

CALIFORNIA COASTAL SEDIMENT MASTER PLAN STATUS REPORT



DRAFT FOR PUBLIC REVIEW AND COMMENT

PREPARED BY
California Coastal Sediment Management Workgroup
September 2006
<http://dbw.ca.gov/csmw/csmwhome.htm>

IMPORTANT NOTE

This status report documents the completed, on-going, and future activities of the California Coastal Sediment Management Workgroup in their efforts to compile the California Coastal Sediment Master Plan. Funding for this program was initiated by a \$1,200,000 grant from the National Oceanic and Atmospheric Administration Coastal Impact Assistance Program administered by the Resources Agency of California. Subsequent funding has been provided by the U.S. Army Corps of Engineers (\$795,000) California Department of Boating and Waterways (\$580,000), and the California State Coastal Conservancy (\$20,000).

The Coastal Sediment Management Workgroup is soliciting comments on this status report to help us as we move from the development of tools for regional sediment management, to the completion of a Master Plan for implementation.

Please submit your comments to Clifton Davenport, the CSMW project manager, by November 30, 2006. Comments can be received by U.S. mail or at the e-mail address provided below:

Mailing address:
Clifton Davenport
Senior Engineering Geologist
California Geological Survey
135 Ridgway
Santa Rosa, CA 95401

E-mail address:
Clif.Davenport@conservation.ca.gov

MASTER PLAN STATUS REPORT

TABLE OF CONTENTS

California Coastal Sediment Draft Master Plan Status Report: Executive Summary.....	1
Problem Statement: Coastal Sediment	1
Regional Sediment Management	2
Coastal Sediment Management Workgroup.....	2
California Coastal Sediment Master Plan.....	3
Sediment Master Plan Status Report 2006	6
1.0 Background	6
1.1 Problem Statement.....	6
1.2 Opportunity Statement: The New Regional Approach	8
1.3 California Coastal Sediment Management Workgroup	10
2.0 California Coastal Sediment Master Plan	11
2.1 Why a Sediment Master Plan is Needed	12
2.2 Sediment Master Plan Objectives.....	12
2.3 Sediment Master Plan Development	13
2.4 Sediment Master Plan Tools and Products.....	14
3.0 Regional Sediment Management in California.....	17
3.1 SMP Efforts and Tasks	17
3.2 Case Studies of Successful RSM Implementation in California.....	25
3.3 Potential Candidate for RSM Implementation	25
Appendix A: Summary SMP of Completed Sediment Master Plan Tools	A-1
CSMW Website	A-1
California Beach Restoration Survey (CBReS).....	A-1
Sand Compatibility and Opportunistic Use Program (SCOUP)	A-2
Policies, Procedures and Regulations (PPR) Analyses:	A-2
Beach Restoration Reference Guide (BRRG).....	A-3
Regional Sand Budgets.....	A-3
Mud Budgets	A-4
Biological Impacts Assessment (BIA).....	A-5
Economics of RSM	A-5
Coastal References Compilation	A-6
GIS Database	A-6
Web-Based Mapping	A-7
Coastal Sediment Benefits Analyst Tool (CSBAT).....	A-7
Appendix B: List of SMP Questions and Recommended Tools for Answering Them.....	B-1
Appendix C: Sediment Master Next Steps: Tasks and Schedule.....	C-1
Appendix D: List of Acronyms	D-1
Appendix E: Glossary.....	E-1

EXECUTIVE SUMMARY

DRAFT STATUS REPORT FOR COMMENT AND PUBLIC REVIEW

Problem Statement: Coastal Sediment

Human activities over the last 150 years have altered the natural supplies of sediment (e.g., gravel, sand, silt, clay/mud) to the coast, as well as the transport of sediments along the coast. Dams block the transport of sediment through coastal streams and rivers and reduce peak stream flows, both of which reduce downstream transport of sediment. Timber harvesting and land development release volumes of sediment much larger than that produced from unaltered land. If the cleared land is subsequently covered by roads, buildings or other impermeable surfaces, the volume of sediment available for beaches drop far below the unaltered condition. Coastal structures, like groins and breakwaters, alter the transport of sediment along the coast; and harbors and harbor maintenance activities trap sediment and modify the transport patterns through dredging and disposal practices. Figure 1 illustrates the ways in which human actions impact the supply of sediment to the coast.

The activities described above are not intended to adversely affect California's coastline, but often they do. Beach erosion is a natural process, but many of California's coastal beaches are eroding at an accelerated rate due to the lack of a regular 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, areas for recreation, 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 storm events 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 too abundant or is a construction by-product such as flood control maintenance projects, port/harbor expansion/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 beneficial resource. The CSMW views sediments as a resource, that if wisely managed can benefit public infrastructure and recreational resources.

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

Regional Sediment Management

Over the last seven years a new paradigm for addressing coastal sediment supply related problems and imbalances has emerged in coastal areas of the nation, including California. This approach, known as Regional Sediment Management, or simply “RSM”, systematically addresses sediment supply and imbalances on a regional basis rather than attempting to resolve sediment problems on a site-specific location/project. RSM also optimizes the beneficial reuse of sediment by recognizing that coastal sediment is a valuable resource rather than a waste product.

As an example, a dredging project to deepen a navigational channel at a port can provide the sediment (i.e., sand) needed to replenish an eroded coastal beach or 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. This evaluation may lead to a determination that one site is a more feasible and appropriate location to receive sediment due to economic, environmental, and engineering factors and concerns. Scientists and resource managers have determined that RSM could best be utilized to balance coastal sediment and sand movement within self-contained regional areas known as littoral cells.

Regional sediment management is based on the concept of a littoral cell. A littoral cell is a portion of the coastline where sand enters the cell (e.g., a river mouth), moves along the shore residing temporarily on the beaches, and then out of the coastal region (e.g., a submarine canyon). Littoral cells have distinct geographical boundaries. Figures 5-10 (in Section 3) show the locations of the 25 littoral cells along the California coast.

Coastal Sediment Management Workgroup

The Coastal Sediment Management Workgroup (CSMW) is a collaborative of federal, state, and local agencies and non-governmental organizations working together to find solutions to California's coastal sediment management needs on a regional, system-wide basis. These needs include, but are not limited to:

- ❖ Reducing shoreline erosion and coastal storm damages,
- ❖ Providing sediment for environmental restoration and protection,
- ❖ Increasing and restoring natural sediment supply to the coast,
- ❖ Restoring and preserving coastal beaches,
- ❖ Improving coastal beach water quality, and
- ❖ Providing for adequate receiver sites for port and harbor dredge materials.

Mission

Conserve, restore, and protect California’s coastal resources by developing and facilitating regional approaches to managing sediment.

Goals

To reduce shoreline erosion and coastal storm damages; restore and protect beaches and other coastal environments by restoring natural sediment supply from rivers, impoundments and other sources to the coast; and optimize the use of sediment from ports, harbors, and other opportunistic sources.

California Coastal Sediment Master Plan

In order to facilitate the implementation of “Regional Sediment Management”, or RSM, throughout the entire California Coast, the CSMW has embarked on a multi-year effort to compile a California Coastal Sediment Master Plan. This status report documents the completed, on-going, and future activities of the CSMW in compiling the Sediment Master Plan. It also provides overviews of the CSMW and RSM, maps of critical coastal erosion areas in California, timeline for Master Plan development, and case studies of successful RSM implementation in California.

The objectives of the Sediment Master Plan (SMP) are:

- ❖ Promote the use of Regional Sediment Management (RSM) strategies to address problems caused by sediment imbalance.
- ❖ Support the California Ocean Protection Council (COPC) in the implementation of their Strategic Plan
- ❖ Develop an adaptive plan to meet current and future needs of coastal sediment managers.
- ❖ Identify and prioritize critical coastal erosion and accretion areas.
- ❖ Provide resource managers informational tools and techniques to assist their decision making.
- ❖ Facilitate and coordinate beach and coastal watershed efforts with federal, state, local and public stakeholders.
- ❖ Collaborate with regulatory agencies to provide a consistent permit framework for coastal sediment projects.
- ❖ Demonstrate the value of sediment as a coastal resource for habitat, recreation, shoreline protection, and economics.
- ❖ Support requests for funding from local/regional authorities and eliminate inefficient use of public funds.

- ❖ Foster the beneficial use of sediment dredged from ports, harbors, wetlands, and other sources.

When completed, the Sediment Master Plan will be a compilation of tools and products designed to assist sediment managers and others in implementing RSM throughout the California Coast. These products and tools fall under the four general headings:

- ❖ Reports and data,
- ❖ Computer based tools,
- ❖ Educational and informational materials, and
- ❖ Regional-based RSM Programs or Plans.

The following Sediment Master Plan tools are available for public use and can be found on the CSMW website www.dbw.ca.gov/csmw/csmwhome.htm. (Note: A more expansive summary of these tools can be found in Appendix A)

- ❖ Reports and Data
 - ❖ Coastal References Database: Literature review and compilation of bibliographies of documents related to coastal sediment and beach nourishment.
 - ❖ Cumulative Loss of Sand Due to Dams: Report identifies volumes of sediment potentially available for RSM activities.
 - ❖ The Economics of Regional Sediment Management in Ventura and Santa Barbara Counties: Examines incremental costs of RSM resulting from transport of sediment from harbors to various receiver sites.
 - ❖ Sand Compatibility and Opportunistic Use Program (SCOUP): Develops guidance for regional reuse programs using upland materials, including standards for characterizing receiver sites and compatibility of sediment from various sources.
 - ❖ SCOUP Pilot Project Mitigated Negative Declaration: Illustrates preparation of environmental documents for RSM activities.
- ❖ Computer Based Tools
 - ❖ CSMW Website: Provides access to relevant documents, tools developed to assist sediment managers, agency links, general information on CSMW activities and SMP status.
- ❖ Educational and Informational Materials
 - ❖ California Sediment Master Plan Brochure: Provides an overview of the sediment imbalance and need for regional solutions.
 - ❖ California Sediment Master Plan Progress Report to Ocean Protection Council: Lays out how CSMW and member agencies plan to stimulate the utilization of sediment from ports/harbors and other sources to address regional sediment deficits.

The following Sediment Master Plans tools are still under development. When completed, they will be posted to the CSMW website.

- ❖ Reports and data
 - ❖ Analysis of Impacts and Recommended Mitigation for Critical Species and Habitats: Provides standardized references for environmental documentation, and assists sediment managers in pre- project planning by science-based identification of impact to critical species and appropriate mitigation measures.
 - ❖ Beach Nourishment Reference Guide: Guidance for local coastal stakeholders: Clarify the regulatory process and requirements for sediment managers.
 - ❖ California Beach Restoration Strategy: preliminarily identifies critical coastal erosion locations that would benefit from receiving excess sediment at ports, harbors wetlands, flood control projects, etc.
 - ❖ Development of Sand Budgets for California's Major Littoral Cells: Comprehensive review and compilation of dredging records and other relevant sediment source/sink information on a littoral cell basis; calculates regional sand budgets based on port/harbor dredging records.
 - ❖ Mud Budget Final Report- Fine Grained Sediment Sources, Transport and Sinks: Examines the natural fate and transport of fine-grained materials for comparison against sediment management projects; provides a mega-regional analysis of this potentially major impediment to RSM.
 - ❖ Policies, Procedures and Regulations Analysis: Comprehensive review of legislative and procedural requirements that affect sediment management; recommendations on how to reduce impediments to effective, resource-protective RSM.
- ❖ Computer based tools
 - ❖ Prototype Coastal Sediments Analysis Tool: Allows the sediment manager to examine issues, costs and benefits associated with different regional alternatives for sediment procurement, transport, and placement
 - ❖ Web-based Mapping Tool, 2006: User-friendly tool to access visual information, compiled in the GIS database, needed to evaluate sediment management projects
 - ❖ Educational and Informational materials
 - ❖ Beaches, Littoral Drift and Littoral Cells: Understanding California's Shoreline and Beach Nourishment: Layman's explanation of the physical processes and issues/considerations involved with building beaches.
 - ❖ Offshore Canyon Sand Capture: This paper identifies canyons within the state where artificial measures to reduce or eliminate the canyon capture rate might prove cost-effective and environmentally benign, and offers suggestions about how that might be accomplished.
- ❖ Regional RSM Programs
 - ❖ The development of regionally based RSM Programs will utilize all the reports, data, educational and informational tools developed and compiled by the Statewide Master Plan. These programs will rely upon region-specific geographic, economic, environmental and societal data and input. Local and regional governments and all stakeholders will be invited to participate in this effort to find consensus on a regional plan for beneficial reuse of opportunistic sediment as well as planned shoreline restoration projects.

Sediment Master Plan Status Report 2006

1.0 BACKGROUND

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 forces (e.g., 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 last 150 years have significantly altered these natural supplies of sediment to the coast, as well as 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 materials. Major land clearing projects, through timber harvesting or for development, mobilize volumes of sediment much larger than that produced from the unaltered 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 unaltered condition. 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. While many of these activities are not intended to alter beaches, the net effect often is an alteration of the coastline. Figure 1 below illustrates the ways in which human actions impact the supply of sediment to the coast.

