

**CALIFORNIA OCEAN AND COASTAL
INFORMATION, RESEARCH, AND OUTREACH
DRAFT STRATEGY**

I. INTRODUCTION

Science should be the foundation of ocean and coastal management and policy; however, poor communication often leads to a lack of sufficient information available to decision-makers. In many cases, the information needed by decision-makers exists, but is not easily accessible. Better dissemination of information is needed to improve the management of California's ocean and coastal resources. New research initiatives are necessary when information is not available. Science-based management and policy is critical to making informed decisions that balance human needs with the protection of ocean and coastal resources.

California's ocean action plan, *Protecting our Ocean: California's Action Strategy*, calls on the California Ocean Protection Council to develop a state-wide ocean and coastal information, research, and outreach strategy (Action 4). This strategy will help the council fulfill the mandate of the California Ocean Protection Act (COPA). COPA directs the state to improve monitoring and data gathering and advance scientific understanding to continually improve efforts to protect, conserve, restore, and manage coastal waters and ocean ecosystems. Specifically, COPA requires the council to establish policies to coordinate the collection and sharing of scientific data related to coastal and ocean resources.

The strategy will help the council address the guiding principles and requirements established in COPA including: sustainability, ecosystem health, precaution, recognition of the interconnectedness between land and ocean, decisions informed by good science and improved understanding of coastal and ocean ecosystems, and public participation in decision-making.

II. STRATEGY GOAL AND OBJECTIVES

The goal of this strategy is to encourage and support information, research, monitoring, and outreach programs that are of clear benefit to the people of the state of California and that address key ocean and coastal resource management, policy, science, and engineering issues that face the state. This goal shall be achieved by the state of California by pursuing the following objectives:

- ❖ **Information.** Provide improved access to available information necessary to support ocean and coastal protection and management.
- ❖ **Research and Monitoring.** Identify the most critical ocean and coastal research needs for the state of California and pursue the most efficient and effective

methods to increase research funding and data accessibility. Continue California's leadership in ocean and coastal monitoring programs established over the past 50 years and seek to improve, sustain, and expand these programs.

- ❖ **Outreach.** Coordinate outreach efforts with federal, state, and local agencies, academia, industry, and the non-governmental community to engage all Californians in the protection of California's ocean and coast.

This strategy provides a framework for the council to achieve the stated goal and objectives by recommending initial actions for the council (Section III), establishing a policy for state funded research (Section IV), and identifying ocean and coastal information, research, and outreach needs (Sections V and VI).

III. RECOMMENDATIONS FOR COUNCIL ACTION

Recommendation 1. Refine ocean and coastal information, research, and outreach priorities.

Council staff partnered with the California Sea Grant College and Extension Programs, the University of California Marine Council (UCMC), the California Ocean Science Trust (CalOST), and the Resources Agency to co-sponsor a workshop to identify California's ocean and coastal information, research, and outreach needs. Over 60 participants from academia, government agencies, non-governmental organizations, and industry attended. A suggested set of information, research, and outreach priorities, based in part on this workshop, is presented for consideration in this draft strategy. These priorities will be further refined with the assistance of CalOST and other partners. CalOST was established pursuant to the California Ocean Resources Stewardship Act of 2002 with the goal of improving the application of science to California's pressing coastal and ocean management challenges. This entity, which includes members from industry, academia, government agencies, and non-governmental organizations, has offered their services as an advisory group to the council and is well suited to help the council refine these priorities.

- ❖ ***Suggested council action.*** *The council should work with the California Ocean Science Trust to help coordinate a review of this draft information, research, and outreach strategy. This review will focus on refining the information, research and outreach priorities and determining the best ways to implement them. Key components of the review would be seeking the views and expertise of all the Trustees and requesting the Trust to seek public comment on the draft strategy at their upcoming meeting in July.*

Recommendation 2. Make California's ocean observation system a national model.

California began making systematic offshore observations as part of the California Cooperative Oceanic Fisheries Investigations (CalCOFI) over 50 years ago. A high priority of the Governor's ocean action plan is to develop a strategic plan for the full operation of an integrated ocean observation system for California (Action 8). California has provided an unprecedented investment of \$21 million to develop a coastal currents monitoring system, which is an important step in creating an integrated ocean observation system. California is now working to better coordinate the efforts of existing systems, address critical gaps, and improve operations and the delivery of information to users. These systems, when fully operational, will be used to support oil spill cleanup operations, fisheries and water pollution analyses, and search and rescue operations.

- ❖ ***Suggested council action.*** *The council should urge the National Oceanic and Atmospheric Administration to fund California's integrated ocean observation system as the first national pilot program in ocean observations.*

Recommendation 3. Seek federal involvement and assistance.

Both the U.S. Commission on Ocean Policy and the Pew Oceans Commission have called for the development of a national strategy for increasing scientific knowledge of coastal and ocean resources. Coastal states need improved ways to access information that currently resides within federal agencies, influence the research and monitoring sponsored by these agencies, and facilitate dissemination of this information. The U.S. Ocean Action Plan calls on the Joint Subcommittee on Ocean Science and Technology under the President's new Committee on Ocean Policy to develop a national ocean research priorities plan and implementation strategy. California, and other coastal states, need to ensure that their information and research needs are included in this national plan.

- ❖ ***Suggested council action.*** *The council should write the Chairs of the President's Committee on Ocean Policy and Joint Subcommittee on Ocean Science and Technology to determine how California and other coastal states can provide input into the development of this national plan, and obtain improved access to federal funding and assistance. In addition, California should continue to advocate for the U.S. Commission on Ocean Policy's recommendation to double the national ocean and coastal research budget.*

Recommendation 4. Make research part of the council's funding strategy.

The council will receive funds from a variety of sources to meet the requirements of the California Ocean Protection Act. Some of these funding sources, such as bond funds, will not be eligible to support research and monitoring activities because bond funds can only be used to support infrastructure. However, other sources of funding such as the

Environmental License Plate Fund, State Tidelands Revenues, the General Fund, or support from non-profit groups and philanthropic interests could provide funds applicable to research and monitoring activities.

