability of storm damage along the coast
- Coastal stream water quality becoming impaired
- Many coastal wetlands and lagoons experiencing either accelerated erosion or excessive sedimentation
- Sediment being removed, trapped, redirected, modified, and polluted as it moves from the coastal watersheds to the shoreline and along the coast
- Sand dredged from harbor channels being, in many instances, placed in locations that do not optimize beneficial use of that material
- Sediment supply to the coast continuing to be reduced as a result of interruptions caused by dams and debris basins, in-stream mining of sand and gravel, coastal armoring, hardening of the coastal watersheds, and trapping sediment in coastal wetlands and lagoons

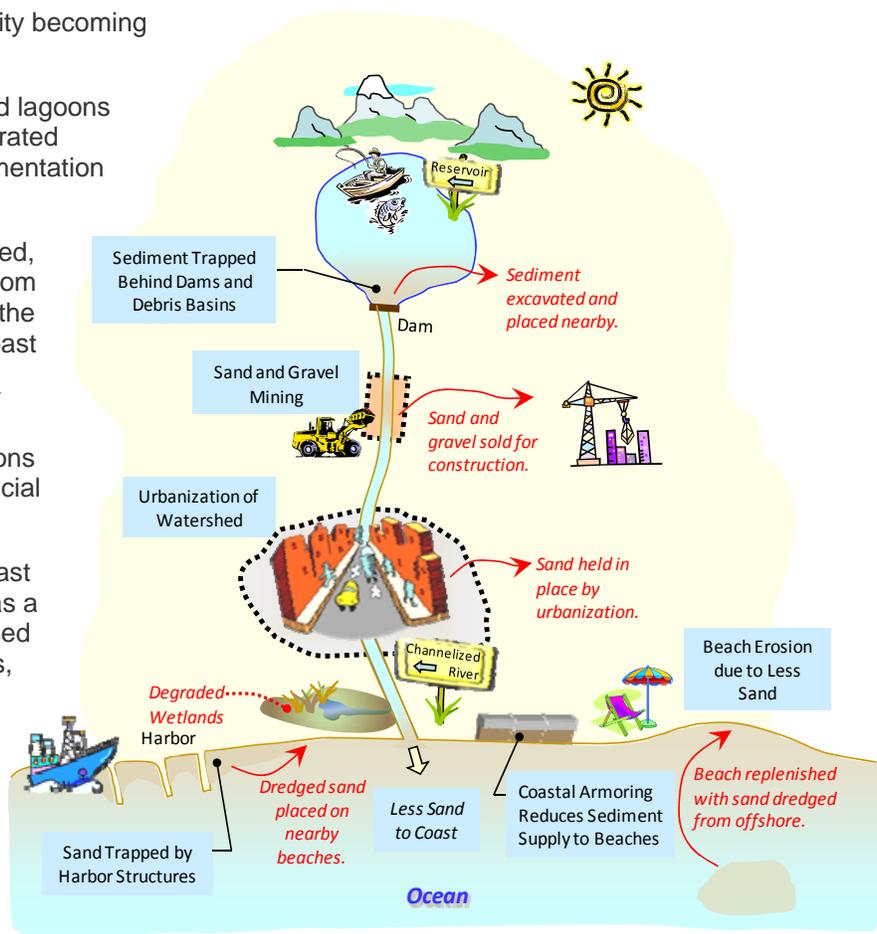


Figure 2 The Problem – Existing CA Coastal Sediment Management

1.2 Opportunity Statement: The New Regional Approach

RSM aims to increase efficiency by managing sediment demand and excess on a regional basis. RSM also optimizes the beneficial use of sand by considering coastal sediments to be a valuable resource instead of a waste product. Previously-independent projects are conjoined to maximize sediment use.

For example, the cost of dredging navigation channels can be combined with placing that material where it is most needed to remediate beach erosion. This approach is successful because it considers costs and benefits not previously counted. Benefits arise from an array of potential sources valued on their contribution to the region rather than just for an individual project. The most technically appropriate “region” for such management of sediment is the littoral cell. The RSM approach is illustrated in **Figure 3**.

A littoral cell is a discrete coastal and nearshore area within which sand enters from rivers, cliffs, or dunes; moves along the coast; temporarily resides on a beach; and then exits through, typically, a submarine canyon. Littoral cells that are adjacent to one another typically do not share sand.

Some of the main principles associated with implementing RSM include:

- ❖ Establishing the regional framework (i.e., littoral cell boundaries, sediment budgets, and regional regulatory jurisdiction);
- ❖ Examining the anthropogenic alterations to coastal sediment supply and transport;
- ❖ Developing priority areas within each region for implementation activities;
- ❖ Identifying opportunities to restore sediment balance throughout the affected region by modifying the sediment transport processes;
- ❖ Determining issues that may inhibit implementation of these opportunities and develop tools to address these issues in an environmentally-responsible manner;
- ❖ Obtaining funds to pay for the incremental costs associated with implementing RSM;
- ❖ Recognizing the need to use non-traditional sources of sediment to help re-establish wide beaches;
- ❖ Educating concerned stakeholders on the value of sediment and need for RSM solutions; and,
- ❖ Promoting cooperative and coordinated efforts by agencies involved in protection of California’s priceless coastal resources.