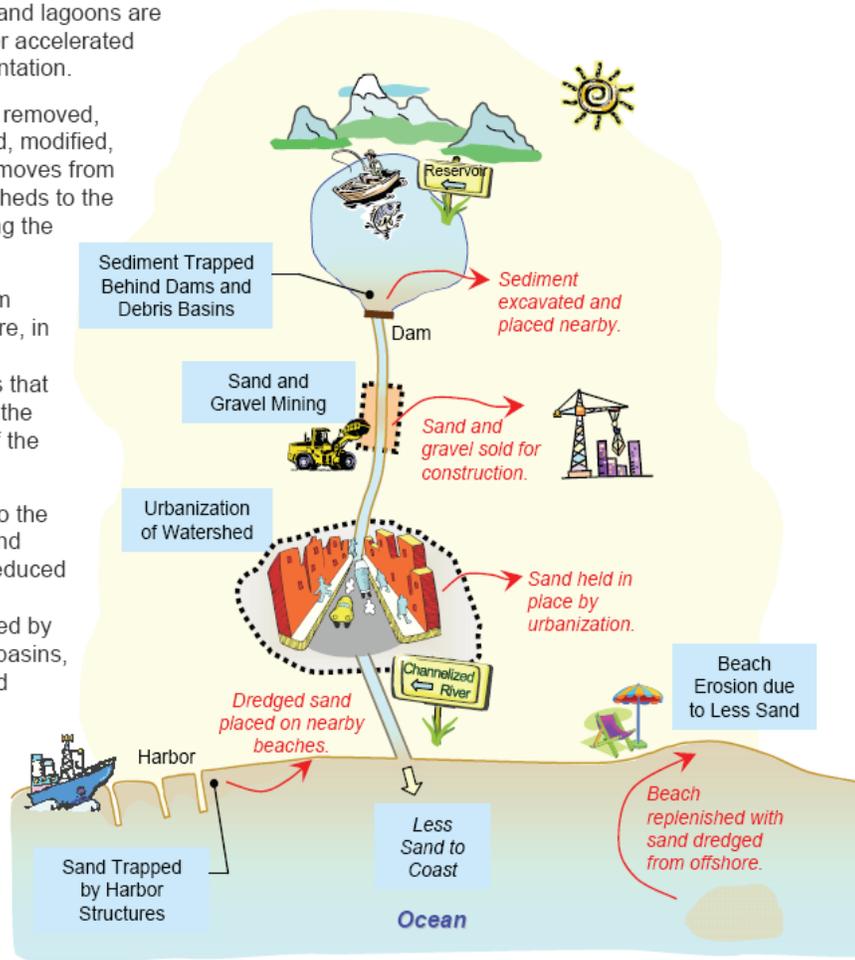
Most sediment supply-related problems can be associated with societal failure to recognize, communicate and implement regional (i.e., littoral cell) solutions to sediment-related projects. For instance, before RSM the approach to addressing sediment imbalances by state and federal agencies was project by project with a narrow focus on solving a very local problem. Further, state and federal agencies would implement sediment projects in order 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 also led to the unfortunate perception that coastal sediment is a waste product requiring disposal, rather than a potential beneficial resource.

Regional sediment management is based on the concept of a littoral cell. Basically, a littoral cell is a portion of the coastline where sand flows in (e.g., a river mouth), along, and then out of an area (e.g., a submarine canyon). Littoral cells have distinct boundaries and individual sources and losses of sand. Figures 5-10 (in Section 3) show the exact locations of the 25 littoral cells along the California coast.

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. Dams, built to control floods and store water, trap sediment in reservoirs. Sand and gravel are mined from stream systems for use in construction. Timbering, grading, and earth moving strip off vegetation and expose the watersheds to excessive erosion. Conversely, construction of channels, roads, and buildings hardens the watershed, which reduces erosion and leads to decreases in the amount of coarse sediment available for delivery 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 the amount of sediment supplied directly to the shoreline through the reduction of bluff and cliff erosion. Human modifications to the coastal watersheds and shorelines of California have resulted in the following sediment-related problems:

- Beaches are undergoing accelerated erosion, reducing recreational opportunities, contributing to loss of habitat, and increasing the probability of storm damage along the coast.
- Coastal stream water quality has become impaired.
- Coastal wetlands and lagoons are experiencing either accelerated erosion or sedimentation.
- Sediment is 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 are, in many instances, placed in locations that does not optimize the beneficial reuse of the material.
- Sediment supply to the coast has been, and continues to be, reduced as a result of interruptions caused by dams and debris basins, mining of sand and gravel, artificially stabilizing the shoreline, and hardening of the coastal watersheds.



Existing Sediment (Sand) Management

FIGURE 1: The Problem; Existing California 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 reuse of sand by considering coastal sediments to be a valuable resource instead of waste. Previously independent projects are considered in conjunction with each other to maximize sediment reuse.

For example, the cost of dredging navigation channels can be combined with obtaining sand for 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 2 on the following page.

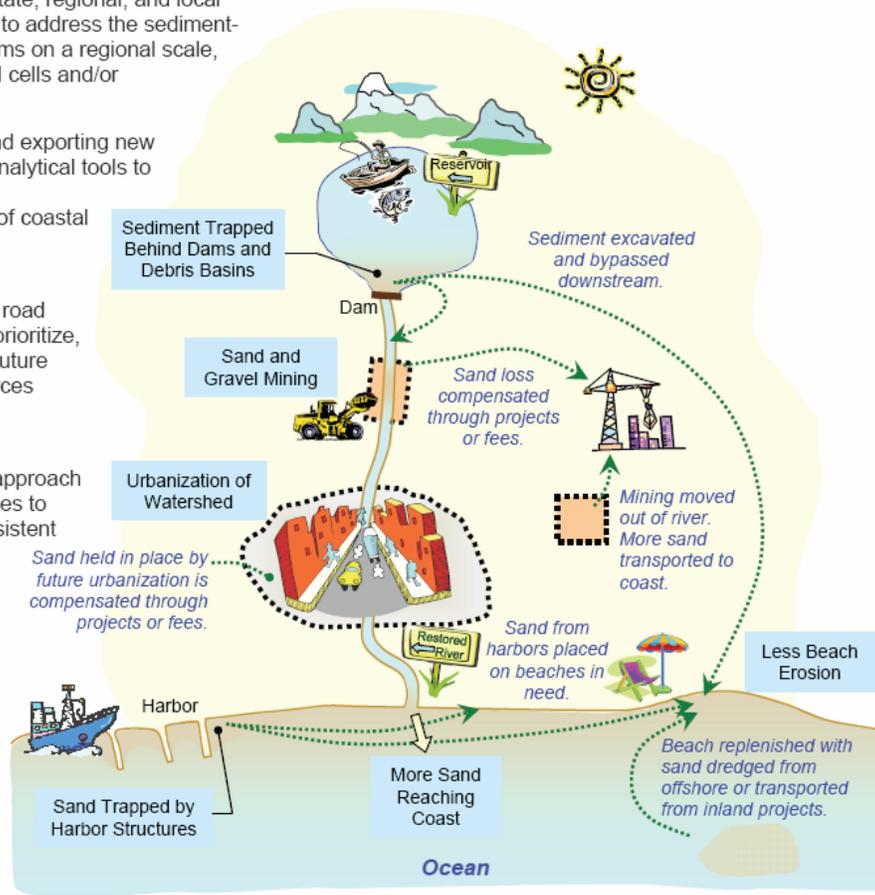
Some of the main principles associated with implementing RSM include:

- ❖ Establishing the regional framework (i.e., littoral cell boundaries, sediment budgets, and regional regulatory jurisdiction),
- ❖ Examining the human activities that have altered coastal sediment supply and transport,
- ❖ Developing priority areas within each region for implementation activities,
- ❖ Identifying opportunities to restore sediment balance throughout the affected region through modifications to 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 beach areas,
- ❖ 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 to the coast can be solved and/or addressed 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, is currently developing the California Coastal Sediment Master Plan (SMP) study, to foster a regional sediment management approach for the entire state. The SMP will provide a framework for finding solutions through RSM by:

- Identifying sediment-related problems along the California coast, such as beach erosion, wetland erosion/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 mining; coastal structures; lack of project coordination; and inconsistent policies, procedures, and regulations.
- Providing a solid scientific framework and database regarding technical issues within the coastal environment to support sediment management decisions.
- Developing 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 and/or watersheds.
- Developing and exporting new and existing analytical tools to assist in the management of 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.



Regional Sediment (Sand) Management

FIGURE 2: The Opportunity; New Approach to California Coastal Sediment Management.

1.3 California Coastal Sediment Management Workgroup

The Coastal Sediment Management Workgroup (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 by the state of California, U.S. Army Corps of Engineers (USACE), and local governments during meetings in 1999 regarding shore protection needs in California. In addition, state agencies and the USACE hosted public workshops between February and June 2004 to gather input on coastal sediment management issues in California. At these workshops and meeting, 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 from rivers, impoundments and other sources to the coast, and optimizing the use of sediment from ports, harbors, and other opportunistic sources.

The California Resources Agency and the USACE co-chair the CSMW. The Resources Agency is composed of multiple departments, boards, commissions, conservancies and programs including, but not limited to, the Ocean Resources Management Program, Department of Boating and Waterways (DBW), California Coastal Commission (CCC), State Lands Commission (SLC), State Coastal Conservancy (SCC), Department of Parks and Recreation (DPR), and the California Geological Survey (CGS). The Resources Agency 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.

The USACE participates as the lead federal agency and has the 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 CSMW is assisted by the California Coastal Coalition (CalCoast), a non-profit organization comprised of cities, counties and regional government agencies along the coast. CalCoast provides the CSMW with local feedback and updates regarding projects and studies underway in coastal communities. Figure 3 below illustrates the CSMW structure.

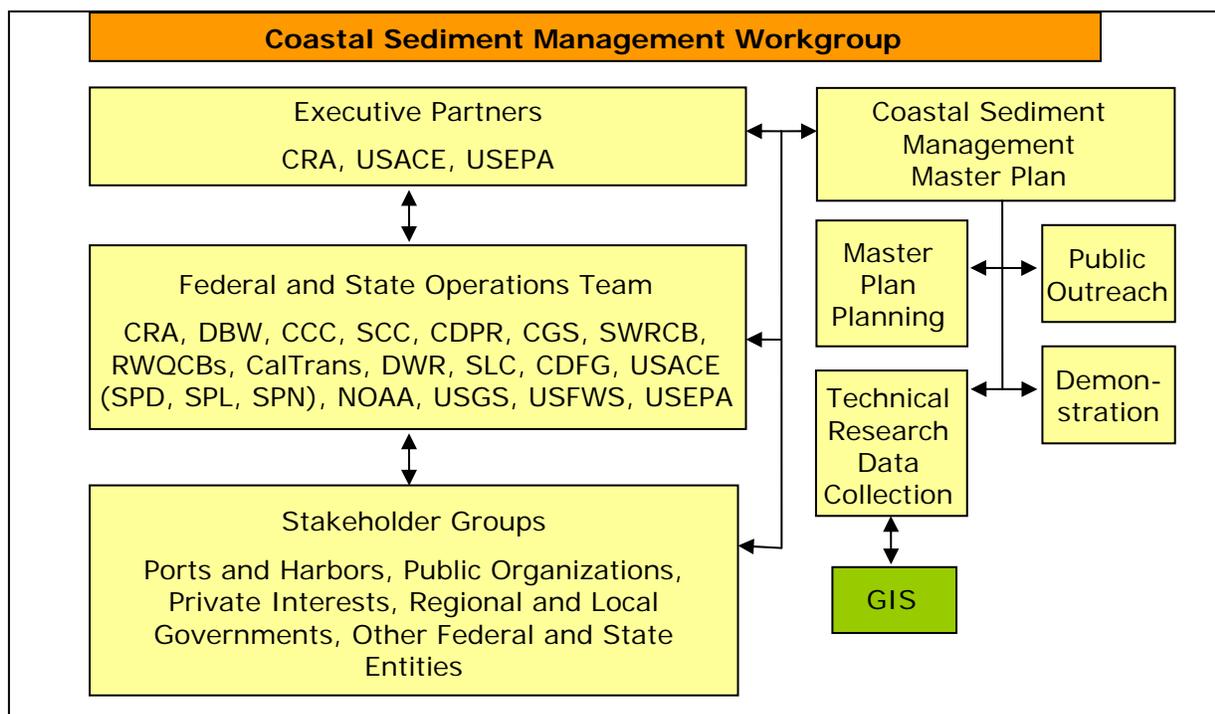


FIGURE 3: CSMW Structure

In addition to the federal, state, regional and local coordination, each participant in the CSMW can use group discussions to strengthen their 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.

In the coming year, the CSMW will be adding representatives from ports, harbors, wetland groups, flood control agencies, NGOs and other groups in an effort to better address the needs of various coastal stakeholder groups outside of state and federal government.

2.0 California Coastal Sediment Master Plan

In order to facilitate the implementation of RSM throughout the entire California Coast, the CSMW has embarked on a multi-year effort to compile a California Coastal Sediment Master Plan. This status report documents the completed, on-going, and future activities of the CSMW in compiling the Sediment Master Plan.

2.1 *Why a Sediment Master Plan is Needed*

After holding numerous public workshops and meetings, the Coastal Sediment Management Workgroup determined that a Sediment Master Plan was needed in order to accomplish the following throughout 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 use of sediment dredged from ports, harbors, wetlands, and other sources;
- ❖ Provide for sufficient receiver sites for port and harbor dredge materials; and
- ❖ When completed, the Sediment Master Plan (SMP) will be a comprehensive plan for the regional management of sediment in coastal California over the next 20 years.