- ❖ ***Suggested council action.*** *The council should establish a firm commitment to fund research and monitoring activities that support management. The council should also seek to identify partnerships for these investments to maximize matching funds and to obtain in-kind services to maximize any investments made in research initiatives.*

Recommendation 5. Launch a California ocean and coastal web information portal.

California needs an up-to-date center for all information on the state's ocean and coastal resources. The Resources Agency currently hosts the California Ocean and Coastal Environmental Access Network (CalOcean). However, this system has become outdated, and the Governor's ocean action plan calls for this system to be revitalized (Action 9). Outside funding is currently being sought to begin this process; however, additional funding from the council will be necessary to complete this project. The revitalized CalOcean will provide a primary tool for identifying data sources, research, management, and regulatory programs, and other programs to support the management and protection of California's ocean and coastal resources.

- ❖ ***Suggested council action.*** *The council should partner with other organizations providing ocean and coastal web information centers in California and commit funding to revitalize the California Ocean and Coastal Environmental Access Network (CalOcean).*

Recommendation 6. Incorporate ocean and coastal education into K-12 curriculum.

Teaching children about the ocean and coast and the fundamentals of science is critical to fostering good stewards of our ocean and coastal resources. Incorporating these principles into K-12 curriculum is essential to connecting with the next generation of ocean stewards. The Governor's ocean action plan calls on the council to ensure that ocean and coastal education is included in the environmental principles and concepts being developed pursuant to the implementation of the Education and the Environment Initiative (Pavley, Chapter 665, Statutes of 2003, AB 1548). The council will be briefed on the progress of the Education and the Environment Initiative at their June 10, 2005 meeting.

- ❖ ***Suggested council action.*** *The council should continue to actively participate in the Education and the Environment Initiative process to ensure that the important principles and concepts of ocean and coastal science are included in the K-12 environmental education model curriculum.*

Recommendation 7. Build a joint public outreach strategy in cooperation with National Oceanic and Atmospheric Administration (NOAA), the Consortium for Oceanographic Research and Education (CORE), Sea Grant Extension, and others.

The state of California and NOAA's National Marine Sanctuary Program have assembled an alliance of California ocean communicators, a network of professionals with expertise in communicating ocean and coastal issues. The Ocean Communicators Alliance will work with government agencies, academia, industry, and non-government organizations to launch an ocean and coastal stewardship media campaign.

The Consortium for Oceanographic Research and Education and the Aquarium of the Pacific are convening a group of scientists to develop a portfolio of information that every citizen should know to be considered "ocean literate." This effort will take advantage of the work that has been done for K-12 teachers and students by the Centers for Ocean Sciences Education Excellence and the National Marine Educators Association.

The Sea Grant Extension Program has a unique network of Marine Advisors and Specialists throughout the state. The Marine Advisors and Specialists conduct applied research and deliver science-based education to coastal residents and resource managers. They use a variety of extension education models including individual consultations, issue focused workshops, and larger conferences to disseminate information and create educational opportunities.

Suggested council actions

- ❖ *The council should work with NOAA's National Marine Sanctuary Program and the Ocean Communicators Alliance to launch an ocean and coastal stewardship media campaign at the next California and the World Ocean Conference being planned for September 2006.*
- ❖ *The council should partner with the Consortium for Oceanographic Research and Education and the Aquarium of the Pacific to extend their ocean literacy effort throughout California.*
- ❖ *The council should use California Sea Grant Extension Program's statewide network of Advisors and Specialists to help facilitate information sharing to apply the best available science to the development of sound policy and resource management.*

IV. POLICY FOR STATE FUNDED RESEARCH PROJECTS

The state of California should establish funding guidelines for ocean and coastal research initiatives so that all research funded by the state meets California's ocean and coastal management needs. The following policy should be used in all decisions to use state funds for ocean and coastal research.

Policy: The state of California will support the acquisition of information or the initiation of new research that addresses or substantially contributes to management, protection, conservation, or restoration of the state's coastal and ocean resources. These endeavors must support the mandatory provisions of the California Ocean Protection Act and be consistent with the actions contained within Governor Schwarzenegger's ocean action plan.

Research projects funded by the state must:

- Provide a clear research objective, demonstrate the use of sound scientific methods and experimental design, and specify the anticipated product.
- Demonstrate how the project can assist, complement, or augment the work of government agencies or private sector interests in their efforts to manage, protect, conserve, or restore coastal or ocean resources.
- Be supported by, prepared in cooperation with, or of expressed interest to a public or private agency or association involved with the management, protection, conservation, or restoration of coastal or ocean resources.
- Promote or be of discernible benefit to current or future generations.

V. INFORMATION AND RESEARCH NEEDS

There are many ways to organize California's information and research needs. After consultation with the various partners in this effort, the ocean and coastal information and research needs have been organized into the following five broad categories. The priority information and research needs in each of these categories are identified in their respective sections below.

- Fisheries and Aquaculture
- Ecosystems and Habitats
- Coastal Hazards and Shoreline Processes
- Water and Sediment Quality
- Invasive Species

Several cross-cutting information and research needs can be applied to several or all of these topic areas. These cross-cutting needs are ocean observations, monitoring, seafloor mapping, and socio-economics.

Fisheries and Aquaculture

Information and research in the following areas are needed to help managers address the declines in many of California's fisheries, to preserve marine biodiversity, and to promote sustainable and efficient aquaculture practices.

- Implement ecosystem-based fisheries management.
- Gather more information on single species.
- Develop networks of marine protected areas.
- Develop sustainable aquaculture practices.
- Improve communication, collaboration, and conflict resolution among user groups.

Ecosystems and Habitats

Information and research in the following areas is needed to protect and restore ocean and coastal ecosystems and habitats.