The Road to Solutions – The California Coastal Sediment Master Plan

Many watershed and shoreline problems caused by human modifications can be solved or minimized through the development of a new approach known as Regional Sediment Management (RSM). The California Coastal Sediment Management Workgroup (CSMW), a partnership of several federal and state agencies and non-governmental organizations, is developing and implementing the California Coastal Sediment Master Plan (SMP) to foster an RSM approach for the entire state. Through this effort, region-specific issues and solutions are coordinated with local and regional partners through a series of CRSMP designed around littoral cell management. Although development of the SMP is ongoing, the SMP already provides a framework for finding solutions through RSM by

- Identifying sediment-related problems along the California coast, such as beach erosion, wetland erosion and sedimentation, habitat loss, and water-quality impairment
- Defining the causes of sediment-related problems such as dams, debris basins, dredging, sand and gravel in-stream or back-beach mining, coastal structures, lack of project coordination, and inconsistent policies, procedures, and regulations

- Providing a solid scientific framework and database on technical issues within the coastal environment to help visualize and support sediment management decisions

- Providing a framework, through collaboration with federal, state, regional, and local governments to address the sediment-related problems on a regional scale, such as littoral cells or watersheds

- Developing and exporting new and existing analytical tools to assist in managing coastal resources

- Providing a programmatic road map to plan, prioritize, and program future coastal resources projects

- Fostering a collaborative approach among agencies to provide a consistent framework for project proponents

- Establishing a streamlined process for coastal resources-related project approvals

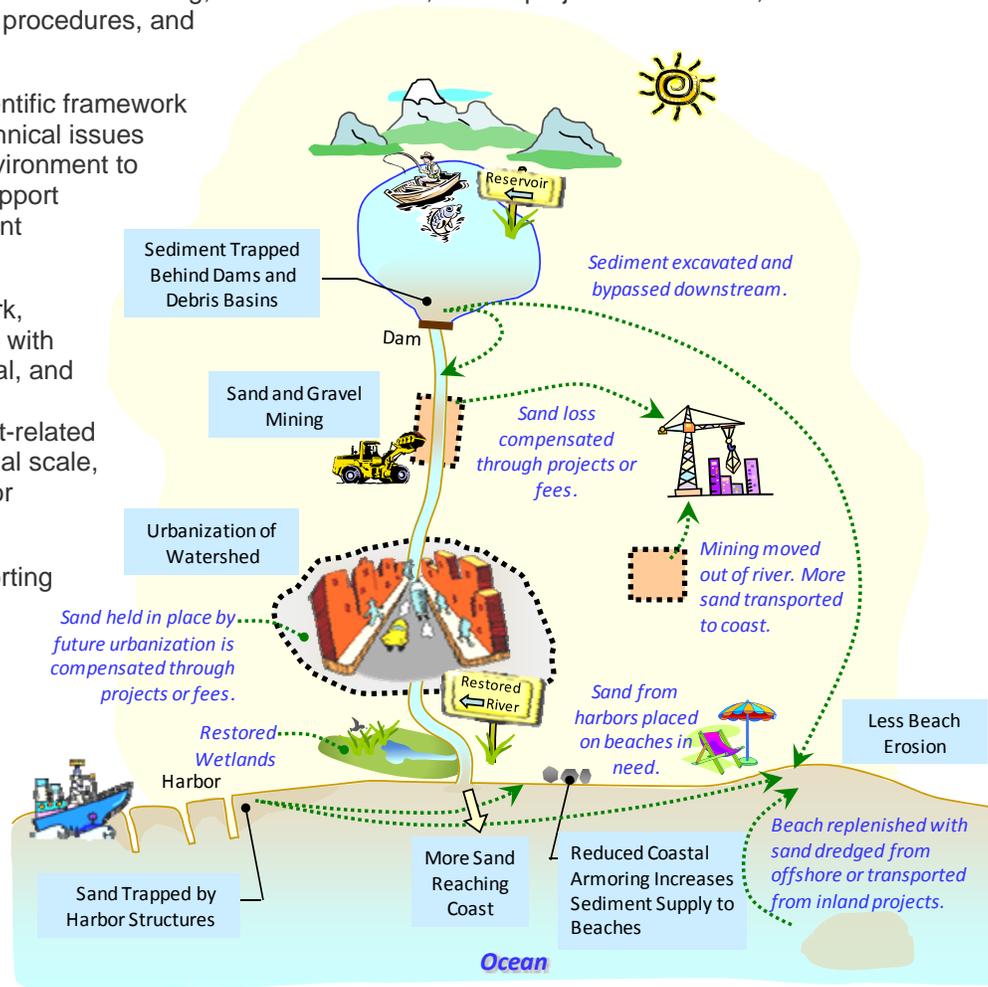


Figure 3 The Opportunity – New Approach to CA Coastal Sediment Management

1.3 California Coastal Sediment Management Workgroup

The CSMW is a collaborative effort by federal, state, and local agencies and non-governmental organizations committed to evaluating and addressing California's coastal sediment management needs on a regional, system-wide basis. The CSMW was formed in response to concerns raised on shore protection needs in California by the State of California Resources Agency (now Natural Resources Agency or CNRA), the U.S. Army Corps of Engineers (USACE), and local governments during meetings in 1999. The CSMW hosted public workshops between February and June 2004 to gather input on coastal sediment management issues in California. At these workshops and meetings, there was consensus that integrated coastal sediment management is a key factor in the development of strategies to conserve and restore California's coastal beaches and watersheds.

CSMW's Mission: Conserve, restore, and protect California's coastal resources by developing and facilitating regional approaches to managing sediment.

Goals: Reduce shoreline erosion and coastal storm damages, restore and protect beaches and other coastal environments by restoring natural sediment supply to the coast, and optimizing the use of sediment from ports, harbors, and other opportunistic sources.

The CNRA and the USACE co-chair the CSMW. The CNRA is composed of multiple departments, boards, commissions, conservancies and programs including, but not limited to, the Ocean Resources Management Program (ORMP), the CDBW, the CCC, the SCC, the C DPR, the CGS, and the CDFG. Other state agencies involved in sediment management that participate in the CSMW include the BCDC, the CSLC, and the SWRCB. The CNRA and its departments have responsibilities related to conserving, enhancing, and managing California's natural and cultural resources, including coastal beaches and watersheds, and the ocean ecosystem. State funds for the SMP are typically provided through the CDBW.