2.2 *Sediment Master Plan Objectives*

The objectives of the Sediment Master Plan (SMP) are:

- ❖ Promote the use of RSM strategies to address areas of sediment imbalance in order to restore coastal habitats and beaches.
- ❖ Support the California Ocean Protection Council (COPC) in the implementation of their Strategic Plan.
- ❖ Develop an adaptive plan to meet current and future needs of coastal sediment managers.
- ❖ Identify and prioritize critical coastal erosion and accretion areas.
- ❖ Provide those who manage sediment with informational tools and techniques to assist their decision-making.
- ❖ Facilitate and coordinate beach and coastal watershed efforts with federal, state, local and public stakeholders.
- ❖ Collaborate with regulatory agencies to provide a consistent permit framework for coastal sediment projects.
- ❖ Add to the scientific database regarding technical issues within the oceanic environment.
- ❖ Demonstrate the value of sediment (mud, silt, sand, gravel and cobble) as a coastal resource for habitat, recreation, shoreline protection, and economics.
- ❖ Support requests for funding from local/regional authorities and eliminate inefficient use of public funds.

2.3 Sediment Master Plan Development

Development of the Sediment Master Plan (SMP) is organized under the following five activities: 1) Planning, 2) Public Outreach, 3) Technical Research/Data Collection, 4) Interagency Coordination and 5) Demonstration Projects. Components of each activity are shown in Figure 4 below.

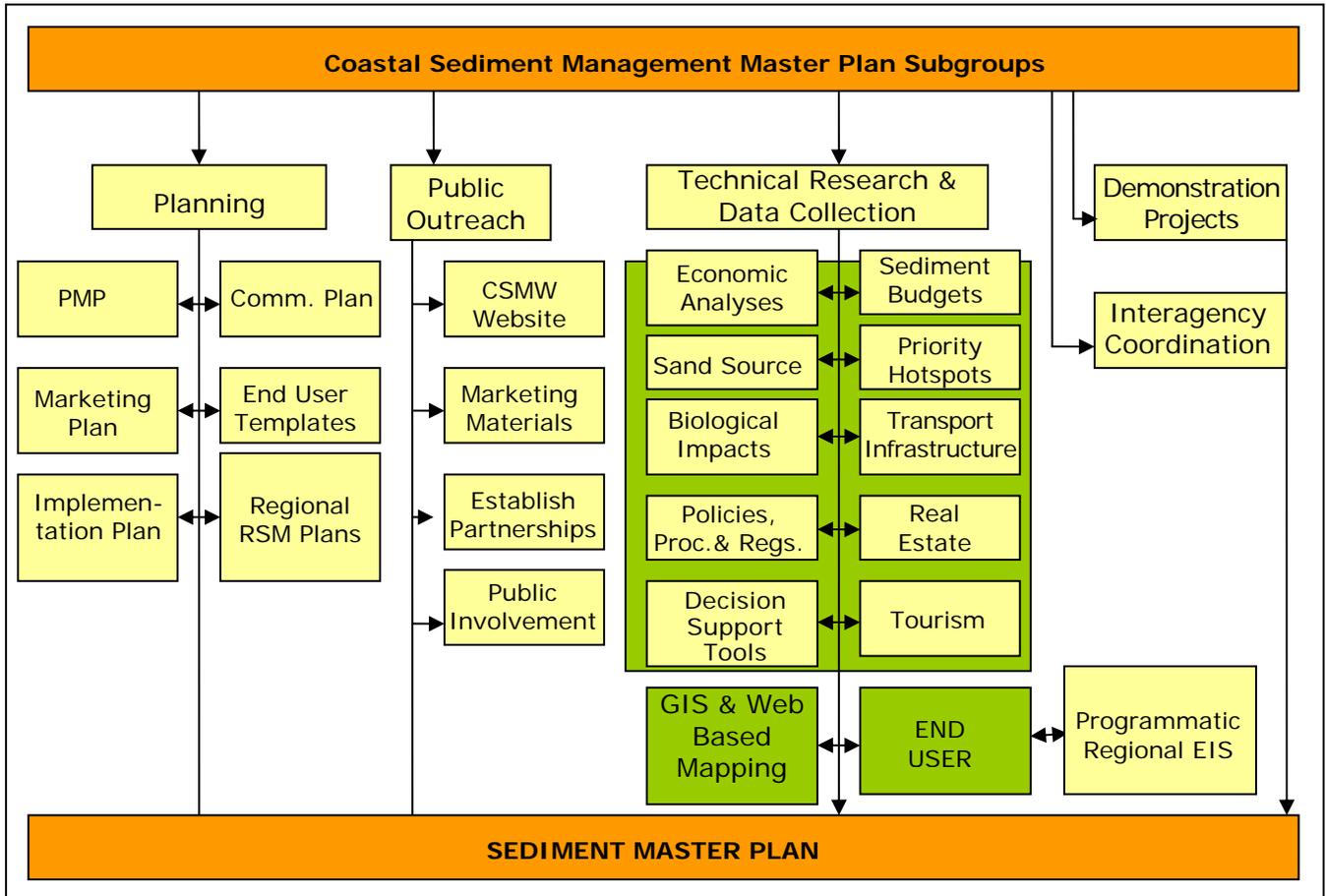


FIGURE 4: Sediment Master Plan Development Structure

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

The SMP will continue to support these initial state-wide efforts and add new information to that already gathered. After developing the state-wide foundation, SMP efforts will focus on more regionally specific studies and tools, since most sediment management implementation occurs at the local or regional scale. Regional Sediment Management and SMP efforts with respect to regional efforts are described in more detail in Section 3.

The SMP will maximize the use of public funds to support implementation of regional sediment management by:

- ❖ Coordinating dredging activities to avoid delays and added costs with other RSM activities;
- ❖ Guiding placement of dredged material where economic benefit is maximized through recreational use, environmental restoration, shoreline protection, and tourism; and
- ❖ Developing a strategic plan for funding beach restoration.

The SMP When completed the SMP will do the following:

- ❖ Identify and prioritize critical coastal erosion areas;
- ❖ Locate potential sources of sediment to replace and/or restore lost sediment;
- ❖ Develop plans by which sediment can be managed regionally to remediate the eroding areas,;
- ❖ Identify species and habitats of concern that could be impacted by regional sediment management activities ;
- ❖ Incorporate regulatory-appropriate procedures designed to streamline CSM activities while protecting natural and recreational coastal resources;
- ❖ Foster team-building between agencies with disparate missions and objectives;
- ❖ Increase scientific understanding of technical issues that arise within the coastal and oceanic environment as a result of RSM activities; and
- ❖ Provide for public input to meet stakeholder concerns.

2.4 Sediment Master Plan Tools and Products

California Coastal Sediment Master Plan

In order to facilitate the implementation of RSM throughout the entire California coast, the CSMW has embarked on a multi-year effort to compile a California Coastal Sediment Master Plan. This status report documents the completed, on-going and future activities of the CSMW in compiling the Sediment Master Plan. It also provides overviews of the CSMW and RSM, maps of critical coastal erosion areas in California, and case studies of successful RSM implementation in California.

When completed, the Sediment Master Plan will be a compilation of tools and products designed to assist sediment managers and others in implementing RSM throughout the California coast. These products and tools fall under the three general headings:

- ❖ Reports and data,
- ❖ Computer based tools, and
- ❖ Educational and informational materials,
- ❖ Regional-based RSM Programs or Plans

The following Sediment Master Plan tools are available for public use and can be found on the CSMW website <http://www.dbw.ca.gov/csmw/csmwhome.htm>. (Note: A more expansive summary of these tools can be found in Appendix A)

- ❖ Reports and data
 - ❖ Coastal References Database: Literature review and compilation of bibliographies of documents related to coastal sediment and beach nourishment.
 - ❖ Cumulative Loss of Sand Due to Dams: Report identifies volumes of sediment potentially available for RSM activities.
 - ❖ The Economics of Regional Sediment Management in Ventura and Santa Barbara Counties: Examines incremental costs of RSM resulting from transport of sediment from harbors to various receiver sites.
 - ❖ Sand Compatibility and Opportunistic Use Program (SCOUP) - Develops guidance for regional sand reuse programs using upland materials, including standards for characterizing receiver sites and compatibility of sediment from various sources.
 - ❖ SCOUP Pilot Project Mitigated Negative Declaration: Illustrates preparation of environmental documents for RSM activities.
- ❖ Computer based tools
 - ❖ CSMW Website- Provides access to relevant documents, tools developed to assist sediment managers, agency links, general information on CSMW activities and SMP project status.
- ❖ Educational and informational materials
 - ❖ California Sediment Master Plan Brochure: Provides an overview of the sediment imbalance and need for regional solutions.
 - ❖ California Sediment Master Plan Progress Report to Ocean Protection Council: Lays out how CSMW and member agencies plan to stimulate the utilization of sediment from ports/harbors and other sources to address regional sediment deficits.

The following Sediment Master Plans tools are still under development. When completed, they will be posted to the CSMW website.

- ❖ Reports and data
 - ❖ Analysis of Impacts and Recommended Mitigation for Critical Species and Habitats: Provides standardized references for environmental documentation, and assists sediment managers in pre- project planning by science-based identification of impact to critical biota and appropriate mitigation measures.
 - ❖ Beach Nourishment Regulatory Guide: Guidance for local coastal stakeholders: Clarify the regulatory process and requirements for sediment managers.

- ❖ California Beach Restoration Strategy: preliminarily identifies critical coastal erosion locations that would benefit from excess sediment at ports, harbors wetlands, flood control projects, etc.
- ❖ Development of Sand Budgets for California's Major Littoral Cells: Comprehensive review and compilation of dredging records and other relevant sediment source/sink information on a littoral cell basis; calculates regional sand budgets based on port/harbor dredging records.
- ❖ Mud Budget Final Report- Fine Grained Sediment Sources, Transport and Sinks: Examines the natural fate and transport of fine-grained materials for comparison against sediment management projects; provides a mega-regional analysis of this potentially major impediment to RSM.
- ❖ Policies, Procedures and Regulations Analysis: Comprehensive review of legislative and procedural requirements that affect sediment management; recommendations on how to reduce impediments to effective, resource-protective RSM.
- ❖ Computer based tools
 - ❖ Prototype Coastal Sediments Analysis Tool: Allows the sediment manager to examine issues, costs and benefits associated with different regional alternatives for sediment procurement, transport, and placement.
 - ❖ Web-based Mapping Tool: User-friendly tool to access visual information, compiled in the GIS database, needed to evaluate sediment management projects.
- ❖ Educational and informational materials
 - ❖ Beaches, Littoral Drift and Littoral Cells: Understanding California's Shoreline and Beach Nourishment: Layman's explanation of the physical processes involved in building beaches and the issues/considerations involved when artificially renourishing them.
 - ❖ Offshore Canyon Sand Capture: This paper identifies canyons within the state where artificial measures to reduce or eliminate the canyon capture rate might prove cost-effective and environmentally benign, and offers suggestions about how that might be accomplished.
- ❖ Regional RSM Programs
 - ❖ The development of regionally based RSM Programs will utilize all the reports, data, educational and informational tools developed and compiled by the Statewide Master Plan. These programs will rely upon region-specific geographic, economic, environmental and societal data and input. Local and regional governments and all stakeholders will be invited to participate in this effort to find consensus on a regional plan for beneficial reuse of opportunistic sediment as well as planned shoreline restoration projects.

3.0 Regional Sediment Management in California

The SMP is a long-term project with an anticipated lifespan of approximately ten years. The Sediment Master Plan will develop a series of tools and products designed to assist in addressing issues expected to arise during implementation of RSM. These products include but are not limited to a) regional sediment plans that identify regional linkages between areas with sediment deficits and excesses and provide various tools to promote effective regional sediment decisions, b) functional geospatial databases to assist in determining potential project sites as well as the possible impacts; c) sampling and analysis standards for non-traditional sources of sediment, d) biological recommendations for use in environmental documents and project planning, and e) regional permits. Products will be made available through CSMW's website (www.dbw.ca.gov/csmw/csmwhome.htm) and other venues. Annual status reports will be prepared before the end of the federal fiscal year, describing accomplishments to date.

3.1 SMP Efforts and Tasks Necessary for Effective RSM Implementation in California

Figures 5-10 illustrate some of the information compiled to date by the CSMW as part of its SMP development effort. Technical and political boundaries (e.g., littoral cells and counties) provide a basis for the regional framework. Critical coastal erosion areas and some potential larger sources of sediment (e.g., ports) begin the establishment of regional supply and demand along the California coast. Additional potential sources of sediment (e.g., wetlands, debris basins, dams and offshore locations) will be included in the regional-based RSM plans to be developed during SMP implementation.

Implementation efforts needed to accomplish the objectives, goals and mission of the CSMW and the Sediment Master Plan 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 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 California Ocean Protection Council.
- ❖ Developing process-related guidance to help eliminate confusion with the regulatory process and streamline project permitting.
- ❖ Developing Regional General Permits and Programmatic Environmental Impact Statement/Environmental Impact Report for beach restoration.
- ❖ Expanding available knowledge on species and habitats of concern that could be impacted by RSM activities and best protective measures.

- ❖ 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.
- ❖ Assisting ports, harbors, wetlands restoration groups and flood control agencies in resolving their sediment-related issues.

Numerous tasks have been identified as needed over the next several years to meet the implementation efforts of the SMP. For planning purposes, Appendix C lists these “next steps”, grouped by task type (coordination, outreach, process, technical, and funding). These steps have been preliminarily assigned relative priorities (high, medium, and low) and schedule (short-, medium-, long-term, and ongoing). Descriptions indicate RSM and COPC issues that the individual effort supports. Individual steps or activities associated with implementation of the Task have been identified. The section of the SMP's Project Management Plan (PMP) encompassing the individual task is identified.