- Improve understanding of ecosystem structure and function.
- Identify, protect, and restore critical habitats.
- Improve understanding of human behavior and decision-making.
- Study the impacts of sound on marine life.

Coastal Hazards and Shoreline Processes

The following information and research is needed to better identify, predict, and respond to coastal hazards and improve the management of California's shoreline.

- Study sediment changes and impacts.
- Improve coastal hazard identification and forecasting.
- Conduct legal and public policy analyses.
- Develop coastal hazard response strategies.
- Study the threat of tsunamis.

Water and sediment quality

Information and research in the following areas are needed to improve water and sediment quality in California and reduce risks to human health.

- Determine the impacts of non-point source and storm water pollution.

- Develop baseline health indicators.
- Identify sources of pollutants.
- Conduct risk assessment for emerging contaminants.
- Develop strategies to improve sediment management.
- Improve non-point source and storm water pollution control technologies, remediation, and mitigation.

Invasive Species

Information and research on invasive species is needed to prevent introductions, detect new invaders, eradicate successful invaders, and control established non-native species.

- Expand prevention strategies for invasive species.
- Develop a state-wide invasive species detection protocol.
- Develop a more science-based eradication approach.
- Support research and development to control the spread of invasive species.

Cross-cutting needs

The following information and research priorities are needed in several to all of the above categories.

- Develop an integrated ocean observation system.
- Improve, sustain, and expand monitoring programs.
- Complete seafloor mapping of high-priority areas in state waters.
- Gather and utilize socio-economic data.

VI. OUTREACH NEEDS

Outreach efforts in the following areas are needed to engage all Californians in the protection of California's ocean and coastal resources.

- Improve communication between scientists, managers, stakeholders, and policy-makers.
- Incorporate ocean and coastal education and science literacy into K-12 curriculum.
- Support informal educational opportunities to connect with underserved groups.
- Promote ocean and coastal stewardship.
- Support web-based information centers.
- Support programs that promote future ocean leaders and their professional development.



About OSPR



The **Office of Spill Prevention and Response** (OSPR), within the Department of Fish and Game (DFG), is the lead State agency for marine and off-highway inland oil spill prevention and response in California.

The **Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990** (Act) established the OSPR and provides the OSPR Administrator, who is appointed by the Governor, with substantial authority to direct spill response, cleanup, natural resource damage assessment and restoration.

OSPR's mission is to provide the best achievable protection of California's natural resources by preventing, preparing for, and responding to spills of oil and other deleterious materials, and by restoring and enhancing natural resources affected by spills.

As **both a prevention and response** organization, the OSPR has the DFG's public trustee and custodial responsibilities for protecting, managing and restoring the State's fish, wildlife, and plants. It is one of the few State agencies in the nation that has both major pollution response authority and public trustee authority for wildlife and habitat. This ensures that prevention, preparedness, response and restoration will provide the best protection for California's natural resources.

California's Oil Spill Contingency Plan, prepared by the OSPR, describes spill response roles and outlines the OSPR's relationship to other agencies.

Responsibility for prevention is shared with agencies represented on the State Interagency Oil Spill Committee (SIOSC). The OSPR Administrator chairs SIOSC and keeps 22 other State agencies informed through that committee.

MARINE SAFETY BRANCH (MSB)

Part of OSPR's comprehensive program is the requirement that all marine facilities, vessels carrying petroleum as cargo, and all vessels over 300 tons have oil spill contingency plans. The MSB developed the State oil spill contingency plan and reviews and approves all other spill response plans.

The MSB works closely with the U.S. Coast Guard (USCG) to develop Area Plans, pursuant to the Federal Oil Pollution Act of 1990. MSB staff co-chair federal committees for all six USCG planning areas of the State. The OSPR supports a strong working relationship between state, federal, and local contingency planners to maintain plan compatibility and spill preparedness throughout California.

The MSB and USCG analyze vessel traffic routing and other safety measures to reduce marine casualties and pollution incidents off California's coast. OSPR brought on-line and funds a Vessel Traffic Information Service system for Los Angeles and Long Beach Harbors. This monitoring and communications system now includes vessels in Santa Monica Bay.

To increase spill prevention measures, the OSPR has created and funded Harbor Safety Committees for the State's five busiest ports. OSPR assists these committees in developing and refining harbor safety plans to reduce the risk of accidents near major harbor facilities. Jointly with other OSPR units, MSB staff completed a statewide Coastal Protection Review, which identified especially sensitive sites and refined response strategies for all coastal locations.

The MSB staff consists mainly of Oil Spill Prevention Specialists (OSPS). These professionals possess technical backgrounds essential to the OSPR's prevention and response work, such as monitoring oil transfers, advising Harbor Safety Committees, and supporting the Small Craft Refueling Dock Program. At spills they provide technical assistance with regard to initial site safety issues, determination of cause, procedures to slow and stop additional releases, and product recovery, quantification, and disposal.

The drills and exercises program tracks and evaluates drills required by the contingency planning regulations. MSB staff design and evaluate all types of announced and unannounced drills with facility and vessel owner/operators and oil spill response organizations, in coordination with the USCG. They also participate in drills as players or controllers.

REGULATIONS UNIT

The OSPR Regulations Unit writes spill prevention regulations, tug escort requirements, and oil spill contingency requirements. The Regulations staff also review and comment on federal oil spill legislation and regulations, and deal with admiralty issues. Once written, State regulations are submitted to the Office of Administrative Law for approval. The OSPR Regulations Unit holds public hearings, works with the SIOSC and Technical Advisory Committee, and provides a representative for the Pacific States/British Columbia Oil Spill Task Force. Regulations and MSB staff serve as Liaison Officers during oil spill response, keeping public officials informed of the situation and related activities.