The USACE participates as the lead federal agency and has federal responsibilities related to managing and restoring coastal shorelines, wetlands, and watersheds. In addition, the USACE has lead federal authority for flood control, ecosystem restoration, and navigation activities. The Los Angeles District of the USACE provides federal funds used to develop the SMP. The USEPA also participates periodically in CSMW meetings.

The CSMW is advised by the CalCoast, a non-profit organization comprised of cities, counties, and regional government agencies along the coast. The CalCoast provides the CSMW with local feedback and updates regarding projects and studies underway in coastal communities. The CMANC participates in the CSMW to provide insights and concerns related to issues affecting California's ports and harbors. The USGS also advises and assists the CSMW in technical issues along the California coastline. The CSMW also works directly with regional planning JPAs (Joint Powers Authority) to prepare, provide, and implement the documents, tools, and CRSMPs comprising SMP development. **Figure 4** below shows the structure of the CSMW.

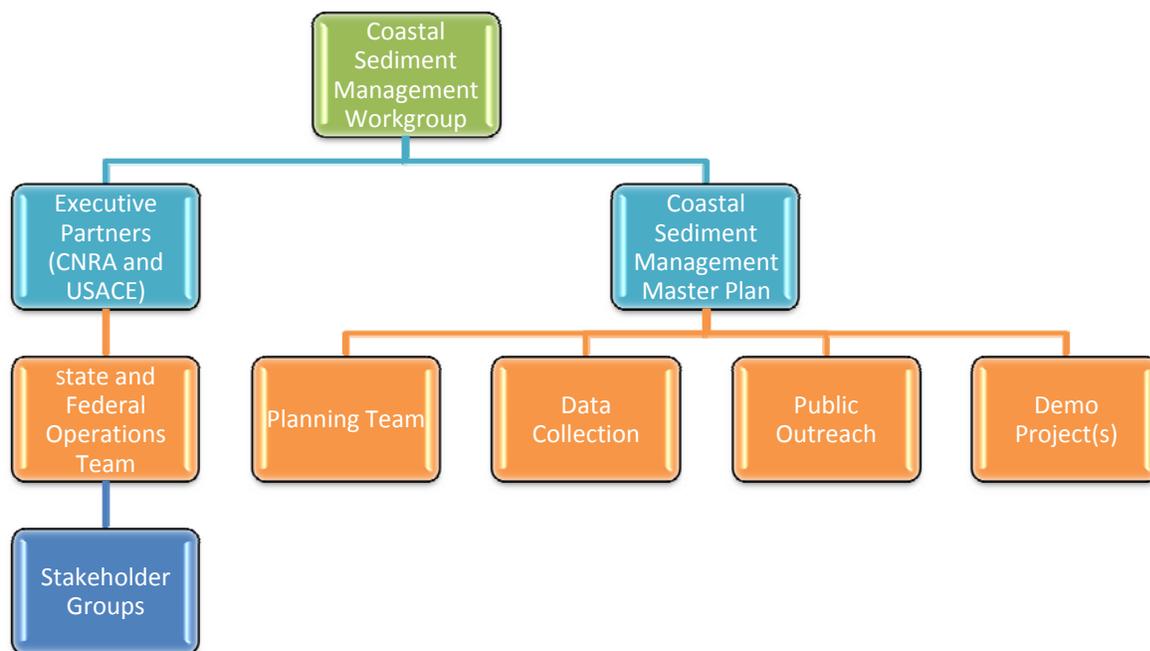


Figure 4 CSMW Structure

In addition to the federal, state, regional, and local coordination, each participant in the CSMW can use group discussions to strengthen its own programs within the context of statewide and regional RSM implementation. State agencies have used the CSMW to coordinate the development and review of projects undertaken through recent state funding and bond-issue programs. The CSMW provides a forum to enhance these individual efforts, minimize redundant studies, and ensure that various studies are being conducted in a complementary way.

1.4 California Coastal Sediment Master Plan

To facilitate implementation of RSM throughout the entire California Coast, the CSMW has embarked on a multi-year effort to compile a California coastal SMP. The SMP (SMP) is a compilation of tools, strategies, and informational documents designed to assist and guide sediment managers and others in implementing RSM throughout the California coast. These products fall under three general headings:

- ❖ Educational and informational reports and data,
- ❖ Computer based tools, and
- ❖ A series of CRSMPs that will strategize how sediment can be best managed within regions and collectively address differences in local issues along coastal California.

A series of triannual Status Reports are envisioned to document completed, on-going, and anticipated future activities of the CSMW in compiling the SMP. Additions, revisions and other updates will be presented in the appropriate SMP Status Reports. This Status Report provides:

- Discussion on why RSM is needed to address sediment management problems; and,
- Descriptions of the various types of products being developed by the CSMW to implement RSM along coastal California.

2 CA Sediment Master Plan

2.1 Why a SMP is Needed

After holding numerous public workshops and meetings, the CSMW determined that a SMP was needed to meet its mission for coastal California:

- ❖ Reduce shoreline erosion and coastal storm damages;
- ❖ Provide sediment for environmental restoration and protection;
- ❖ Increase and restore natural sediment supply to the coast;
- ❖ Restore and preserve coastal beaches;
- ❖ Improve water quality along coastal beaches;
- ❖ Foster the beneficial reuse of sediment dredged from ports, harbors, wetlands, and other sources; and,
- ❖ Provide sufficient receiver sites for port and harbor dredge materials.

When completed, the SMP will be a comprehensive plan for the regional management of sediment in coastal California over the next 20 years.