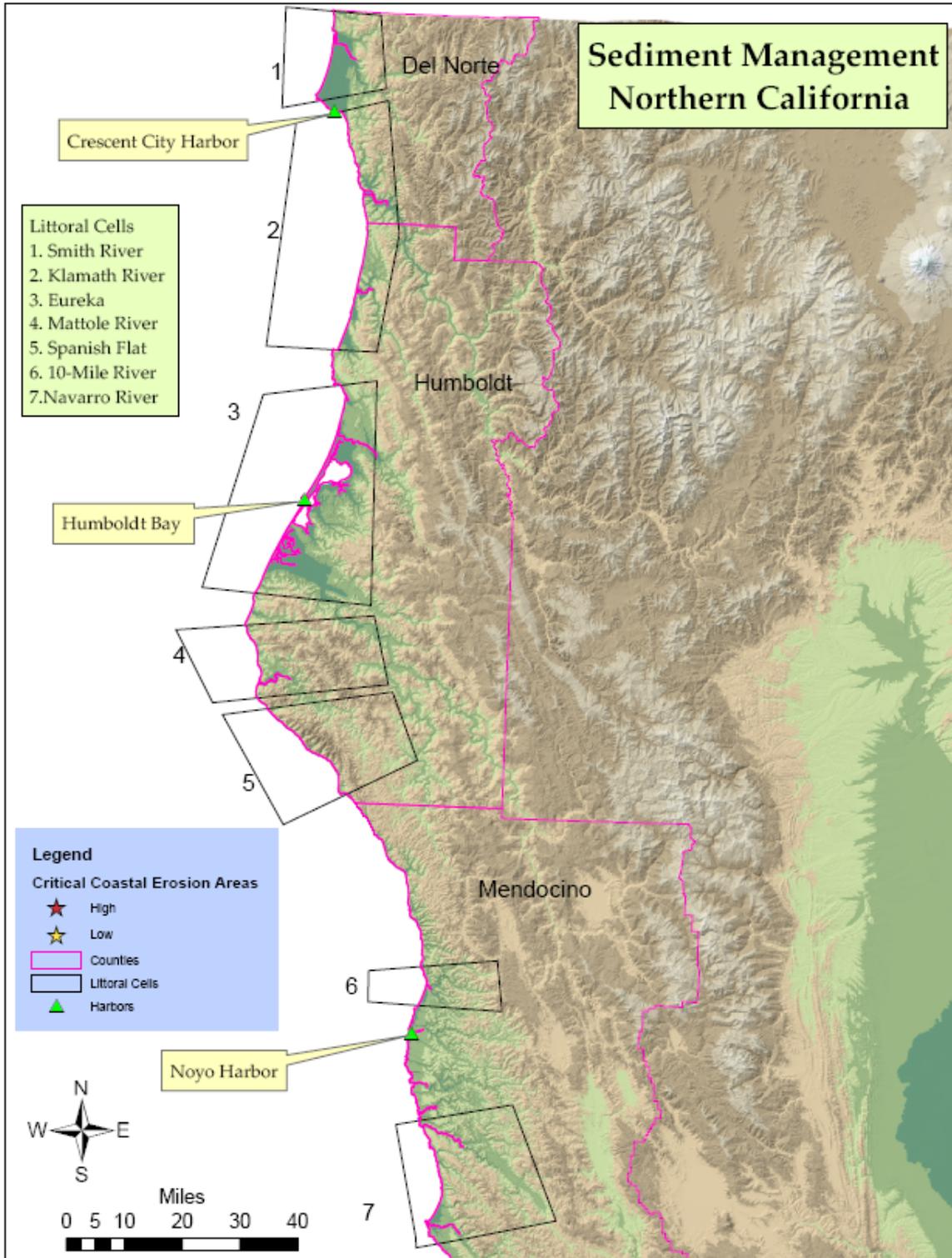


FIGURE 5 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Northern California

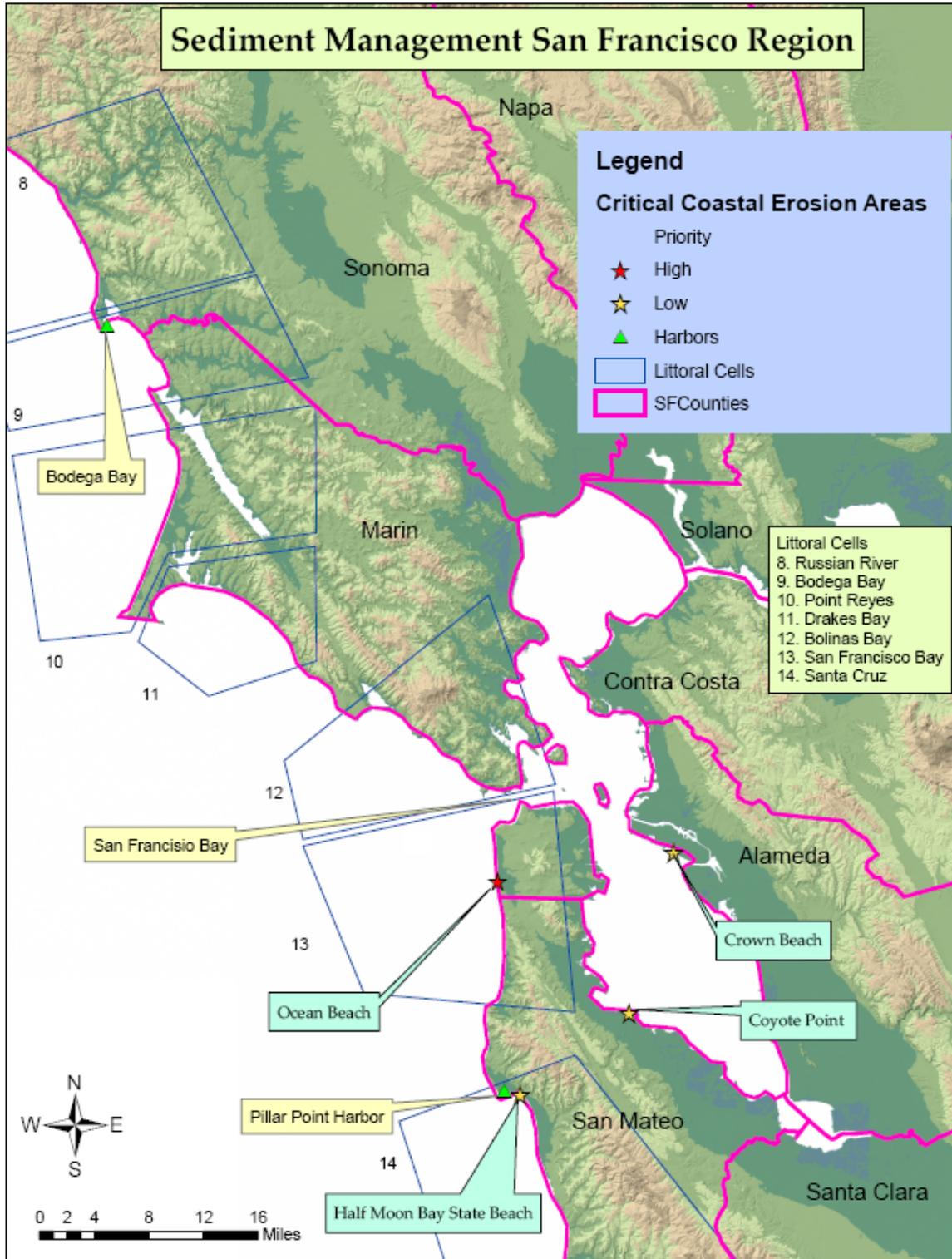


FIGURE 6 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Northern California - San Francisco Region.