SCIENTIFIC BRANCH

OSPR's Scientific Branch directs and studies the scientific aspects of oil spill prevention, response, and restoration. This responsibility includes natural resource assessment, environmental sensitivity mapping, protecting and minimizing injuries to natural, cultural, and economic resources; cleanup methods and technologies, assessment of spill impact on natural resources, veterinary expertise, research, and wildlife care; and identification of the sources of spilled oil for enforcement actions. These activities are carried out by the Resource Assessment, Response Technology Development, Field Services and Veterinary Services Units, and five analytical support laboratories.

The five laboratories are: the Petroleum Chemistry Lab (PCL), the Fish and Wildlife Water Pollution Control Lab, Moss Landing Marine Lab, Granite Canyon Pollution Lab, and the Pesticide Investigation Unit and Aquatic Toxicology Laboratory.

OSPR's PCL is a state-of-the-art facility where chemists can identify the type and origin of oil spill samples. This is a key component of the investigation and prosecution of pollution incidents. The Water Pollution Control Lab, Pesticide Investigations Unit and Aquatic Toxicology Lab, and Marine Pollution Studies Lab also support the OSPR mission.

The Geographic Information System (GIS) laboratory staff protects biological, cultural, and socio-economic resources of the marine environment by collecting, compiling, analyzing, maintaining, and displaying marine resource data.

The Scientific field staff has identified over 400 ecologically sensitive sites along the coast, and — with industry and the USCG — develop oil spill response strategies to protect them. The Field Services units also provide essential staff for the ICS Planning Section during spill response, providing early natural resource injury data and recommendations for response and cleanup.

Natural Resource Damage Assessments are conducted by a team that includes a toxicologist, a natural resource economist, legal counsel, and environmental scientists. Following a spill, the Resource Assessment team evaluates the injury to natural resources, identifies appropriate restoration projects, monitors results, and sees that injured resources and uses are fully restored. With other natural resource trustee agencies, they solicit public input on restoration projects through the Internet, news media, and public meetings.

The OSPR and UC Santa Cruz operate the nation's first permanent marine wildlife rescue center specifically designed to protect California's endangered sea otter population, and marine birds and mammals injured in oil spills. The Marine Wildlife Veterinary Care and Research Center is one of twelve facilities that may be used by the Oiled Wildlife Care Network, a statewide network of facilities for the care and treatment of oiled wildlife. The OWCN is funded by OSPR and managed by UC Davis.

Working through the Oiled Wildlife Care Network, the OSPR has established a competitive grants program that supports focused research into the effects of oil on wildlife; improvements in the cleaning and care of oiled wildlife; telemetry, follow-up studies, survey methods and preventive procedures. A request for proposals is put out internationally, each year, and proposals are judged on merit by an independent scientific advisory committee.

LEGAL UNIT

The OSPR legal staff provides confidential advice to the Administrator regarding regulatory issues, Natural Resource Damage Assessments, statutory interpretation, litigation, and administrative civil penalties. Most specialize in environmental or maritime law. They coordinate with the State Attorney General's Office and County District Attorneys to enforce civil and criminal statutes contained in the OSPR Act and Fish and Game Code, and serve on Natural Resource Trustee Councils following oil spill settlements.

ENFORCEMENT PROGRAM

OSPR enforces laws that prevent oil spills, dispatches personnel, and investigates both marine and inland spills. While most of our work is with oil spills, we also respond to spills of other toxic or hazardous materials that threaten wildlife and habitat.

Fish and Game Wardens are sworn peace officers with the authority to enforce both criminal and civil statutes. Wardens conduct spill investigations, and gather and prepare evidence that is essential to any court case. They follow a strict chain-of-control protocol to collect spill samples and transport them to the Petroleum Chemistry Laboratory for fingerprinting. The cases they build against polluters are given to OSPR attorneys, who use that material either in settlement talks with the responsible party or to court.

During spill response, the State On-Scene Coordinator (SOSC or Incident Commander) is usually an OSPR Warden. S/he represents the State of California in the Unified Command, and all State spill responders answer to the SOSC. The OSPR Enforcement Branch received more than 6,400 spill reports in 2003.

FINANCIAL RESPONSIBILITY

The Financial Responsibility Unit ensures that vessel and facility owners/operators are able to pay for the cleanup and damage costs of an oil spill that could occur from their vessel or facility.

Tankers and barges that transport oil in bulk, and non-tank vessels over 300 gross tons that transit State marine waters, as well as marine terminals, marine fuel docks, offshore facilities, pipelines and mobile transfer units must obtain a Certificate of Financial Responsibility (COFR) to operate in California.

Tankers and large Marine barges (150,000 barrels or more capacity) must demonstrate financial responsibility in the amount of \$1 billion.

Facilities and non-tank vessels must demonstrate coverage of up to \$300 million, and small barges are assessed at 30 percent of the maximum cargo capacity.

HEALTH AND SAFETY

The Health and Safety Unit ensures a safe and healthful work environment for all OSPR employees. This unit's program conforms to all applicable occupational health and safety standards required by State and federal laws. Staffed by Industrial Hygienists, the unit conducts air monitoring and assesses biological, chemical and physical hazards in the office, field, and laboratory work environments. They often serve as the Unified Command's Safety Officer at oil spills.

PUBLIC AFFAIRS / EDUCATION OUTREACH

Small craft refueling docks are exempt from many of the Act's requirements, but they are still liable for any spills. Fuel dock operators must register with OSPR every two years, and may have their facilities and operations reviewed by an Oil Spill Prevention Specialist, if they wish to learn how they could decrease their spill risks.

The Education Outreach Program (in the Public Affairs unit) registers small craft refueling docks and provides them with information about proper refueling operations, regulations, reporting procedures and spill clean-up.

The Education-Outreach Coordinator serves on the California Clean Boating Network, Pacific Oil Spill Prevention Education Team, and Coastal Commission's Boating Clean & Green campaign Advisory Board. S/he also provides outreach support to all five Harbor Safety Committees, as needed.

The Public Affairs unit writes, designs and publishes informational brochures and *The OSPR News*. At spills, they work in the Joint Information Center, providing incident details to the news media.