2.2 SMP Objectives

The objectives of the SMP are:

- ❖ Promoting the use of RSM to address problems caused by sediment imbalances;
- ❖ Fostering cooperation between agencies involved in sediment management;
- ❖ Support the OPC in the implementation of their Strategic Plan;
- ❖ Developing adaptive regional plans to meet current and future needs of coastal sediment managers and to maintain consistency within those plans across coastal California;
- ❖ Identifying and helping to prioritize critical areas of coastal erosion and sediment accretion;
- ❖ Providing resource managers informational tools and techniques to assist their decision making;
- ❖ Facilitating and coordinating beach and coastal watershed efforts with federal, state, local and public stakeholders;
- ❖ Collaborating with regulatory agencies to provide a consistent permit framework for coastal sediment projects;
- ❖ Demonstrating the value of sediment as a coastal resource for habitat, recreation, shoreline protection, and economics;
- ❖ Supporting requests for funding from local and regional authorities and eliminating inefficient use of public funds; and,
- ❖ Fostering the beneficial use of sediment dredged from navigation channels, harbors, wetlands, and nearshore reservoirs and collected from inland sources.

2.3 SMP Development

Development of the SMP comprises four major categories: 1) Planning (including interagency coordination), 2) Public Outreach, 3) Technical Research and Data Collection, and 4) Demonstration Projects, as shown in **Figure 5**.

Initial SMP efforts focused on compiling and developing informational products or tools of state-wide utility that cover the major concerns related to coastal RSM. The main issues addressed by these efforts were identification of critical coastal erosion areas and potential sources of sediment to replace or restore lost sediment, examination of the governmental frameworks (policies, procedures, and regulations, aka PPR) concerning sediment management, and assessment of the natural and biological systems involved with or affected by sediment management. In addition, the SMP effort has fostered and continues to foster team building between agencies with disparate missions and objectives, and added to the scientific database regarding issues related to sediment management.

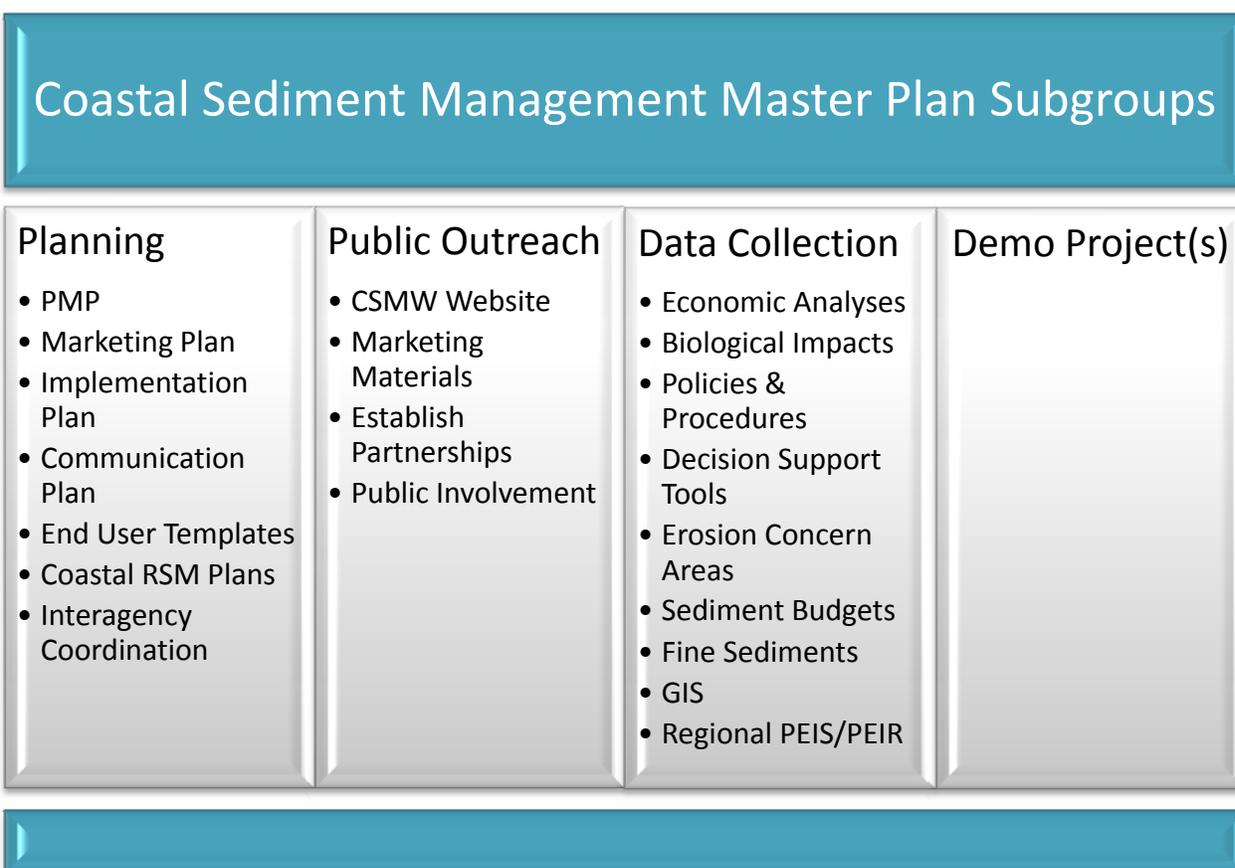


Figure 5 CSMW Structure

The SMP will continue to support and augment these initial state-wide efforts. During this reporting period, SMP efforts have focused on more regionally-specific strategies for RSM, because most sediment management implementation occurs at the local or

regional scale. Regionally-based strategies to address sediment supply issues of concern are being developed within specific regions that utilize the reports, data, and educational and informational tools developed and compiled by the CSMW for the SMP. Local and regional governments and other stakeholders are invited to participate in the effort to find consensus on a regional plan for beneficial use of opportunistic sediment as well as planned shoreline restoration project. Three CRSMPs were developed and finalized at the end of the last reporting period. Lessons learned are currently being extended to other coastal regions as resources become available to develop CRSMPs for those regions. When completed the SMP will have:

- ❖ Identified critical coastal erosion areas throughout coastal California;
- ❖ Located potential sources of sediment to replace or restore lost sediment;
- ❖ Developed a series of CRSMPs along the entire California 1,100 mile coastline providing strategies by which sediment can be managed regionally to remediate the eroding areas;
- ❖ Identified species and habitats of concern that could be affected by RSM activities as well as means to minimize such impacts during those activities;
- ❖ Incorporated regulatory-appropriate procedures designed to streamline RSM permitting activities while protecting natural and economic coastal resources;
- ❖ Fostered team-building between agencies with disparate missions and objectives;
- ❖ Increased scientific understanding of technical issues that arise within the coastal and oceanic environment as a result of RSM activities;
- ❖ Provided for public input to meet stakeholder concerns; and,
- ❖ A comprehensive GIS database and spatial data viewer allowing sediment managers to conduct spatial-based evaluations of issues related to sediment management

2.4 SMP Tools and Products

SMP tools available for public use can be found on the CSMW website, as can the most recent accounting of project status. Tools, strategies, and informational documents that either have been or will be developed for the SMP are identified in this section. All completed documents and tools are available through the CSMW website www.CDBW.ca.gov/csmw/default.aspx.

2.4.1 Previous Accomplishments

Products previously completed by the CSMW are:

- ❖ Policies, Procedures, and Regulations (PPR) Analysis
- ❖ Development of Sand Budgets for California's Major Littoral Cells
- ❖ Coastal References Compendium and Searchable Database
- ❖ Literature Search and Review of Selected Topics Related to Coastal Processes, Features, and Issues in California
- ❖ Cumulative Loss of Sand Due to Dams
- ❖ The Economics of Regional Sediment Management in Ventura and Santa Barbara Counties
- ❖ Sand Compatibility and Opportunistic Use Program (SCOUP)

- ❖ SCOUP Pilot Project Mitigated Negative Declaration
- ❖ California SMP Brochure
- ❖ CSMW Website- www.CDBW.ca.gov/csmw/default.aspx
- ❖ Public Outreach Program
- ❖ California Regional Sediment Management Information System (CRSMIS)
- ❖ SMP Status Report May, 2009
- ❖ Beach Restoration Regulatory Guide
- ❖ Sources, Dispersal and Fate of Fine Sediment Supplied to Coastal California

- ❖ Littoral Cells, Sand Budgets and Beaches
- ❖ Web-based Spatial Data Mapping Tool (WebMapper)
- ❖ Southern Monterey Bay CRSMP
- ❖ Santa Barbara / Ventura Counties CRSMP
- ❖ San Diego County CRSMP

Please refer to the CSMW website or the SMP Status Report 2009 report for a more detailed discussion of the individual tool, document, or strategy.

2.4.2 CSMW Efforts Completed During this Reporting Period

Between the May 2009 SMP Status Report and June, 2012, the CSMW has completed the following products related to the SMP:

- ❖ BEACON's Programmatic Environmental Impact Report: The CSMW provided funding to the BEACON to develop an environmental document associated with implementing recommendations within their CRSMP. BEACON developed a programmatic EIR (PEIR) to evaluate potential environmental impacts associated with nourishment and retention structures to minimize sand loss, as recommended in their CRSMP. The Final PEIR was completed in March 2011.
- ❖ California Beach Erosion Assessment Survey (CBEAS) 2010: This informational report and strategy identifies critical coastal erosion locations, known as beach erosion concern areas (BECAs), where beach erosion has been of concern to jurisdictional entities. The report also identifies locations of excess sediment, including ports, harbors, wetlands, and flood control projects, that could be used to address erosion through RSM applications. This report was finalized in October 2010.
- ❖ Regional Sediment Management - Offshore Canyon Sand Capture: This informational tool identifies submarine canyons along the California coast where artificial measures to reduce or eliminate the amount of sand being lost to the canyon and recovery of that sand for beach nourishment activities might prove cost-effective and environmentally benign. Furthermore, it offers suggestions about how that might be accomplished. The white paper, titled "Regional Sediment Management – Offshore Canyon Sand Capture" was completed in 2009.
- ❖ GIS User's Survey: In coordination with a state-wide group of experienced GIS users in the coastal realm, the CSMW funded an effort to identify improvements that would make the CSMW Webmapper and associated GIS-based online tools more

useful to more stakeholders. The effort included development of a survey in which stakeholders across the state identified GIS-related needs and recommended improvements for use in coastal management. The Final Report containing recommendations for implementation was completed in July 2011.