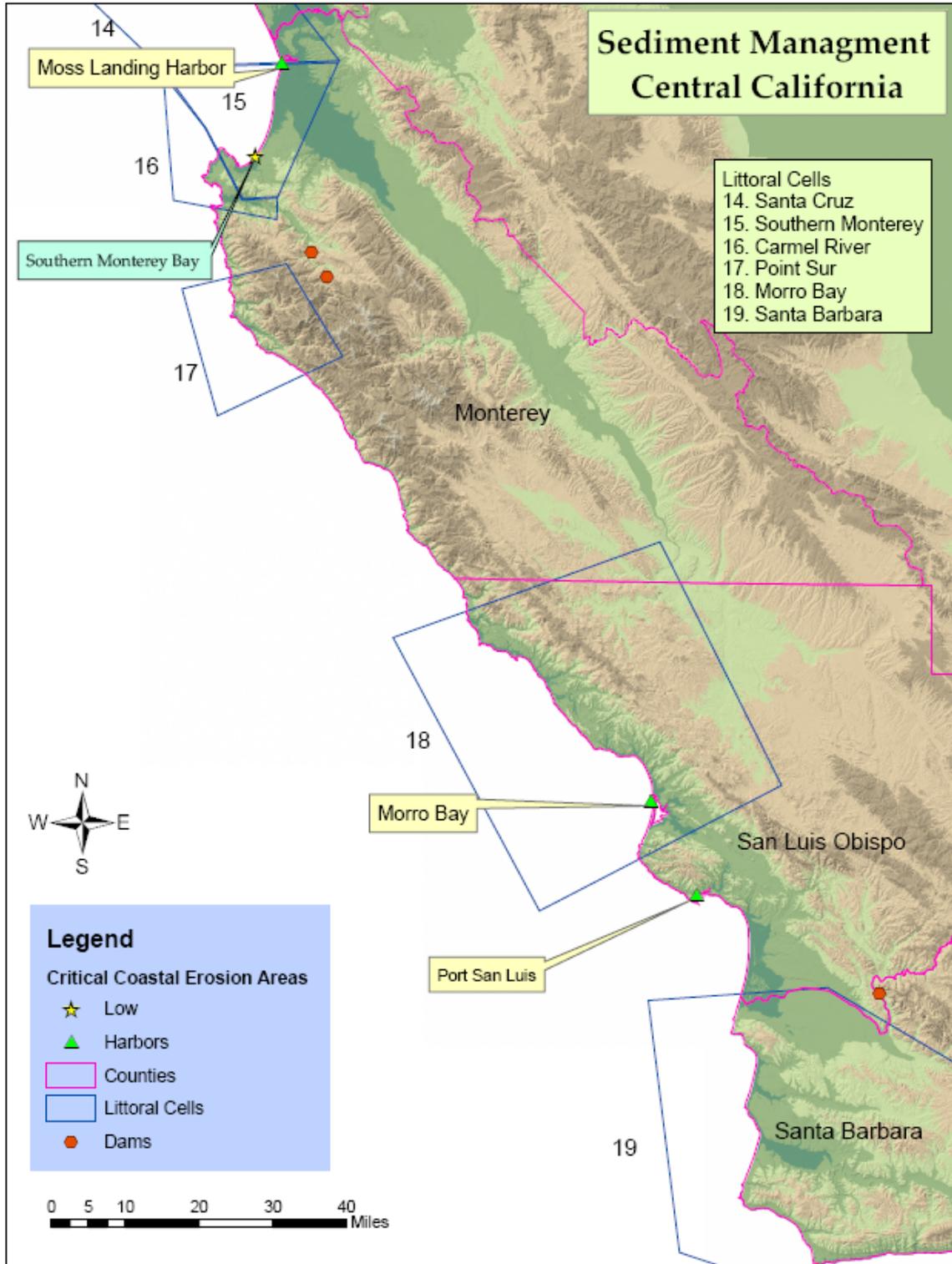


FIGURE 7 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Central California

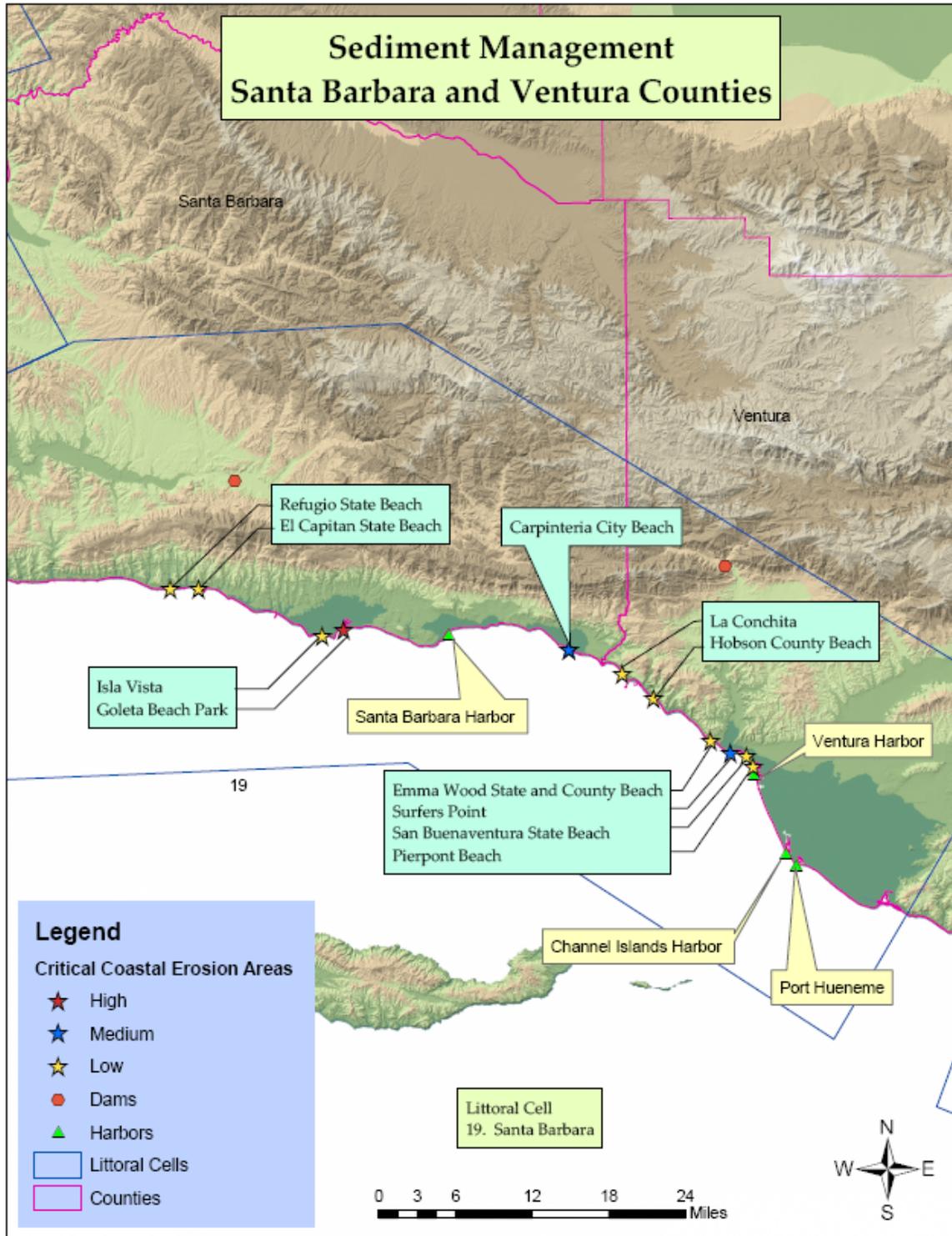


FIGURE 8 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Southern California – Santa Barbara and Ventura Counties

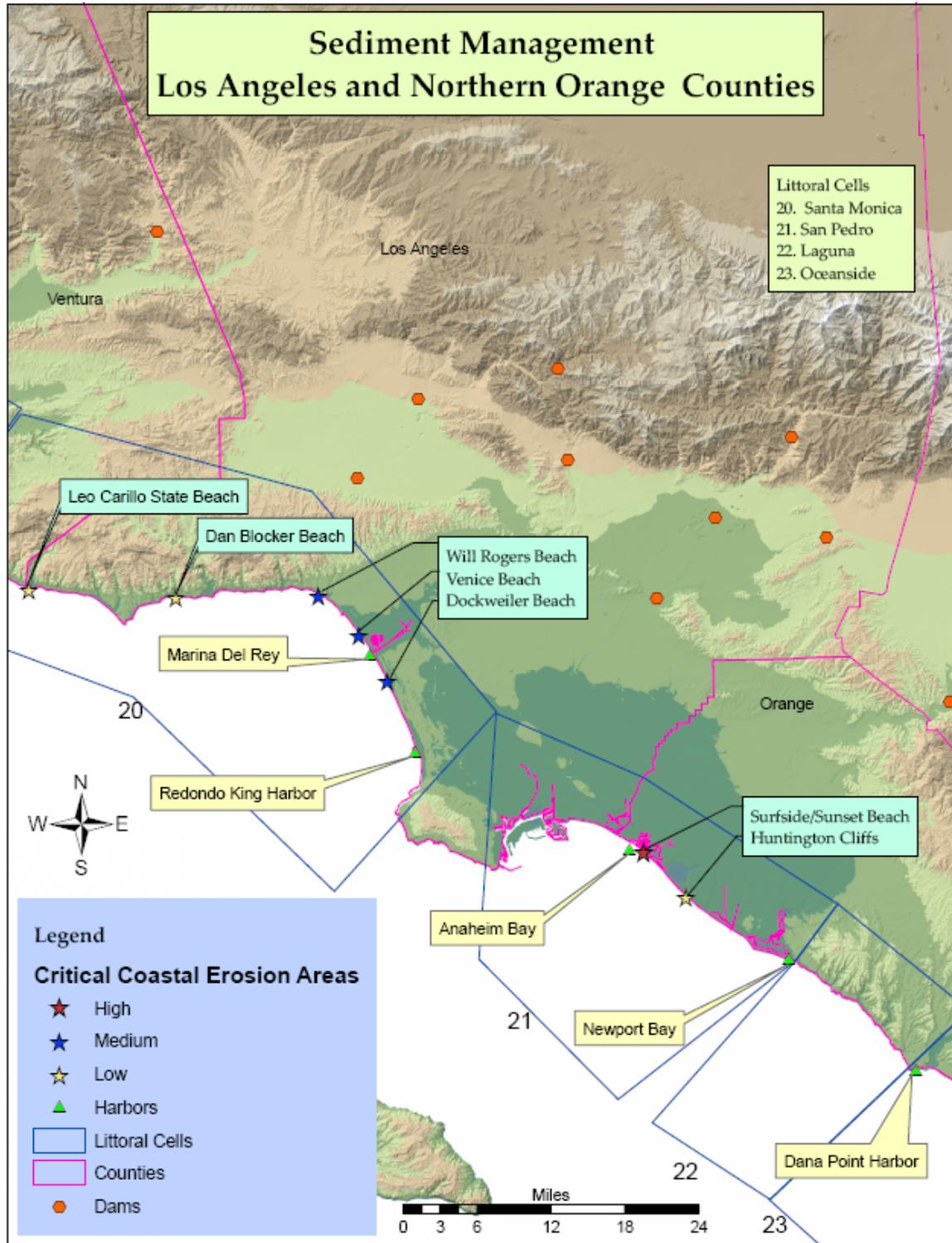


FIGURE 9 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Southern California – Los Angeles and Northern Orange Counties

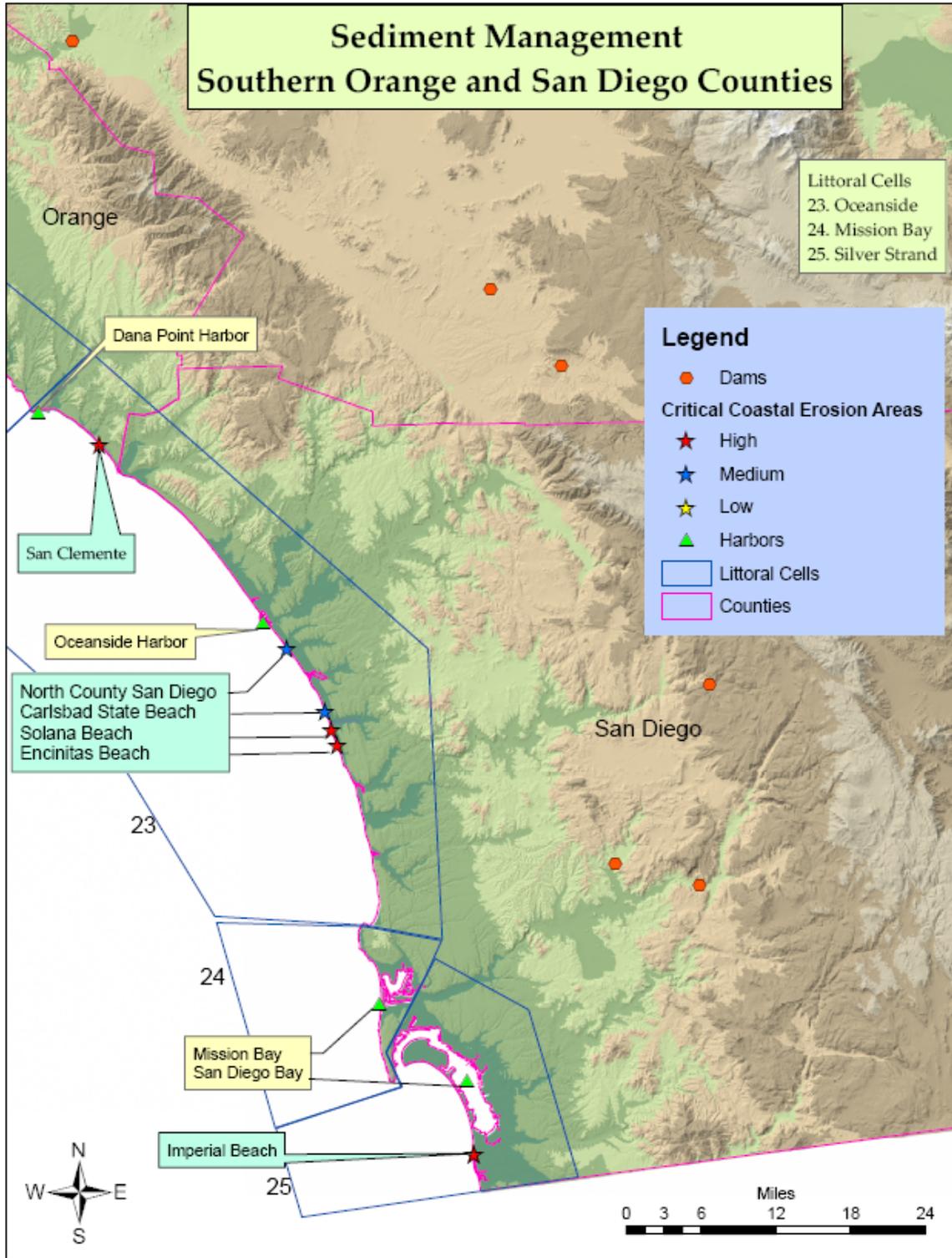


FIGURE 10 - California Critical Coastal Erosion Areas, Potential Sediment Sources, and Littoral Cells – Southern California – Southern Orange and San Diego Counties

3.2 Case Studies of Successful RSM Implementation in California

While the concept of sediment management has been around for many years, it has not been until recently that sediment management has been implemented in a truly regional context. The following sections are case studies and examples of coastal projects throughout California that have achieved the objectives of regional sediment management. These studies illustrate how project design, implementation and needed environmental protections associated with RSM can be achieved. Examples showing how restoration of natural processes can be combined with local values and how habitat restoration can also preserve natural processes are also presented. Each of these examples works with the regional conditions so it is unlikely that these efforts can be duplicated exactly in other regions. However, these examples provide an array of RSM options that may have applicability to other regions with similar coastal situations.

3.2.1 Orange County Beach Erosion Control Project (Surfside – Sunset Project)

Background:

The Surfside-Sunset Nourishment Program was initiated in 1964 as a component of the Orange County Beach Erosion Control Project. The goals of the RSM program are to mitigate erosion of Surfside-Sunset Beach, and nourish the downcoast Orange County shoreline north of Newport Harbor. To accomplish these objectives, periodic beach nourishment is performed at Surfside-Sunset Beach, functioning as a “feeder beach” restoring beach width. The project is funded jointly by USACE, County of Orange and the State of California through the Department of Boating and Waterways. In addition, the Department of Parks and Recreation is involved historically through both the Bolsa Chica State Beach and Huntington State Beach. This is California’s only federally authorized shore protection project that involves state and local participation.



Surfside-Sunset

Major alterations to the natural condition of the San Pedro littoral cell began in 1889 with construction of the Los Angeles/Long Beach Harbor Complex. Additionally, inland development, particularly flood control projects, significantly reduced the San Gabriel and Los Angeles River contributions of beach sand. This loss, combined with navigational development at the San Gabriel River mouth and Anaheim Bay effectively caused erosion at Surfside-Sunset Beach by the mid-1940s. With development removing 67 percent of the natural sand supply from the coastal sediment system, beach erosion became a serious problem. The first areas in the region to realize damages due to erosion were the Surfside–Sunset Beaches in the north and West Newport Beach to the south.

The initial nourishment effort conducted under the Surfside-Sunset Project was completed in June 1964 and provided 4 million cubic yards of beach sand. Subsequently, between 1971 and 2002, over 12 million cubic yards of additional sand were placed on the Surfside-Sunset feeder beach. Although the initial replenishment utilized material from within the Naval Weapons Station, the majority of sand placed since 1979 originated from nearshore borrow sites.

Implementation of RSM:

The feeder beach concept was a fore-runner of and an integral part of today's RSM strategy. By migrating downcoast, sediment placed at Surfside Colony provides a source of sediment for 17 miles of beaches from Surfside Beach to the north jetty of Newport Bay. Prior to the start of this project the beaches in the San Pedro Cell were eroding.

A primary component of the Orange County Coast of California Study (Orange County CCSTWS) was an evaluation of the Surfside-Sunset nourishment project. A detailed analysis of beach widths and sediment volumes between 1963 and 1997 indicated that the vast majority of nourishment material placed on the beach has remained in the littoral system (USACE, 1999). Furthermore, beach widths throughout the region were found to have increased at an average rate exceeding 4 feet per year. Substantial social, recreational, economic, environmental, and health and safety benefits are realized through this restoration project. The Surfside–Sunset Project serves as shining example of how RSM can work in other sediment starved littoral cells in California, and how beneficial reuse of dredged material from an offshore borrow site can provide multi-faceted benefits to a region.