VOLUNTEER PROGRAM

The OSPR Volunteer Program allows concerned citizens to assist in certain aspects of oil spill response and clean-up. This program has established protocols for the recruitment and training of a corps of volunteers that can respond immediately to oil spills along California's coast.

For more information, visit the OSPR pages of the
Department of Fish and Game web-site: www.dfg.ca.gov/ospr

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ENVIRONMENTAL SENSITIVITY INDEX (ESI) MAPS

Fact sheet



Background:

Environmental Sensitivity Index maps serve as quick references for oil and chemical spill responders and coastal zone managers. They contain three kinds of information:

- Shoreline Rankings - Shorelines are ranked according to their sensitivity, the natural persistence of oil, and the expected ease of cleanup.
- Biological Resources - Oil-sensitive animals, as well as habitats that either (a) are used by oil-sensitive animals, or (b) are themselves sensitive to spilled oil
- Human-Use Resources - Resources and places important to humans and sensitive to oiling, such as public beaches and parks, marine sanctuaries, water intakes, and archaeological sites.

The maps include summary information on the spatial distribution of biological resources that may be sensitive to spilled oil or chemicals.

Project Objective:

- Revise and update the existing Central California ESI maps and digital data. Existing ESI maps are approximately 10 years old. The Central California ESI maps will consist of 41 maps covering the geographic region from Point Conception to Point Reyes and extend seaward to the offshore boundary of the Monterey Bay National Marine Sanctuary (MBNMS).

Participating Funding Agencies

- National Oceanic and Atmospheric Administration
Monterey Bay National Marine Sanctuary
- California Department of Fish and Game
Office of Spill Prevention and Response



ESI Atlas Development:

- ESI shoreline classification
- ESI digitization
- Biological and Human-Use data collection
- Biological and Human-Use data digitization
- Metadata creation
- Atlas creation

Project Status:

- Aerial overflight to update ESI shoreline classification was flown April 2005
- Interviews and data collection from cooperating biological and human-use resource experts conducted May 2005

Future Project Direction:

- Seek funding partners to complete N. California, S. California, and San Francisco Bay ESI maps

Additional Resources:

- California project overview
 - <http://www.cwo.com/~rimai/>
- Detailed national ESI project
 - <http://response.restoration.noaa.gov/esi/esiintro.html>
- Participating organizations
 - <http://www.mbnms.nos.noaa.gov/>
 - <http://www.dfg.ca.gov/ospr/>

Managing California's Coastal Sediments

"The Coastal Sediment Management Workgroup"

MISSION

The mission of the Coastal Sediment Management Workgroup (CSMW) is to facilitate regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through federal, state and local cooperative efforts.

GOALS

In support of this mission, the goals of the group are to:

- Coordinate California's coastal beach and watershed restoration, protection and enhancement efforts with local, state and federal stakeholders and programs;
- Better coordinate coastal sediment management and beach nourishment activities with related ongoing coastal watershed management, habitat restoration and protection, water quality enhancement, resource sustainability, and urban waterfront planning efforts;
- Increase awareness of state and federal coastal beach and watershed protection, restoration and enhancement policies, programs and activities among local and regional governments; and
- Prioritize sediment needs and opportunities, make such information available to resource managers and the public, and identify opportunities to streamline regional sediment management activities in California by developing a comprehensive "Sediment Management Plan".

BACKGROUND

The California Coastal Sediment Management Workgroup (CSMW) was established by the U.S. Army Corps of Engineers (Corps) and the California Resources Agency (Resources Agency) in 1999 to develop regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through federal, state and local cooperative efforts.

The CSMW is the first state and federal partnership developed in California for on-going, multi-agency interaction on statewide coastal sediment management issues. Until the CSMW was formed, the Corps, Resources Agency, regional government agencies and local coastal communities separately conducted studies, beach nourishment, harbor maintenance, habitat restoration and other efforts.

The CSMW was formed in response to concerns voiced at a meeting between the Resources Agency and Corps on shore protection needs in California. The consensus was that coastal sediment management is a key factor in developing strategies to conserve and restore California's coastal beaches and watersheds.

OPERATION

The Corps participates in the CSMW as the federal agency with the mission, authority and capability to assist in managing and restoring coastal shorelines, wetlands, and watersheds. In addition, the Corps has lead federal authority for flood control, ecosystem restoration and navigation activities that provide systematic coastal sediment management linkages. The Los Angeles, San Francisco and South Pacific Divisions all participate in the CSMW.

The Resources Agency participates as the state "superagency" that oversees conserving, enhancing and managing California's natural and cultural resources, including coastal beaches, coastal watersheds and the ocean ecosystem. Resources Agency member groups include the Ocean Resources Management Program, Department of Boating and Waterways, Department of Park and Recreation, California Coastal Commission, State Lands Commission, State Coastal Conservancy, California Geologic Survey and Department of Fish and Game.

The California Coastal Coalition (CalCoast) is a non-profit organization comprised of cities, counties and regional government agencies along the coast. CalCoast advises the CSMW with local feedback and updates regarding projects and studies underway in coastal communities.

The entities that participate in an advisory capacity include the federal Minerals Management Service, U.S. Geological Survey, and the California Department of Transportation (CalTrans).

COASTAL SEDIMENT MANAGEMENT PLAN

The CSMW is overseeing the development of the California Coastal Sediment Management Plan (SMP). The SMP will identify and prioritize regional sediment management needs and opportunities along the California coast, provide this information to resource managers and the general public, and streamline sediment management activities. Such issues may include coastal erosion, recreational opportunities, dredging and sediment flow through coastal watersheds.

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Education and the Environment Initiative



Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003)

FACT SHEET

Background

In October 2003, former Governor Gray Davis signed into law AB 1548, a bill authored by Assemblymember Fran Pavley and sponsored by Heal the Bay, which was designed to build on the early successes achieved by the Integrated Waste Management Board in implementing SB 373 (Torlakson, Chapter 926, Statutes of 2001). This new law mandated the development of a unified strategy to bring education about the environment into California's K-12 schools.