- ❖ The Economic Costs of Sea Level Rise: The report “The Economic Costs of Sea-Level Rise to California Beach Communities” was prepared in September 2011 to provide an analysis of the economic implications of rising sea level on five representative California coastal community beaches: Ocean Beach, Carpinteria State and City Beach, Broad Beach & Zuma Beach, Venice Beach, and Torrey Pines State Beach.
- ❖ Support Documents for a Programmatic Environmental Impact Statement (PEIS) / Programmatic Environmental Impact Report (PEIR) for SANDAG: Two documents were produced to support the RSM plan for SANDAG – “Description of Proposed Action and Alternatives in Support of Preparation of a PEIS/PEIR” and the “Coastal Habitat Survey of Onshore and Nearshore Beach Receiver Sites Proposed in the CRSMP.” These documents were finalized in May 2010.
- ❖ Sensitive Shoreline and Nearshore Resources and Shoreline Types Within the BEACON Jurisdictional Region: Completed as a follow-up to the CRSMP for the Ventura/Santa Barbara Counties region, the effort focused on gathering and presenting available spatial information on natural resources within the Plan boundaries. The Report and GIS shapefiles were submitted to the CSMW in August 2010.
- ❖ Tijuana Estuary Sediment Study/Demonstration Project: This is a RSM demonstration project designed to provide a science-based approach to determine the suitability of beneficially reusing clean upland sediment for restoration within the coastal nearshore. The study evaluates potential adverse impacts associated with placing upland sediment with a relatively high percentage of fines along the beach and nearshore. The demonstration was conducted at two sites, the Tijuana Estuary Demonstration from the mouth of the Tijuana River to the International Border and the Santa Cruz Harbor Demonstration adjacent to the mouth of the Santa Cruz Harbor. Results of each demonstration showed that fine-grained sediment dispersed quickly, after being placed in the intertidal zone for the Tijuana Demo. and in nearshore waters for the Santa Cruz Demo. Results were compared with three-dimensional, numerical models of sediment movement by Deltares, which were found to adequately describe the directions and rates of fine-grained sediment movement at both sites. These results suggest that numerical models can be used to characterize the movement of fine-grained sediment in the coastal settings of California as long as the dominant processes of waves and currents are included. The USGS is actively looking for additional sites to demonstrate the model, and is conducting outreach to increase understanding of the results and to encourage the Regulatory community’s utilization of the results to address future policy compliance options that meet applicant’s needs.

- ❖ Southern Monterey Bay Coastal Erosion Workgroup (SMBCEW): The CSMW is participating in the SMBCEW, which is currently evaluating various alternatives to address coastal erosion throughout coastal southern Monterey Bay, in addition to the sediment management options recommended in the CRSMP. When completed, the selected alternatives will be combined with the sediment management options into one master Implementation Plan. The Final Alternatives Study was submitted to the CSMW member Monterey Bay National Marine Sanctuary (MBNMS) in April 2012.

2.4.3 CSMW Products Expected During Next Reporting Period

Several products are expected to be finalized in the next SMP reporting interval:

- ❖ Biological Impacts Analysis (BIA) Report: This informational report and strategy provides standardized references for environmental documentation and assists sediment managers in pre-project planning by science-based identification of impacts to critical biota and appropriate mitigation measures. Workshops to help develop Resource Protection Guidelines were held across the State; these guidelines will ensure the product is of maximum use to agency staff charged with protecting natural resources. A Draft Report and User's Guide (including Natural Resource Protection Guidelines) for implementation was completed in April 2011. The Draft Report and User's Guide are currently being peer-reviewed by the Ocean Science Trust, prior to completion of a Final Report.
- ❖ Southern Monterey Bay Mitigated Negative Declaration: The CSMW has provided funding to the Association of Monterey Bay Area Governments (AMBAG) to develop an environmental document associated with implementing recommendations within their CRSMP. AMBAG has chosen to develop a Mitigated Negative Declaration (MND) associated with placement of upland and coastal sediment along the coastline, as recommended in their plan. AMBAG has selected the consultant team to conduct the study and is working to coordinate development of the MND.
- ❖ Surfers Beach and Pillar Point Harbor: The CSMW is participating in a stakeholder workgroup to work with NOAA Sanctuaries, the Harbor District, surfers, and other stakeholder groups to find ways to address coastal erosion at Surfers Beach (aka El Granada Beach) in Half Moon Bay. The workgroup's current focus is to determine how excess sediment accumulating inside the adjacent Pillar Point Harbor could be beneficially used at Surfer's Beach, given strict regulatory limitations on placement of dredged materials within the Sanctuary.
- ❖ TMDL Development: The CSMW is working closely with the State and Regional Water Quality Control Boards (RWQCB) to facilitate the fluvial transport of coarse sediment needed to replenish coastal beaches while keeping fine-grained sediment contained so that it doesn't result in adverse impacts to fluvial, riparian, or coastal habitats.
- ❖ Coastal Sediment References Searchable Database Update: The CSMW is currently expanding the existing online reference database to include a

comprehensive listing of USACE-gathered references. Users will be able to search by author, title, region of applicability, date, keyword, etc. to identify reports that would be of relevance and use for coastal management activities in California. The database will also be expanded to include references compiled by various CRSMPs completed since 2009. The database update is being completed by the Corps' National Library Staff at no cost to the SMP or CSMW and completion is expected in 2012.

- ❖ CSMW Webmapper Updates: The Webmapper interface will be updated to implement the GIS User Survey Recommendations. This will involve improving the data quality and ensuring relevant data is up-to-date and current. The accessibility, structure, and effectiveness of the Webmapper will be improved, and data will be "cross-checked" against other web-based interfaces to ensure all potentially-available data is included to fill data gaps. The public website will be maintained to educate and update government agencies, non-government organizations, and the public with pertinent GIS-related data to make informed coastal sediment management decisions. Update of the Webmapper to address the GIS User Survey recommendations is expected to be complete in late 2012. The CSMW is also working with the State Geographical Information Officer to incorporate the WebMapper into the State Geoportal when that effort has been completed.
- ❖ Master Plan Coastal GIS Improvements: Master Plan funds were provided in FY12 for addressing coastal management and planning-related GIS needs for both SPL and SPN. These updates include: creating a raster catalog of all nearshore, harbor, and port bathymetry; digitization of offshore sediment borrow sites along the CA coast; archiving sediment sampling data; installation and update of eCoastal data; archiving of legacy dredging data in GIS; archiving of Light Detection and Ranging (LIDAR) data for the CA coast; and, digitization of habitat and vegetative data for pertinent District projects, among other coastal GIS-related tasks. Completion of these tasks is expected in late 2012.
- ❖ CRSMP Development: A significant portion of the CSMW efforts this reporting period has been to take the lessons learned from the initial set of CRSMPs and apply that knowledge to development of similar Plans in other parts of coastal California. Please refer to Section 3.2 for a discussion on existing, developing and planned CRSMPs.