3.2.2 Agua Hedionda Lagoon

Background:

The Agua Hedionda Lagoon, in Carlsbad, is in the Oceanside Littoral Cell, and was originally dredged in 1954 to provide cooling water for the Encina Electric Power Plant. Since that time two new generating units have been added to the plant, adding to the cooling water demand. Waves carry littoral sediment into the lagoon. To maintain the necessary volume of cooling water, the lagoon requires periodic dredging. Approximately 120,000 to 140,000 cubic yards are annually removed from the outer basin. Historically, this sand was placed on the beaches south of

Agua Hedionda Lagoon. With dominant littoral drift to the south, it was expected that the material would be carried away from the lagoon and lagoon managers would therefore not be in the position of dredging the same sand numerous times.



Agua Hedionda Lagoon

The volume removed each year represents approximately 40 percent of the annual littoral drift in for the Oceanside Littoral Cell. Due to the regular dredging and placement of sediment onto the adjacent beaches, the outer basin of Agua Hedionda Lagoon is considered a temporary sediment sink. Some sand moves from the outer lagoon to the middle or inner lagoon; these areas are dredged less regularly than the outer lagoon.

The majority of sand placement from Agua Hedionda Lagoon was at the Middle or South Beaches; however the inlet continued to intercept sand. Although the dominant littoral drift direction is to the south, northerly transport is a regular occurrence as well. Sand trapped in the outer basin could have been naturally destined for some of the beaches north of the inlet.

Implementation of RSM

In the late 1990's, San Diego Gas & Electric, at the request of the California Coastal Commission, studied the nearshore conditions at Aqua Hedionda Lagoon with the intent of determining an equitable distribution of dredge sand. The study discovered that natural transport of sand is both to the north and south, and that the northern beach areas should receive some of the dredged sand. Analysis of local currents indicated that 20 percent of the gross littoral transport past Agua Hedionda was to the north and 80 percent of the gross transport was to the south. The beaches

north of the inlet had higher recreational demand and public access than Middle Beach and other beaches immediately south of the lagoon jetties. This factor was also considered in the examination of equitable sand distribution. Based on the analysis of sediment transport and recreational demand a new disposal pattern was developed with at least 30 percent of all dredged sand placed on the beaches north of the inlet jetties and no more than 70 percent of the dredged sand placed on Middle Beach or South Beach.

The new distribution of sediment placement is being used for each dredging episode. It reflects an appreciation for both natural sediment transport conditions and for the community values that develop from recreational beach areas.

3.2.3. Bolsa Chica Wetland Restoration Project

Background:

The Bolsa Chica Wetland Restoration Project is located in Orange County, adjacent to the City of Huntington Beach. The purpose of the project is to restore portions of the wetland ecosystem of the Bolsa Chica lowlands. Restoration objectives are to protect and enhance:

- ❖ Migratory shorebird, seabird, waterfowl over wintering habitat value,
- ❖ Nesting habitat for shorebirds and seabirds,
- ❖ Estuarine fish habitat, and
- ❖ Nesting and foraging conditions for threatened or endangered species (California least tern and western snowy plover).

The project area covers about 1,247 acres and will restore tidal influence from the Pacific Ocean to about half of this area to reinvigorate the wetland ecosystem. To achieve the biological benefits of tidal restoration, a direct connection to the Pacific Ocean had to be reestablished through the creation of a new tidal inlet through Bolsa Chica State Beach and across the Pacific Coast Highway near the Huntington Mesa. The ocean connection consisted of three separate project elements, the inlet, the inlet jetties and the ebb tidal shoal.



Bolsa Chica Ocean Inlet

Photo Credit: Jack Fancher

An ocean inlet has been constructed to the full tidal basin that is 360 feet in width between the levy crests and encompasses an area of approximately 3.7 acres. As the inlet was excavated, approximately 190,000 CY of sand were placed on the adjacent state beach for beach nourishment purposes. Bolsa Chica Ocean Inlet just opened on 24 August 2006.

To stabilize the inlet, two jetties were constructed to prevent the entrance channel from closing. Each jetty is approximately 450 feet in length from Pacific Coast Highway to the jetty tips and about 100 feet at their base. Approximately 5 acres of beach were excavated to construct both the jetties and the inlet totals.

To stabilize the down-coast region near Huntington Cliffs from the loss of the existing beach, assure sand movement along the beach and maintain beach stability, an ebb shoal was constructed just outside the inlet mouth. The equilibrium volume of the ebb shoal was calculated to be approximately 620,000 CY of sandy material. To provide additional safety, as much as 1,300,000 CY of sandy material (> 80 percent sand) was dredged from the restored fully tidal and muted tidal basins and pumped in the proposed ebb shoal location over approximately 45 acres of soft bottom substrate.

Ebb and flood tidal shoals are normal features that develop at a tidal inlet. For a new inlet project, the ebb and flood shoals would build naturally, trapping littoral drift and capturing it on the tidal shoals. Once the shoals grow to equilibrium with the tidal flows, littoral sediment would be carried around the inlet and shoal, continuing its longshore transport. This project, by establishing the ebb shoal as part of the inlet project, is expected to minimize interruption of littoral transport.

Implementation of RSM:

Inlet maintenance will require regular dredging of the inlet and flood tidal shoal for the life of the project. The full tidally-dependant wetland condition and associated habitat restoration values cannot be maintained without regular and ongoing inlet dredging. Beach widths adjacent to the inlet will be monitored regularly to determine whether any unanticipated beach changes are developing adjacent to the inlet jetties. All dredged material will be placed on adjacent beaches and if the beach monitoring identified any areas of beach erosion, the dredged material will be placed in those locations or where they can best otherwise reduce or prevent loss of beach width.

3.3 Potential Candidate for RSM Implementation

Ventura Harbor

Background:

Ventura Harbor is a man-made commercial and recreational harbor located within the City of San Buenaventura in Southern California, about 65 miles northwest of Los Angeles and 7 miles northwest of Port Hueneme Harbor. The harbor also serves as the entrance to the Ventura Keys, a private development with channels that have dock facilities for residents. The harbor entrance, located 1 mile north of the Santa Clara River, consists of a 1,550-foot long north jetty, a 1,070-foot long south jetty and a 1,798-foot long detached breakwater.



Ventura Harbor

The entrance stabilization jetties of the harbor effectively intercept and block the alongshore sediment transport. As a consequence, periodic maintenance dredging is required to maintain navigation channels and prevent erosion of adjacent downdrift beaches. Between 1969 and 2003, the average volume of sediment dredged from Ventura Harbor was approximately 459,000 cubic meters (600,000 cubic yards) per year. Of this volume, it is estimated that about 76,460 cubic

meters (100,000 cubic yards) per year may be attributable to sand that accumulates upcoast during times of alongshore transport reversal. The littoral material that accumulates each year at Ventura Harbor represents a significant sediment resource. Normally, this material is placed downcoast on McGrath State Beach, or occasionally on South Beach, and even less frequently upcoast on Pierpont Beach.

Potential Implementation of RSM:

RSM applications include the following: 1) determining where sediment is needed within the region (Santa Barbara Littoral Cell); 2) assessing how much could be diverted from McGrath or South Beach without detrimental effects to either the beach or other sites downcoast; and 3) determining what is the most economical and environmentally acceptable way to transport the sediment.

Alternatives for beneficial reuse of proportional volumes of sand currently discharged from the Ventura Harbor Sand Bypass System have been formulated. South Beach is the recommended location to use as a source and/or stockpile site because of its short distance from the harbor sand trap and the truck accessibility. Use of waterborne modes of transportation to move bypassed sand from the harbor to other regional beach sites presents more operational challenges.

Candidate receiver sites that were analyzed include sites previously identified and screened by the Beach Erosion Authority for Clean Oceans and Nourishment's (BEACON) South Central Coast Beach Erosion Program. BEACON is a California Joint Powers agency established to deal with coastal erosion and beach problems on the Central Coast of California. The agencies making up BEACON are Santa Barbara and Ventura Counties and the cities of Port Hueneme, Oxnard, San Buenaventura, Carpinteria and Santa Barbara.

These beaches include Carpinteria, Oil Piers, Surfers Point, and Hueneme Beach. BEACON currently has opportunistic beach nourishment permits from the California Coastal Commission and the USACE to allow annual placement of sand on each beach. Additional sites that were analyzed include the Rincon Parkway (which includes Oil Piers), San Buenaventura State Beach, Pierpont Beach, Marina Park, Oxnard Shores, and the Naval Base Ventura County.

The regional beneficial reuse of Ventura Harbor bypassed sand would be limited to small volume applications. Diversion of more than about ten percent of the shoreline's net alongshore transport rate to beaches other than the immediate downcoast receiver sites may adversely impact the shoreline reach between the Santa Clara River and Channel Islands Harbor.

The protocol for RSM may be based upon preservation of minimum beach widths concurrent with conditions and surplus sediment within the reach. When surplus conditions exist the potential sand volume is estimated to be no greater than about 47,000 cubic meters (61,000 cubic yards) if excavated from the harbor traps. Although greater sand volumes will be available at times within the harbor sand

traps and at South Beach, it is recommend that the RSM program start slowly so that impacts and benefits can be carefully evaluated.

In conclusion, for practical reasons, the RSM plan for beneficial reuse of sand from Ventura Harbor should consider modest amounts of sand delivered by truck over short haul distances. Pipeline dredge may be considered for beaches at the lower end of Pierpont Bay.

Appendix A

Summary SMP of Completed Sediment Master Plan Tools

The CSMW has been actively developing various tools and documents to facilitate the development of RSM in California. The need for these tools, how they can help address RSM issues and their status (as of September 2006) are described below. This section will be updated in each successive annual SMP Status Report.

CSMW Website

Background:

The CSMW needed a website to contain information and tools developed as the Sediment Master Plan proceeds, and to make such information and tools widely available. CSMW's website is currently hosted by DBW. Information on the various coastal sediment-related programs and projects of CSMW member agencies are available as well as meeting records and access to documents, tools and reports developed by CSMW as part of their SMP efforts.

Importance for RSM efforts in California:

Part of the SMP Public Outreach effort, the website is currently the primary source of information on the SMP, and provides access to a library of tools and information on SMP Projects. This information will help coastal planners and managers assess regional conditions as they develop RSM Plans. The website also supports the California Ocean Protection Council's goal of a comprehensive website for the ocean.

Status:

This educational document is available at the following URL:

<http://www.dbw.ca.gov/cswm/csmwhome.htm>

California Beach Restoration Survey (CBReS)

Background:

DBW conducted an initial survey to identify critically eroding areas along the California coastline; these locations were filtered, based on State of California technical and funding requirements. The list was further condensed to reflect locations where sediment management (primarily beach restoration and groin repair) was considered an appropriate solution. These critically eroding areas and additional shoreline segments currently under study by the US Army Corps of Engineers (USACE) collectively define locations of interest for purposes of the survey. These CBReS sites have been preliminarily assigned high, medium or low priority. This priority is dependant primarily on the level of interest expressed by local government, as well as availability of State and federal funds to investigate and remediate the erosion. Criteria for additional prioritization, especially at regional levels are also presented. The projects currently being assessed by the CBReS are shown in Figures 5-10.

Importance for RSM efforts in California:

This report presents and preliminarily prioritizes coastal erosion locations along the California coastline currently under consideration for sediment management activities by local, state and/or federal governments. The CBRs sites represent specific locations that can be assessed for mitigation utilizing regional (littoral cell) approaches to the management of potential sediment sources.

Status:

This prioritization and planning tool has been reviewed by CSMW and local governmental stakeholders. The report is now being revised for general public review. The report will be finalized after the close of the public review period for release as a DBW report.

Sand Compatibility and Opportunistic Use Program (SCOUP)

Background:

CSMW and San Diego Association of Governments (SANDAG) crafted a process designed to streamline regulatory approval of small (less than 150,000 cubic yards) beach nourishment projects at identified receiver sites using opportunistic materials from throughout the region. SCOUP was developed with significant input from appropriate staff at permitting and resource agencies. Identifying technical and regulatory concerns associated with beach nourishment using regionally-available sources, and addressing those concerns in a systematic and consistent manner is part of CSMW's thrust to coordinate and streamline RSM across California. A pilot project in the Oceanside littoral cell (northern San Diego County) provides an example of how to implement the SCOUP process and guidance for developing regional programs elsewhere in coastal California.

Importance for RSM efforts in California:

By encapsulating regulatory and process needs, regional-based reuse of upland materials for beach restoration can be stimulated. This process can be exported to other regions, providing for consistency across coastal California.

Status:

This procedural guidance tool has been finalized, and is available at the CSMW website library. A hard copy of the report can be obtained from SANDAG if requested. Currently, four additional cities in San Diego County are jointly developing a SCOUP program for their beaches.

Policies, Procedures and Regulations (PPR) Analyses:

Background:

An analysis of federal, state, and local policies, procedures, and regulations (PPRs) affecting beach nourishment and related sediment management activities in California is being conducted as part of the SMP. These related activities include the dredging/excavation, transportation, and placement of sediment in littoral cells throughout California.

Importance for RSM efforts in California:

Federal, state and local PPRs relevant to regional sediment management are being analyzed to identify problems and develop suggested recommendations for such management activities throughout coastal California. Specific recommendations on how best to resolve those problems in order to streamline the project development process, and steps needed to implement the recommended changes, will facilitate effective RSM by minimizing project delays.

Status:

The planning and governance tool is under development.

Beach Restoration Reference Guide (BRRG)

Background:

Implementing a beach restoration project requires compliance with various regulations at the federal, state, and local levels of government. The numerous and sometimes overlapping regulations may confuse many coastal planners, managers or other interested stakeholders. As a result, projects may be delayed significantly due to incomplete or insufficient compliance with these regulations.