This landmark law, now referred to as the *Education and the Environment Initiative* (EEI), provides a comprehensive framework for bringing environment-based education to students across California's primary and secondary schools. The major components of this "unified education strategy" include:

- Development of California's first ever environmental principles and concepts;
- Design, development and dissemination of a standards-based model curriculum to teach the environmental principles and concepts to students in kindergarten through 12th grade;
- Incorporation of the environmental principles and concepts into the State Board of Education's criteria for textbook adoption in science, mathematics, English/language arts, and history/social science; and,
- Reorientation of the state's existing environmental education programs to support the learning of the environmental principles and concepts.

Who's Involved

The California Environmental Protection Agency and the California Integrated Waste Management Board lead and are actively engaged in the implementation of the *Education and the Environment Initiative* (EEI). This work is occurring in close collaboration with California's State Board of Education, Department of Education, Office of the Secretary for Education, and the Resources Agency. The government agencies that are collaborating in the EEI have been joined by a broadly-based group of partners from business and industry, educational institutions, nongovernmental organizations, and professional organizations to ensure the successful implementation of the EEI.

The EEI represents a major commitment by the State of California: staffing from the California Environmental Protection Agency (CalEPA); staffing and funding from the California Integrated Waste Management Board (CIWMB); and, technical support and staff commitments from all of the government agency partners involved in the initiative.

Environmental Principles and Concepts

California's Environmental Principles and Concepts (EP&C) examine the interactions and interdependence of human societies and natural systems. The EP&C were developed through technical working groups that involved over 100 scientists and experts representing state agencies, universities, business and industry, and environmental organizations from across California.

The Office of the Secretary of the CalEPA and the CIWMB have reviewed and adopted the following Environmental Principles:

- Principle I The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.
- Principle II The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies.

- Principle III Natural systems proceed through cycles that humans depend upon, benefit from and can alter.
- Principle IV The exchange of matter between natural systems and human societies affects the long-term functioning of both.
- Principle V Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

The complete listing of the Environmental Principles, with associated concepts and examples, is available at: <http://www.calepa.ca.gov/Education/Principles/EPC.pdf>.

Development of the Standards-based Model Curriculum

The EEI Model Curriculum is intended to provide K-12th grade teachers, schools and districts with standards-based curricular materials, approved by the State Board of Education that can be used to teach the EP&C. As such, the EEI Model Curriculum will be designed to teach both the California's academic content standards and the EP&C to mastery.

The Model Curriculum will be structured so that it takes advantage of the instructional materials that are adopted by the State Board of Education as well as the educational resources that are offered by the providers of California's diverse environmental curricula and education programs. This approach should provide students and teachers with the opportunity to make the most appropriate use of all of the rich instructional resources that are available to them.

The Model Curriculum will be designed to use content from adopted instructional materials using the EP&C as the context for instruction. It will provide opportunities for students to achieve mastery of content standards in science and history/social science. The Model Curriculum will also help develop skills and knowledge in English/language arts and mathematics.

Environmental Principles and Concepts and Textbook Adoption

The law calls for incorporating the EP&C into criteria for textbook adoption in science, mathematics, English/language arts, and history/social science. The textbook adoption process is long-term, cyclical and spans several years for each subject area listed above. For example, the criteria for the next science textbook adoption were recently released by the State Board of Education; these criteria state "To be considered suitable for adoption, an instructional materials submission must provide: ... Examples, where directly supportive of the California Science Standards, of principles of environmental science, such as conservation of natural resources and/or pollution prevention." We will be working to incorporate the EP&C into textbook adoption criteria in each of the four areas pursuant to the law, as the cycles dictate.

Relation to California's Existing Environmental Education Programs

The law states that the environmental principles and concepts that are being developed under EEI shall be used to do all of the following:

- (1) "To direct (the programs of) state agencies that include environmental education components for elementary and secondary education in regulatory decisions or enforcement actions.
- (2) "To (serve as the basis for aligning the) state agency environmental education programs and materials that are developed for elementary and secondary education."

Under the direction of the Secretary of CalEPA, the Office of Education and the Environment, will work with other state agencies to assist them in developing programs that support implementation of the EEI. Depending on the availability of external funding, similar assistance will be made available to non-profit environmental organizations that are interested in modifying their education programs so that they conform to the EP&C and Model Curriculum.

Additional information regarding the Education and the Environment Initiative is available at: <http://www.calepa.ca.gov/Education/AB1548/>

Plastic Marine Debris: Challenges and Future Actions

Recent studies have revealed the problem of plastic in the ocean to be more pervasive and insidious than previously imagined, with implications for the marine food web.

Why focus on plastic?

The qualities that make its use so widespread – durability, light weight, low cost – also have caused it to become by far the most serious marine debris problem. Estimates are that from 60-80% (and 90-95% in some areas)¹ of marine debris is plastic, as is 90% of all floating debris.²

U.S. resin production soared from 6 billion pounds per year in 1960 to 108 billion pounds in 2000³, and only a small percentage (5%) get recycled.⁴ The abundance of plastic disposable goods combined with improper disposal has led to the proliferation of plastic in places it doesn't belong. And because plastic is durable and lightweight, it is easily carried by wind and currents and can circulate continuously in the open sea, where it is mistaken for food by birds and fishes. Over time plastic photodegrades – breaks down into progressively smaller pieces – but it never fully biodegrades. Broken, degraded plastic pieces outweigh surface zooplankton in the central North Pacific by a factor of six to one, i.e., six pounds of plastic for every single pound of zooplankton.⁵ It is a global phenomenon affecting all oceans and shorelines.⁶ Even the beaches of uninhabited islands in the middle of the Pacific are littered with plastic debris, as are the waters and shores of remote Antarctica. Plastic affects the entire body of the ocean: it floats on the surface, is present throughout the water column, and settles in bottom sediments.