3 Regional Sediment Management in California

During its anticipated lifespan of approximately ten years, the SMP will develop a series of tools and products designed to assist in addressing issues expected to arise during RSM implementation. These products include, but are not limited to:

- ❖ CRSMPs that identify regional linkages between areas with sediment deficits and excesses and provide various tools to promote effective regional sediment decisions;
- ❖ Functional geospatial databases to assist in determining potential project sites as well as the possible impacts;
- ❖ Sampling and analysis standards for non-traditional sources of sediment;
- ❖ Biological recommendations for use in environmental documents and project planning; and,
- ❖ Regional permits

Bi-annual status reports will describe accomplishments to date and future plans, and products are and will be available through the CSMW's website (www.CDBW.ca.gov/csmw/default.aspx) and other venues.

3.1 SMP Efforts Needed for Effective RSM Implementation

Technical and political boundaries (e.g. littoral cells and counties, respectively) provide a basis for the regional framework of CRSMPs. Beach Erosion Concern Areas (BECAs) have been compiled that represent locations of high concern to state, federal, and regional entities known to the CSMW at the time of this report. Additionally, larger potential sources of sediment have been compiled through CSMW efforts, including the first phase of CRSMPs. These potential sources (e.g., ports and harbors, wetlands, coastal dams and debris basins, offshore sediment sources) and BECAs help begin the assessment of regional sediment supply and demand along the California coast. Additional potential sources of sediment and areas of need will be identified in future CRSMPs and included in future SMP Status Reports.

Implementation efforts needed to accomplish the objectives, goals, and mission of the CSMW and its SMP were discussed in Section 2. These “next steps” were developed based on roundtable discussions with staff from regulatory, resource, and flood control agencies, planners, managers, scientists, and the general public. These efforts include, but are not limited to:

- ❖ Collecting data needed to characterize the coastal environment;
- ❖ Performing economic studies to determine the cost-effectiveness of potential projects;
- ❖ Developing tools to inform, educate, and promote littoral cell based (regional) sediment management;
- ❖ Disseminating new and existing tools to assist resource managers;
- ❖ Collaborating among agencies with shared and disparate missions including the OPC and West Coast Governors Agreement;

- ❖ Developing process-related guidance to help eliminate confusion with the regulatory process and streamline project permitting;
- ❖ Developing Regional General Permits and region-based Environmental Impact Statement/Environmental Impact Reports for beach restoration;
- ❖ Expanding available knowledge on, and best protective measures for, species and habitats of concern that could be affected by RSM activities;
- ❖ Encouraging use of the SMP by California's coastal sediment managers;
- ❖ Implementing a public outreach program to identify and promote two-way communication with coastal stakeholders;
- ❖ Developing educational materials that will support sediment-based solutions and consideration of sediment as a resource rather than a waste; and,
- ❖ Assisting ports, harbors, wetlands-restoration groups, and flood-control agencies in resolving their sediment-related issues.

3.2 CRSMPs

To date, three CRSMPs have been completed. Four more are underway, and the CSMW expects to have financial resources to initiate at least four additional Plans during the next reporting period. These efforts are:

COMPLETED:

Southern Monterey Bay CRSMP

This Plan, which was coordinated by the CSMW through the Association of Monterey Bay Area Governments (AMBAG), covers the Southern Monterey Bay Littoral Cell, which extends from Moss Landing to Point Piños in Monterey. The stakeholder group included the SMBCEW, consisting of local jurisdictions and other stakeholders and led by the MBNMS. This CRSMP, which was the CSMW's first, was completed in November 2008.

Santa Barbara and Ventura Counties CRSMP

This Plan, which was coordinated by the CSMW through the BEACON, covers the Santa Barbara Littoral Cell from Point Conception to Point Mugu. A public meeting was held, and the strategies identified in the Plan were subsequently adopted by the BEACON Board of Directors in January 2009, and the Plan was completed.

San Diego County CRSMP

This Plan, which was coordinated by the CSMW through the SANDAG, covers the southern Oceanside, Mission Bay, and Silver Strand Littoral Cells, from Camp Pendleton to the Mexican border. The stakeholder group included SANDAG's Shoreline Preservation Working Group (SPWG), consisting of local jurisdictions, state and federal agencies, and environmental NGOs. This Plan was completed in April 2009.

UNDERWAY:

Orange County CRSMP

This Plan, which is being coordinated by the CSMW through the Orange County Dept. of Parks and Recreation, will focus on all littoral cells and beaches on the Orange

County coastline and will provide recommendations for future management based on physical and economic trends experienced in the coastal environment. An Administrative Draft Report was prepared in December 2011 and the revised Draft Report was submitted in April 2012.

Eureka Littoral Cell CRSMP

This Plan, which is being coordinated by the CSMW through the Humboldt Bay Harbor Recreation and Conservation District, covers the coast from Trinidad Head south to False Cape. The kickoff meeting was held in Eureka on July 27, 2010. A preliminary draft report was submitted in August 2011 and the Final Report completion is expected by the end of 2012.

Los Angeles County CRSMP

This Plan is being coordinated by the CSMW and is seeking to address governance concerns through the Los Angeles County Dept. of Beaches and Harbors. A preliminary draft report was completed in December 2011 and the Final Report is expected in 2012.

San Francisco Outer Coast Littoral Cell CRSMP

The CSMW is working with the Association of Bay Area Governments (ABAG) governance body to coordinate development of this Plan, which will include the open coast from the Golden Gate to Pacifica. The Plan is complementary to the one to be developed for the San Francisco Central Bay. The first stakeholder meeting was held on March 28, 2012. The Plan development effort is underway, with completion anticipated in early 2013.