Importance for RSM efforts in California:

The BRRG summarizes the federal and state regulatory process involved in planning and implementing beach restoration projects within California. Information is provided on applicable regulations, the regulatory compliance process required by each jurisdictional agency, and flow charts recommending how to proceed through environmental review and regulatory compliance. Clarifying the process and expectations is expected to streamline the permitting process, providing for better planned and executed projects. This in turn facilitates regional use of sediment by helping the coastal manager identify regional issues during development of RSM plans.

Status:

This regulatory guidance tool is very near completion.

Regional Sand Budgets

Background:

When reviewing or considering sediment management activities such as beach restoration projects, regulatory and resource agency personnel often request regional sediment budget information. This allows comparison of the expected input from the proposed sediment management activity to that of the natural system, in order to assess whether such a project would "overload" the regional system. Project proponents and others believe that the "natural" (i.e., before dams, debris basin, armored bluffs/rivers, etc) budget should also be contrasted against that currently in operation. CSMW and the University of California at Santa Cruz have developed natural and altered (primarily source reduction) sand budget information by littoral cell.

Three informational tools are part of this effort:

- a. Development of Sand Budgets for California's Major Littoral Cells- A quantitative description of available information on sand transport and sediment management activities within those littoral cells.
- b. Beaches, Littoral Drift and Littoral Cells- A non-technical explanation of sediment transport and natural and human-induced beach building processes within littoral cells.
- c. Cumulative Losses of Sand to the California Coast from Dams- A temporal and spatial analysis of the volume of sand trapped behind dams on coastal streams.

Importance for RSM efforts in California:

A regional understanding of littoral cell boundaries, sand budgets and disruptions to the natural movement of sand to and along the coast is an important tool in coastal land use management and an essential step in understanding sand routing along the coast. Understanding causes of sand deficit is necessary to implement regional solutions to such deficit.

Status:

The Development of Sand Budgets for California's Major Littoral Cells is being revised to reflect reviewer's comments. The educational tool "Beaches, Littoral Drift and Littoral Cells" is very near completion, while the report, "Cumulative Losses of Sand to the California Coast from Dams" is currently available on the CSMW website.

Mud Budgets

Background:

Currently, sediment budget knowledge relates primarily to "sand" budgets. However, much of the regulatory concern over impacts on natural resources associated with sediment management activities relates to fine-grained sediment transport and deposition. To understand the magnitude of such potential impacts, the fate and transport of fine-grained materials under natural conditions needs to be understood. Therefore, the CSMW and U.S. Geological Survey undertook development of a fine-grained sediment budget ("mud budget"), looking first to quantify the amount of fine grained materials being supplied to the coastal ocean, and secondly where and how such material is deposited.

Importance for RSM efforts in California:

Determining land-based sources and oceanic sinks for silts and clays will help understand their potential impacts on coastal and oceanic environments. This in turn helps establish appropriate volumes and/or percentages of fine-grained sediment in beach restoration materials that can be used without adverse impact, addresses regulatory and resource agency concerns and streamlines the regional use of potential sources of sediment.

Status:

The first phase of work has been completed. The second phase and final report are due in fall 2006.

Biological Impacts Assessment (BIA)

Background:

Parties involved in sediment management activities have an urgent need to better understand the actual effects that management activities have on coastal biota. Stakeholders felt that a better understanding of physical processes and scientific data was needed for policy-makers, regulatory community and project proponents to make informed decisions and recommendations. The BIA has reviewed literature sources, compiled available information on biota and habitats of concern, and is developing science-based recommendations protective of sensitive biota, habitats or ecosystems.

Importance for RSM efforts in California:

Identifying critical coastal biota and/or habitats and relatively standard protection protocols during sediment management projects will help streamline projects by reducing the pre-project permitting time required for environmental assessments and documents. Understanding natural resource protection requirements up front supports RSM by providing needed information to the coastal planner or manager during their assessments of regional conditions.

Status:

The informational and procedural tool is under development.

Economics of RSM

Background:

This preliminary assessment report examines the costs and benefits of using opportunistic sediment to nourish sediment depleted beaches as an alternative to the traditional policy of disposing of this material in the least expensive manner. Dredged material is usually placed on an adjacent or nearby beach while upland materials are typically taken to landfills. The study examines the benefits of widening three receiver sites in Santa Barbara and Ventura Counties, and incremental costs associated with transport of sediment from various potential sources to those receiver sites.

Importance for RSM efforts in California:

The report provides a preliminary methodology for determining recreational values of increased beach width and transport costs of opportunistic materials in the Ventura/Santa Barbara region that could be exported to other regions. Identifying incremental costs and viable placement methods, when combined with a funding source, should result in more sediment placed where it will be regionally beneficial.

Status:

The preliminary educational and procedural tool has been completed and is available on the CSMW website. A beta version of the tool is under construction as part of the Coastal Sediment Benefits Analysis Tool (see discussion below).

Coastal References Compilation

Background:

Studies and reports related to coastal activities have historically been done largely from a local, project-by-project approach. There is abundant information and documentation, but much of it has been accomplished and presented in piecemeal, isolated (rather than integrated) fashion. CSMW was requested to develop a manageable format for this diverse information. Brief summaries and extensive reference listings related to seven initial categories were developed to collate physical properties and geographic locations of sediment management along the coast of California. Additional categories and references will be incorporated as time and resources allow.

Importance for RSM efforts in California:

The extensive list of relevant technical, regulatory and process-related references should assist coastal planners and managers in their review of regional issues as they develop their plans for RSM. The information should also help streamline project planning by early identification of available literature resources.

Status:

The informational tool has been completed and is available at the CSMW website. CSMW is investigating methods to update the compilation with a spatial component to further assist in regional assessments.

GIS Database

Background:

A comprehensive GIS database is being compiled for the entire coastal region of California. The GIS database will serve as the central depository of geo-referenced sediment management data, providing a basis for analytical tasks conducted during master plan development and implementation of priority projects.

Importance for RSM efforts in California:

This database will assist coastal managers, planners and engineers in developing best management practices and optimizing strategies to realize environmental and economic benefits for California and the Nation. The user-friendly display of GIS information will assist visualization and assessment of essential linkages, not only along the coast, but also with upland (watersheds) and oceanic conditions, thereby facilitating a more robust regional issue resolution and coordinating with the COPC's GIS programs.

Status:

A Work plan governing how the GIS database will be constructed, developed, maintained and made available to the widest number of users has been completed.

Web-Based Mapping

Background:

To make spatial information gathered into CSMW's GIS database as widely available as possible, the data will be disseminated through our Web-based Mapping (Internet Map Server or IMS) informational tool. Users will be able to view the CRSMIS information using the website's GIS system, and/or download information to their desktop computer for further analyses.

Importance for RSM efforts in California:

The Web-based Mapping is intended to provide easy access to GIS-based tools and assist analyses by agency staff, the general public and other stakeholders. This should help stakeholders more fully assess regional conditions and issues as they develop their regional RSM plans.

Status:

The informational tool is under development.

Coastal Sediment Benefits Analyst Tool (CSBAT)

Background:

A prototype Decision Support Tool (DST) was developed to assess options for sediment dredged from Ventura Harbor and three potential beach fill sites. The prototype describes, in a qualitative or semi-quantitative manner, the complex, spatially-dependent relationships between sediment transport costs and the associated benefits that relocation to other receiver sites will generate.

Importance for RSM efforts in California:

Determining incremental costs associated with alternate placement of harbor dredging, when combined with a funding source, will help optimize regional reuse of sediment. The beta version of the tool will help to assess dredging and placement options at other potential source and receiver sites along the California shoreline.

Status:

The prototype of this procedural and technical tool has been completed. The DST is currently being expanded to analyze receiver sites, sources and economics of RSM in the San Diego region.

Appendix B

List of Sediment Management Questions and Recommended SMP Tools for Answering Questions

This table contains a list of questions and/or concerns that commonly arise when assessing sediment supply or demand projects. These issues were compiled from harbormasters, local beach managers, wetland restoration staff, and ports. The compiled information is presented in order of project type, issue of concern and, when available, the SMP tool currently available, under construction, or planned.

SEDIMENT MANAGEMENT QUESTIONS AND RECOMMENDED SMP TOOLS

SEDIMENT MANAGERS	QUESTIONS	SMP PRODUCT/TOOL
Ports and Harbors	Is sediment accumulation blocking critical navigation?	RSB, GIS
	Do we need and emergency or accelerated permit?	CSMO,
	What are the physical, chemical properties of the dredge materials?	ITM
	Is there a current permit that recognizes historic characteristics or do you have to test?	
	Is the sediment suitable for beach nourishment, beneficial reuse, offshore disposal or do the materials have to be hauled upland?	SCOUP
	Is the grain size distribution, color, chemistry compatible with the potential receiver site(s)?	SCOUP, GIS
	What is needed for the Sampling and Analysis Plan?	SCOUP
	Who will design it?	
	Which labs will be used?	
	Chain of Custody assurance	
	What agencies need to review and approve the SAP?	SCOUP, ITM
	What rewrites are needed to meet all regulatory needs?	
	Lead time on this can be 4-6 weeks.	
	How will the actual sampling be conducted?	SCOUP, BIA
	Who will conduct the coring, vibracore, or grab sample services?	
	Who will conduct the oversight of physical sampling (probably the SAP designer)?	
	Labs perform tests, environmental firm evaluates the results	
Based on sediment character, what is needed for the dredging plan and disposal plan?	CSBAT	
Prior to designing dredging contract, all permit conditions must be known. Is permit acquisition running ahead of or parallel to the sampling and analysis?		
Permit acquisition:		
Which agencies need to be involved in project oversight and what permits are required?	BRRG	
Do you have existing permission (i.e. permit)?		

SEDIMENT MANAGEMENT QUESTIONS AND RECOMMENDED SMP TOOLS (Continued)

SEDIMENT MANAGERS	QUESTIONS	SMP PRODUCT/TOOL
Ports and Harbors (continued)	Notification Requirements?	
	Is a modification to existing permit needed?	
	Do I need a new permit?	
	Is an environmental review required?	BRRG
	Initial study, EIS, EIR, or categorical exemption?	BRRG
	What is the lead time required for permits/ public review?	BRRG
	What is the timing of the dredging and disposal?	
	Work with engineer to design, advertise, award, mobilize for, commence and complete contract.	
	How much is being charged for the material to be placed on the beach (or elsewhere)?	
	Post-construction: What are the reporting requirements from the monitoring program?	SCOUP, BIA
	What is the timing of the dredging and disposal?	
	Can we save money by putting it on the beach or in the near shore?	RSM Plans, CSBAT
	Can we save money by finding someone to sort and resell the material?	CSMO
	Can we save money by finding a nearby quarry to reclaim thereby avoiding landfill fees?	
	Where are the landfills and what are their fees?	
	What equipment innovations might allow us to cost effectively excavate and transport material?	
	What characterization is necessary at the donor site and receiver site?	SCOUP
How do we fund the initial excavation/disposal and repeated maintenance excavation/disposal?	RSM Plans, CSMO	
Can we do a coast wide sampling project to characterize the undesired sediment in coastal wetlands and their protective sediment basins?	SCOUP, BIA	
Wetlands	Can we do a coast-wide sampling project to characterize the near shore and beaches?	RSM Plans, CSMO
Receiver beach	What are the procedural requirements for the selected receiver beach?	SCOUP
	Can the busy summer tourist season be avoided?	
	Do ocean processes indicate summer placement is optimal?	
	What are the available haul routes or other transport methods (barge, pump line, etc.)?	RSM Plans
	What is the acceptable placement method/location: e.g., back beach, nearshore, etc.?	SCOUP
	Has the local government reviewed and approved the project?	Public Outreach, CSMO
Local concerns	Do local residents support the project?	Communications Plan