Impacts of Plastic Marine Debris

Plastic marine litter poses a growing threat to marine life and its biological diversity. One of the ways this threat manifests is by causing damage and death to marine wildlife, including endangered or protected species. Marine litter harms a significant number of marine species – 267 worldwide by one estimate.⁷ Given the quantities of small plastic pieces floating in the ocean, the potential for ingestion is enormous. For example, 90% of Laysian Albatross chicks surveyed had plastic in their stomachs – a significant source of mortality.⁸ The continued survival of endangered sea turtles is also threatened by ingestion of plastic; studies have found as many as 75% with plastic debris in their digestive tracks.⁹ Entanglement is another serious problem. Scientists have estimated that 100,000 marine mammals are killed by entanglement in plastic each year in the North Pacific.¹⁰ Population declines for a variety of marine mammals have been attributed to plastic entanglement.¹¹

A 2001 study found that plastic resin pellets absorb toxic chemicals such as PCBs and DDE at up to one million times background levels, becoming a potential source of toxins to the marine organisms that ingest them.¹² Since plastics are ingested by filter-feeding organisms at the base of marine food chains, this finding may have repercussions throughout the marine food web, including implications for human health. Plastic litter is also known to transport invasive species.¹³

In addition to environmental and health impacts, plastic marine litter has great economic costs. For commercial and recreational fisherman, floating debris is a hazard that can damage boat propellers and clog seawater intakes. In a survey of fisherman in Oregon, 58% had experienced vessel problems due to plastic marine debris.¹⁴ Since tourism is such a large part of California's coastal economy, coastal cities and counties spend millions of dollars per year cleaning debris off beaches. Beaches and shorelines that are littered with debris may result in lost tourism dollars for the surrounding communities.

Sources of Marine Debris

Marine debris originates from both land-based and ocean-based sources. Land-based sources include littering, storm water runoff, coastal municipal landfills, transport of garbage, open trash collection containers, industrial facilities, and beach-goers. Ocean-based sources include commercial and recreational fishing, overboard disposal of passenger and commercial shipboard waste, and cargo containers falling off ships in high seas. The majority of marine debris appears to come from land-based sources (approximately 80%).¹⁵

Plastic Debris: Rivers to Sea Project

The Coastal Commission is working in partnership with the Algalita Marine Research Foundation on a two-year effort funded by the State Water Board to assess plastic debris loading and sources of plastic and trash in the Los Angeles and San Gabriel Rivers. The project involves working with plastic manufacturers and municipalities to develop best management practices, and bringing together stakeholders to develop a California Action Plan to reduce land-based sources of marine debris. The Plastic Debris: Rivers to Sea conference, to be held September 7-9, 2005 in Redondo Beach will involve scientists, government officials, industry and environmental activists. The conference is cosponsored by the Heinz Center.

Public Education Efforts

Education is one of the keys to solving the marine debris problem. Examples include the International Coastal Cleanup, for which the Coastal Commission coordinates California Coastal Cleanup Day, and the year round Adopt-A-Beach Program. These and other public education efforts should be expanded.

The State Water Resources Control Board's Erase the Waste campaign is designed to reduce storm water pollution, including plastic debris and other trash, in Los Angeles County. The two-year, \$5 million campaign began in August 2003, and encourages residents to be part of the "pollution solution" by adopting simple, everyday actions.

Regulatory Approaches

The Los Angeles Regional Water Quality Control Board developed Total Maximum Daily Loads (TMDLs) for trash in three watersheds; these TMDLs, however, only address the larger pieces of plastic that are easily recognizable as trash (>5mm), and not the small plastic pieces and resin pellets. The State Water Board placed Orange County beaches on its 2002 monitoring list to evaluate the presence of trash there.

The majority of land-based sources of plastic debris are located in urban areas, which are regulated under storm water permits issued by the Water Boards. State Water Board staff is currently evaluating language in storm water permits and in the California Ocean Plan in order to propose improvements to further limit plastic wastes discharges.

Recommendation for the Future

The public education and regulatory approaches described above are important steps in the right direction, but are inadequate to address the scope of the problem. It has been almost 20 years since a statewide effort produced the California Marine Debris Action Plan. It is time for a renewed, systematic, coordinated effort to look at the various mechanisms through which debris ends up in the ocean, to identify key players, to devise solutions appropriate for each source, and then to follow-up with implementation. The action planning component of the Plastic Debris: Rivers to Sea project is a first step, but that project is nearing the end of its funding. The Ocean Protection Council should support the next step – building upon this coordinated planning and implementation effort to ensure that California maintains a leadership role in addressing this important environmental problem.

¹ United Nations Environment Programme, GPA Coordination Office, Marine Litter – trash that kills, www.gpa.unep.org; <http://marine-litter.gpa.unep.org/facts/what-where.htm>

² Derriak, J.G.B. 2002. The pollution of the marine environment by plastic debris: a review, *Marine Pollution Bulletin* 44, 843.

³ The Resin Review 2000 Edition, American Plastics Council, Washington, D.C. 2001

⁴ U.S.E.P.A. Municipal Solid Waste Generation in the U.S.: 2001 Facts and Figures. EPA 530-S-03-011,7.

⁵ C. J. Moore, *et al*, 2001. A Comparison of Plastic and Plankton in the North Pacific Central Gyre, *Marine Pollution Bulletin*, 42, 1297-1300.

⁶ United Nations Environment Programme 2005: Marine Litter, an analytical overview.

⁷ Laist, D. W. Impacts of marine debris: entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. In Coe, J.M., Rogers, D.b. (eds.), *Marine Debris- Sources, Impacts and Solutions*: Springer-Verlag, N.Y. (1997) pp. 99-139

⁸ Fry, D. M. *et al*, 1987. Ingestion of plastic debris by Laysan albatross and wedge-tailed shearwaters in the Hawaiian Island. *Marine Pollution Bulletin* 18, 339-343.