FUTURE CRSMPs:

San Francisco Central Bay CRSMP

The CSMW is currently coordinating with the Bay Conservation and Development Commission (BCDC) to prepare a Plan covering the Bay coastline from central San Francisco Bay to the Golden Gate Bridge. Funds have been obtained to develop this Plan, and it is in initial stages of development.

Santa Cruz Littoral Cell CRSMP

The CSMW is currently investigating an innovative approach to facilitate Plan development for this littoral cell, which extends from Pillar Point, Half Moon Bay in southern San Mateo County to the southern boundary of Santa Cruz County at Moss Landing. Funds are available and Plan development should start by summer of 2012.

Del Norte County CRSMP

The CSMW has not identified dedicated funds or a timeline for completion of a Plan covering Crescent City and adjacent coastlines. However, preliminary discussions are underway with some of the region's stakeholders, and this Plan may be initiated in the next reporting period if funds become available

San Luis Obispo County CRSMP

The CSMW has not identified dedicated funds or a timeline for completion of a Plan covering San Luis Obispo County, including Morro Bay and adjacent coastlines. However, this Plan may be completed at a future time if funds become available and interested stakeholders emerge.

Appendix A

List of Acronyms

ABAG	Association of Bay Area Governments
BCDC	San Francisco Bay Conservation and Development Commission
BEACON	Beach Erosion Authority for Clean Oceans and Nourishment
BECA	Beach Erosion Concern Area
BIA	Biological Impacts Analysis
BOEMRE	Bureau of Ocean and Energy Management, Regulation and Enforcement
CalCoast	California Coastal Coalition
CBEAS	California Beach Erosion Assessment Survey
CCC	California Coastal Commission
CDBW	California Department of Boating and Waterways
CDFG	California Department of Fish and Game
CDPR	California Department of Parks and Recreation
CGS	California Geological Survey
CIAP	Coastal Impact Assistance Program
CMANC	California Marine and Navigation Council
CNRA	California Natural Resources Agency
CRSMIS	California Regional Sediment Management Information System
CRSMP	Coastal Regional Sediment Management Plan
CSLC	California State Lands Commission
CSMW	Coastal Sediment Management Workgroup
DPR	Department of Parks and Recreation
GIS	Geographic Information System
MBNMS	Monterey Bay National Marine Sanctuary
MND	Mitigated Negative Declaration
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
OPC	California Ocean Protection Council
ORMP	Ocean Resources Management Program
PPR	Policies, Procedures and Regulations
PEIR	Programmatic Environmental Impact Report
PEIS	Programmatic Environmental Impact Statement
RSM	Regional Sediment Management
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SCC	State Coastal Conservancy

SCOUP Sand Compatibility and Opportunistic Use Program
SMBCEW Southern Monterey Bay Coastal Erosion Workgroup
SMP Sediment Master Plan
SPD South Pacific Division
SPL Los Angeles District
SPN San Francisco District
SWRCB State Water Resources Control Board
USACE U.S. Army Corps of Engineers
USEPA U.S. Environmental Protection Agency
USGS U.S. Geological Survey

Appendix B

Glossary

Beach – That portion of land and seabed above Mean Lower Low Water (MLLW). Includes the foreshore and backshore areas.

Bed material – The sediment composing the streambed.

Bedrock – Rock underlying other, unconsolidated material.

Closure depth – The maximum depth of average seasonal cross-shore sand movement. This depth represents the seaward end of the receiver site profile, and essentially remains unchanged on average over the long term. Sand that moves beyond the depth of closure in a seaward direction is typically lost to the littoral cell and not available for natural seasonal beach recovery. The actual closure depth is typically approximately -30 feet MLLW in Southern California and -40 feet MLLW or deeper in Northern California.

Compatibility (physical) of source and receiver site – When the range of grain sizes of a potential sand material source lies within the range (envelope) of natural grain sizes existing at the receiver site, with certain allowances for exceedances of coarse and fine-grained sediments.

Compatibility (chemical) – The potential source has been determined to not contain pollutants at levels considered unsafe.

Fine-grained materials (or fines) - Clays and silts that pass through the #200 soil grain size sieve, or are less than 0.074 millimeters in diameter.

Littoral cell – A portion of the coastline where sand flows in (e.g., a river mouth), along, and then out of an area such as a submarine canyon. Littoral cells have distinct boundaries and their own sources of sand and removal areas.

Longshore current – The zigzag movement of sand entrained in upwash and backwash that effectively creates a current parallel to the coastline.

Mud – Sediment less than 0.0625 mm in diameter. This includes both Silt and Clay fractions (Wentworth Grainsize Scale).

Nearshore – That portion of the seafloor between the closure depth and Mean Lower Low Water.

Offshore – That part of the seafloor beyond the depth of closure.

Opportunistic sand – Surplus sand from various source materials, including inland construction, development projects, flood control projects, dredging of harbors/ wetlands, etc.

Profile - A cross-section through the beach and nearshore perpendicular to the beach slope; it may include a dune face or sea wall, extends across the beach and seaward into the nearshore zone to the closure depth.

Receiver site – The entire related system of coastal environments that would receive opportunistic materials, including the dry beach, nearshore and offshore regions.

Sand – Sediment between 0.0625 and 2 mm in diameter (Wentworth Grainsize Scale).

Sand budgets – A concept used by scientists to identify and quantify, to the degree possible, additions and losses of sand that influence beach width.

Sediment – Particles of inorganic and organic material of various sizes that have been transported by air, water, or ice and have accumulated in loose form behind dams, in bays, in streams, on beaches, in marine canyons, and in other areas. Examples of sediment are gravel, sand, silt, clay/mud.