Appendix C

Sediment Master Plan Next Steps: Tasks and Schedule

SEDIMENT MASTER PLAN STATUS REPORT
Next Steps: Tasks and Schedule

ID NO.	TASK	Priority	Timing	2006				2007				2008				2009				2010				2011				INITIAL EFFORTS	PMP TASK
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
COORDINATION																													
C-1	Ensure that the Sediment Master Plan efforts align with the goals and objectives of the Ocean Protection Councils 5-year Strategic Plan	H	O																									Coordinate/advise on Restoration/Protection of Coastal Habitats, making recreational use of coast a priority, increased public awareness of coastal issues	Interagency Coordination
C-2	Expand CSMW membership to obtain expertise and organizational support in order to develop partnerships that will facilitate priority project and regional RSM Plan implementations	H	S																									Reorganization Plan to be unveiled at CWO 06?	Public Education/Forum
C-3	Coordinate with wetlands, port/harbors and flood control agencies to better address sediment supply issues	M	S																									Identify additional inland watershed groups, flood control agencies, and wetland groups; coordinate and transfer information into GIS; Enter AB 64 report watershed and sediment supply information into the GIS.	Interagency Coordination; GIS
C-4	Coordinate with watershed groups/agencies to develop common interests and objectives	M	M																									Coordinate with California Watershed council. Identify local watershed groups for involvement in regional RSM Plans	Interagency Coordination
C-5	Coordinate with agencies involved with sediment contamination and related environmental/public health impacts	M	O																									Coordinate with CSTF/SWRCB/RWQCBs. Determine how best to incorporate contaminated sediment issues into the SMP.	Interagency Coordination
C-6	Coordinate NPDES Program/TMDL standards and the delivery of beach-compatible sediment to the coast	H	O																									High level SWRCB/RWQCBs/USEPA input needed. Assess PPR recommendations.	Interagency Coordination
OUTREACH																													
O-1	Continue educational efforts towards littoral cell management (RSM) in accordance with OPC objectives	H	O																									Increase public awareness of coastal issues through educational workshops, website, develop and issuance of Brochure and Fact Sheets, presentations at conventions and trade group meetings.	Public Education/Forum
O-2	Inform stakeholders on availability and use of educational tools developed to assist in restoration/protection of coastal resources	H	O																									Develop Facts Sheets for each Tool as it becomes available: Beach Restoration Guide; Littoral cells/beach nourishment white paper; Loss of sediment by Dam impoundment; Biological Impact Analysis; Regional Sand and Mud Budgets.	Public Education/Forum
O-3	Develop and implement Communications Plan	M	S																									Incorporate a public outreach component that differentiates between public involvement and local/regional agency involvement, since public concerns may be different than local government.	Project/Study Management
O-4	Expand CSMW's website and support the comprehensive website to be developed for OPC	H	O																									Continue development of Library. Develop searchable database for coastal references compiled to date, and update the database with results from ongoing studies.	Information Collection and Dissemination; Webpage
O-5	Expand the Public Outreach Contact List to include additional government and	H	S																									Wetlands, watershed groups, ports/harbors, NGOs	Interagency Coordination
O-6	Hold additional public outreach workshops once the SMPPR has been developed	M	M																									Workshops one way to get additional input. Includes Informational workshops developed as part of the BIA	Public Education/Forum
PROCESS																													
P-1	Develop time frames for and periodic assessment of sediment management planning issues, including the long-term future	H	S																									3-Year Planning Windows: 1st Window: High/Medium priority efforts- Coordination, Outreach, Beach Nourishment Issues, Statewide GIS development, regional RSM Plans and Tool Development; 2nd (and additional) Window Long Term Timing- contamination, watersheds, sediment behind dams, etc.	Project/Study Management, Regional Sediment Management Plans
P-2	Pursue regulatory adjustments to streamline project approaches	M	M																									Implement relevant PPR Recommendations. Develop a Programmatic EIS/EIR for Beach Nourishment.	Existing State Federal Policies and Permitting, Programmatic EIS
P-3	Assist local/regional entities establish priorities, and coordinate regional strategies for each of the state's coastal regions and littoral cells	H	M																									Define and sequence Regions; establish priorities for RSM Plan development.	Prioritization
P-4	Develop regional RSM plans that emphasize and reflect regional differences across CA	H	S																									Develop prototype plan (Ventura/Santa Barbara) to establish approach for assisting Ports. Followup study to address Wetlands (?). Utilize tools (SCOUP, CBRs) to assess potential sources, locations of need, transport/stockpile development. Funding analysis and procural.	Regional Sediment Management Plans
P-5	Assist resource managers in the regional utilization of sediment resources	M	M																									Educate them on how tools such as SCOUP, Regional Sediment Budgets, Littoral cell/beach nourishment white paper, Beach Restoration Reference Guide, CSBAT, CRSMIS, others can help anticipate and address potential issues.	GIS, Public Education/Forum
P-6	Assist resource managers in ensuring that management activities are protective of natural resources and OPC objectives	M	M																									Educate them as to how Biological Impacts Analyses, Economics of RSM can assist them in resource protection and recreational enhancement through workshops, fact sheets, CDs, website, etc.	Habitat and Biological Impacts
P-7	Assess whether a Coastal Sediment Management Office (CSMO) can/should be set up similar to DMMO	H	M																										Project/ Study Management
P-8	Develop clearinghouses designed to connect entities with excess sediment to groups with sediment need, including scheduled dredge operations and information on problems/solutions for dredge availability.	H	L																									Is this a CSMO Function? Develop Pilot Scale approach? Coordination with CMANC? Help develop a CMANC-like organization for small harbors? CSMW's website include a Bulletin Board?	Project/ Study Management, Interagency Coordination
P-9	Encourage the California Coastal Commission to use a consolidated permitting form similar to that used by the DMMO and RWQCB	L	O																									Need details.	Policies, Procedures, and Regulations
P-10	Explore the legal concept of "sand rights" as a mechanism to facilitate sediment management	L	L																										Sand Rights

SEDIMENT MASTER PLAN STATUS REPORT
Next Steps: Tasks and Schedule

ID NO.	TASK	Priority	Timing	2006				2007				2008				2009				2010				2011				INITIAL EFFORTS	PMP TASK
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
TECHNICAL																													
T-1	Develop list of critically eroding areas to establish project priorities for the next 5-10 years	H	S																									CBRes Report. Refine priorities at the regional level based on economic, environmental and cultural benefits and costs	Prioritization, Hot Spots
T-2	Establish a number of nearshore disposal sites, near critical erosional areas, for placement of beach fill materials	H	M																									Ocean Beach prototype, need to monitor onshore movement of material. Identify other plausible locations (Ventura/Santa Barbara?) Work with EPA on permitting.	Nearshore Sediment Compatibility
T-3	Develop statewide repository of spatial information (GIS) for use by resource managers	H	S																									Two levels of information needed- Statewide general data for liaison between watersheds and oceans, and detailed regional information to support regional RSM plans	GIS/Web-base mapping
T-4	Continue studies to determine coastal processes in coastal California	M	O																									Catalogue and georeference physical processes causing and physical barriers to sediment transport along the coast. Coast of California information needed along Humboldt/Del Norte and central California coastlines.	GIS/Regional Sediment Management Plans
T-5	Continue refinement of GIS-based Decision Support Tools that utilize the spatial data to help decision makers optimize sediment management.	H	M																									Populate the Coastal Sediment Analyst Tool and the Spatial Data Library to help identify/resolve issues for regional RSM Plan development and other sediment management activities.	GIS; Regional Economics
T-6	Identify onshore source materials physically compatible with and economically viable for beach nourishment.	H	M																									Obtain, compile and georeference information from wetlands, port/harbors, debris basins, retention structures, drop structures, dams, construction projects for each regional RSM plan	Sand Sources/ Natural Composition of Beaches
T-7	Identify and define offshore deposits that may be physically compatible and economically viable for beach nourishment.	M	M																									Incorporate Scripps research on pull-apart zones offshore of San Diego County, OPC's and CalTrans/CGS's Seafloor Mapping Projects, usSEABEDm MMS data	Sand Sources, Offshore
T-8	Sponsor workshops to develop science-based approaches to minimizing impacts to Biological Resources	H	M																									Will be conducted to communicate findings of the Biological Impacts Study	Habitat and Biological Impacts, Public Education/Forum
T-9	Coordinate with sea-floor mapping projects to ensure products address regional sediment needs to the extent practicable	M	O																									Ensure that the USGS, SCC, CGS/CalTrans, and others findings are depicted in a consistent manner to facilitate sediment management decision-making	Habitat Mapping
T-10	Help facilitate long term solutions to Sediment Management such as bypassing around dams, removal of developments/setback policies for floodplains, and restoration of natural creek environment	L	L																									Develop guidelines? Coordinate on case-by-case basis? Rather than recommend specific programs, provide information on a full range of sediment concerns to that specific approaches can be undertaken in regional programs?	Sand Sources, Dams and Debris Basins and Opportunistic Sources/Projects
T-11	Research the impact of Sand and gravel operations on the availability of beach sand	M	L																										Sand Sources, Manufactured (sand & gravel mines)
T-12	Develop studies to determine how large wood debris affects sand retention in streams, coastlines and estuaries	L	L																										Physical Processes
T-13	Identify areas for improved data collection from permits	M	M																										Regional Sediment Management Plans, Opportunistic Sand Sources/Projects
T-14	Develop final Littoral cell budgets, mud budgets and impact of physical barriers and sea level change	M	L																										Regional Sediment Management Plans, Physical Processes
T-15	Support modifications to CEQA defining changes in coastal sediment delivery to the littoral zone by an upstream project as a significant impact	H	O																										Policies, Procedures, and Regulations
T-16	Investigate how to move sediment across a watershed to the coast without it	L	L																										Physical Processes
T-17	Develop Water Quality Issues, Parks, Day Use, Tourism, Attendance Record,	M	M																										Recreation
T-18	Categorize coastal watershed property ownership according to five ownership	L	L																										Real Estate
T-19	Identify non-fluvial transportation alternatives (barges,trucks,pipelines,etc.); develop criteria for selecting sediment transportation mode(s) for a specific project.	L	L																										Transportation
T-20	Conduct a pilot-scale project that applies regional use of beach compatible sediments in a beneficial manner.	H	M																										Regional Demonstration Project
T-21	Review of documents and preparation of comments by members of USACE's Technical Review Team as required by various study milestones.	L	O																										Technical Review
Funding																													
F-1	Investigate funding mechanisms to facilitate coastal sediment management, including data, planning, implementation, and monitoring	M	O																									Dedicated source of funds for beach restoration and incremental costs associated with regional use of sediment is needed	Funds
F-2	Investigate continued funding from member agencies for coordination activities, periodic SMP updates and carrying the SMP program into the future	M	O																									CSMO Function?	Funds

Appendix D List of Acronyms

AB-64	Assembly Bill 64 (Public Beach Restoration Act)
BEACON	Beach Erosion Authority for Clean Oceans and Nourishment
BIA	Biological Impacts Assessment
BRRG	Beach Restoration Reference Guide
CalCoast	California Coastal Coalition
CBReS	California Beach Restoration Survey
CCC	California Coastal Commission
CDIP	California Data Information Program
CEQA	California Environmental Quality Act
CGS	California Geological Survey
CMANC	California Marine and Navigation Council
COPC	California Ocean Protection Council
CRA	California Resources Agency
CRSMIS	California Regional Sediment Management Information System
CSBAT	Coastal Sediment Benefits Analyst Tool
CSM	Coastal Sediment Management
CSMO	Coastal Sediment Management Office
CSMW	Coastal Sediment Management Workgroup
CWO	California and the World Ocean Conference
DBW	Department of Boating and Waterways
DFG	Department of Fish and Game
DMMO	Dredge Materials Management Office
DPR	California Department of Parks and Recreation
DST	Decision Support Tool
GIS	Geographic Information System
IMS	Internet Mapping System
ITM	Inland Testing Manual
MMS	U.S. Mineral Management Service
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PMP	Project Management Plan
PPR	Policies, Procedures and Regulations
RSB	Regional Sediment Budget
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
SLC	California State Lands Commission
SMP	Sediment Master Plan
TMDL	Total Maximum Daily Load

UC	University of California
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

Appendix E

Glossary

Acre-foot – The quantity of water required to cover 1 acre to a depth of 1 foot, equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Backshore – The upper part of the active beach above the normal reach of the tides and wave run-up (high water), but episodically affected by high waves occurring during a spring high tide.

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

Bedload – The material moving on or near the streambed by rolling, sliding, or briefly moving into the flow of water just above the streambed.

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.

Discharge – The volume of water or total fluid plus suspended sediment that passes a given point within a given period of time.

Downdrift (or downcoast) – In California, typically refers to southward direction of littoral drift.

Drainage area – The area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point.

Drainage basin – The area that is occupied by a drainage system, which consists of a surface stream or body of impounded surface water, together with all tributary surface streams and bodies of impounded surface water.

El Niño/Southern Oscillation (ENSO) - A pattern of large-scale oscillations of a number of oceanic and atmospheric variables (sea surface temperature, sea level pressure, etc.) in the Tropical Pacific. The oscillation switches phase in a 3-5 year cycle. El Niño and La Niña refer to extreme phases of this oscillation.

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.

Foreshore – The beach area between approximately Mean Higher High Water and Mean Lower Low Water.

Instantaneous discharge – The discharge at a particular instant in time.

Less-than-Optimum beach fill material – Material that is not compatible in grain size with sand at the dry beach, but is compatible with material within the nearshore portion of the receiver site. The fines fraction should be within 10% of that of the existing nearshore sediments that exist along a profile.

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

Littoral drift – Entrained sand grains moving in the direction of the longshore current. Can be thought of as a river of sand moving parallel to the shore, moving the sand from one coastal location to the next until the sand is eventually lost to the littoral system.

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

Mean discharge – The arithmetic mean of individual daily mean discharges during a specific period.

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.

Optimum beach fill material: Material compatible with the dry beach portion of the beach profile. The fines fraction of the grainsize of this material can be within 10% of that of the existing dry beach sediments.

Pacific decadal oscillation (PDO) - A pattern of atmospheric and oceanic conditions of the north Pacific Ocean. It is characterized by sea surface temperature (SST) anomalies of one sign in

the north-central Pacific and SST anomalies of the opposite sign to the north-eastern Pacific (Aleutians and Gulf of Alaska). The cycle is a multi-decadal, with each phase (warm or cool) lasting 20-30 years.

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.

Sediment discharge – The rate at which the dry mass of sediment passes a section of a stream.

Sediment load – The total sediment being transported as bedload and suspended load, expressed in terms of mass or volume (tons, m³, etc.)

Sediment yield – The quantity of sediment that is produced per unit area and time

Suspended load – Sediment that is moved and maintained in suspension in water by the upward components of turbulent currents or by colloidal suspension.

Updrift (or upcoast) – In California, typically refers to northward direction of littoral drift.

Water year – The 12-month surface water record that starts October 1 and ends September 30 of each year; designated by the calendar year in which it ends.