⁹ Tomas, J., *et al*, 2002. Marine debris ingestion by loggerhead sea turtles, *Caretta caretta*, from the Western Mediterranean. *Marine Pollution Bulletin* 44, 211-216.

¹⁰ Wallace, N. 1985. Debris entanglement in the marine environment. A review. Pp 259-277 in: R. S. Shomura, H. O. Yoshida (eds.) *Proceedings of the Workshop on the Fate and Impact of Marine Debris*. NOAA Technical Memorandum. NMFS, NOAA-TM-NMFS-SWFC-54.

¹¹ Derriak, 2002.

¹² Mato, Y. *et al*, 2001. Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment. *Environ. Sc. Technol.* 35, 318-324.

¹³ Derriak, 2002

¹⁴ Recht, F. 1988. Dealing with Annex V – A Reference Guide for Ports. US Dept. of Commerce, Wa. DC

¹⁵ U.S. Dept. of Commerce and U. S. Navy (1999). *Turning to the Sea: America's Ocean Future*, p. 56.



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MEMORANDUM

TO: Members of the Ocean Protection Council

FROM: Steve Aceti

DATE: June 3, 2005

RE: Local Government Efforts to Reduce Marine Litter/Debris

I am the executive director of the California Coastal Coalition, (www.calcoast.org), an advocacy organization comprised of coastal cities and counties, and I submit this memorandum to apprise the Ocean Protection Council (the Council) of programs that are being developed by local governments, NGO's and the plastics industry to reduce the amount of litter and debris that is reaching the coast and ocean. This memorandum will also discuss ways in which the Council could assist local efforts in dealing with marine debris.

Roughly one year ago, Governor Schwarzenegger unveiled an ocean protection plan, saying "[t]he oceans are in trouble and in need of help." Former Rep. Leon Panetta told the Ocean Protection Council (OPC) at its inaugural meeting in March that marine debris and litter are among the threats to the state's ocean and coast.

Each year, coastal communities participate in "California Coastal Cleanup Day" to remove trash and debris from roadsides, parks, bays, shorelines, rivers, creeks and beaches. Last year, more than 46,000 volunteers collected nearly 650,000 pounds of trash and debris up and down the coast. Some communities engage in cleanups on a regular basis, but a more comprehensive approach is needed to reduce the threat to our coast.

Several CalCoast local government members have created task forces or work groups to reduce marine debris and litter through a variety of means. These efforts can serve as models for other communities along the coast.

CalCoast is an advocacy organization comprised of coastal communities and interest groups

www.calcoast.org

1. Orange County

Last November, the Orange County Stormwater Program formed a Trash and Debris Task Force comprising the following organizations: Earth Resource Foundation, California Plastics Industry Coalition, CalTrans District 12, Rainbow Disposal, Surfrider Foundation, Trails4All, Waste Management, Inc., The Irvine Company, the Irvine Ranch Water District, the cities of Anaheim, Buena Park, Huntington Beach, Irvine, Laguna Beach, Laguna Niguel, Newport Beach, San Juan Capistrano, and San Clemente, the County's Integrated Waste Management Department and the County's Resources & Development Management Department. The Task Force has been formed to develop and implement a regional coordinated strategy to eliminate litter and to prevent trash and debris from entering our waterways and ending up in the ocean.

Also in Orange County, the American Plastics Council is currently working jointly with Keep California Beautiful (KCB), the state's leading anti-litter organization to distribute - at APC expense - a comprehensive anti-litter tool kit for city officials throughout Orange County. The tool kit includes a ready to air television public service announcement to encourage citizens not to litter, information on grant programs and resources to conduct recycling, cleanup and other beautification projects.

2. San Diego County

Recently, San Diego County agreed to create a task force using the Orange County model. A resolution creating the task force will be presented to the County Board of Supervisors soon.

3. Los Angeles County

To assist local governments in the Los Angeles region in meeting their water quality requirements under the Clean Water Act, the plastics industry has funded a research effort aimed at reviewing potential market based (credit-trading) policy options for compliance with trash TMDL rules and regulations. The zero-trash TMDL was adopted by the Los Angeles regional water quality control board. This project, called "Market Based Solutions for Achieving the Trash TMDL in the L.A. Watershed," is designed to function in a collaborative manner with participation from both public and private entities and provide Los Angeles with options to both reducing litter and sources of water quality pollution. Findings from this project are due to be released this summer.

4. City of Laguna Beach

This past April, the City of Laguna Beach, in partnership with the Laguna Beach Chamber of Commerce, the Ocean Laguna Foundation, Waste Management, the California Restaurant Association and the California Plastics Coalition, created a work group to reduce marine litter and debris through education, trash removal and recycling. Some of the approaches being considered by the group include the installation of debris catch basins, voluntary use of alternative packaging, signage on the beach, receptacles that prevent trash from being blown around or scavenged by birds, beach cleanups by

the California Conservation Corps, public service announcements, and curbside recycling.

This is just a sampling of what is being done by coastal communities to reduce marine debris and litter. Some cities and counties are fully engaged in the process and many communities are interested in developing programs, but they are starting from scratch because they are not aware of what programs and management practices are available. The Council and/or other State agencies, with help from the private sector, could assist local efforts in the following ways:

1. Coordinate state and local efforts to reduce marine debris and litter;
2. Develop standardized beach signage that coastal communities could erect to educate the public about the need to dispose of cans, bottles, food containers and other materials properly;
3. Develop brochures for distribution at tourism kiosks, hotels, restaurants and other businesses to educate locals and visitors about proper disposal practices;
4. Develop school materials on this subject;
5. Produce public service announcements for television, newspapers, magazines and other media;
6. Provide local assistance for coastal communities to install catch basins and state-of-the-art trash receptacles.

Marine debris and trash is a serious problem that can best be solved through an active partnership among coastal communities, State government and the private sector.