

CALIFORNIA OCEAN PROTECTION COUNCIL

Staff Recommendation

March 3, 2010

CALIFORNIA SEAFLOOR MAPPING PROGRAM

File No.: 06-097-03

Project Manager: Sheila Semans

RECOMMENDED ACTION: Authorization to accept and disburse up to \$1,710,000 of federal grant funds from the National Oceanic and Atmospheric Administration and from the United States Minerals Management Service Coastal Impact Assistance Program to implement the California Seafloor Mapping Program.

LOCATION: Statewide

STRATEGIC PLAN OBJECTIVE: Ocean and Coastal Ecosystems and Research and Monitoring

EXHIBITS

Exhibit A: [October 27, 2007 staff recommendation](#)

Exhibit B: [September 10, 2008 staff recommendation](#)

Exhibit C: [Examples of the CSMP folio map series](#)

RESOLUTION AND FINDINGS:

Staff recommends that the Ocean Protection Council adopt the following resolution pursuant to Sections 35500 *et seq.* of the Public Resources Code:

“The Ocean Protection Council hereby authorizes the following:

1. Acceptance of the following grant funds awarded to the State Coastal Conservancy, to implement the California Seafloor Mapping Program (CSMP):
 - a. \$1,410,000 (one million four hundred ten thousand dollars) from the United States Minerals Management Service, Coastal Impact Assistance Program (CIAP).
 - b. \$300,000 (three hundred thousand dollars) from the National Oceanic and Atmospheric Administration (NOAA), specifically appropriated to NOAA for implementation of the CSMP.

2. Disbursement of up to \$1,175,000 (one million one hundred seventy-five thousand dollars) of the CIAP grant and up to \$250,000 (two hundred and fifty thousand dollars) of the NOAA grant for ground-truthing hydrographic survey data, map production and dissemination as part of the CSMP implementation. These funds may be disbursed to augment existing agreements or to enter into new agreements with state or federal agencies.
3. Prior to disbursement of any funds, each recipient shall submit for the review and approval of the Secretary to the Council:
 - a. A work plan, including schedule and budget.
 - b. The names of any contractors to be retained by the recipient.
 - c. Evidence that all permits and approvals necessary to implement the project have been obtained.

Staff further recommends that the Council adopt the following findings:

“Based on the accompanying staff report and attached exhibits, the Council hereby finds that:

1. The proposed project is consistent with the purposes of Division 26.5 of the Public Resources Code, the Ocean Protection Act.
2. The proposed project is consistent with the Ocean Protection Council's grant program funding guidelines.”

PROJECT SUMMARY:

Staff is recommending that the Council authorize the funding of additional implementation of the California Seafloor Mapping Program (CSMP) through the acceptance and distribution of federal grant funds from the National Oceanic and Atmospheric Administration and from the United States Minerals Management Service, Coastal Impact Assistance Program. Disbursement of the federal grant funds is expected to augment existing grants or may involve additional agreements with federal or state public entities.

The Council authorized the existing CSMP projects at its October 27, 2007 and September 10, 2008 meetings (Exhibits 1 and 2). Since the initial authorization, the CSMP has been implemented through agreements with the USGS, NOAA, and CSUMB. To date, these organizations have completed CSMP data collection along approximately 80% of the California coastline, and have made progress towards ground-truthing newly collected data and creating mapping products. The proposed authorization would fund continued video ground-truthing as well as the completion of the 10-folio map series for up to 16 mapping blocks along the coast (Exhibit C), including fully interpreted benthic habitat and geology maps. Grant funds will also be used to initiate a pilot project to develop ecological habitat maps in state waters.

PROJECT DESCRIPTION:

Project Background:

As detailed in previous staff recommendations, the goal of the CSMP is to create a comprehensive coastal/marine geologic and habitat base map series for all state waters (mean high water out to 3 nautical miles). When the pilot project for CSMP was initiated, less than a third of California's seafloor was mapped in sufficient enough detail to assist in designating or monitoring marine reserves, understand sediment transport and sand delivery, ensure shipping safety, help assess threats from sea level rise or storm surges, or evaluate the potential for ocean energy. Although the CSMP ultimately envisions a 10-folio map series for each mapping block along the coast (Exhibit C; mapping block are roughly equivalent to USGS 1:24,000 quadrangles), prior OPC funding was primarily devoted to bathymetric data collection, with only seed funding for ground-truthing, product development and data dissemination tasks. Despite the State budget freeze in late 2008, impressive progress has been made on the CSMP: data has been collected for approximately 80% of state waters; over 35% of the newly collected data has been ground-true; the Marine Life Protection Act Initiative, NOAA Office of Coast Survey and other users have been provided with data products necessary for improved ocean management; and initial progress and data dissemination websites have been established (<http://walrus.wr.usgs.gov/mapping/csmpp/progress.html>; <http://seafloor.csusb.edu/csmpp/csmpp.html>).

Along with depicting marine habitats for the first time, CSMP data has also:

- Uncovered hundreds of uncharted hazards to navigation.
- Exposed new fault lines (Hogsi fault), and revealed the seaward extension of the San Andreas fault as never before seen.
- Captured transient events like grey whale feeding scars in shallow north coast waters and seasonal sand movements along the Santa Barbara coast.
- Revealed the geologic mystery responsible for the surf break at Maverick's.
- Been incorporated into modeling efforts to understand sea level rise, coastal erosion and storm surges, impacts to ocean energy facilities, and safe marine transportation through our ports.

Additionally, in 2009 the U.S. Army Corps of Engineers initiated data collection in California as part of the National Coastal Mapping Program (NCMP). This program aspires to provide high resolution LiDAR data for the nation's coastline, 1000 meters offshore and 500 meters onshore. CSMP data collection efforts currently only cover state waters inshore to approximately 10 meters water depth—or or the depth of safe navigation by boat—so if data collection is successful (nearshore bathymetric LiDAR data is very hard collect in California's turbid waters) NCMP will fill a significant data gap for CSMP and allow the creation of seamless onshore/offshore maps of California's coastline.

Project Details and Scope of Work:

Previous staff recommendations have described in detail the multiple components of the CSMP (Exhibits 1 and 2). Using a variety of state-of-the-art mapping technologies including digital

multibeam and side-scan sonar systems, the CSMP mapping team is now collecting the remaining hydrographic data, ground-truthing the sonar data using video cameras, and translating the results into a suite of maps that will be provided to resource managers and the public. These will be provided in a variety of formats ranging from hardcopy paper maps to customizable digital maps served over the web. Funding for the CSMP to date has focused primarily on data collection, with only a small amount being devoted to product development. This project would focus a majority of the grant funds on completing the 10-folio map series (Exhibit C) for sections of the coast where bathymetric data collection and ground-truthing are complete. Where possible, seafloor mapping data will also be combined with high resolution topographic LiDAR data to create complete onshore-offshore elevation maps that are critical to improving climate change modeling to help us adapt for and mitigate the impacts of sea level rise.

As the CSMP continues to mature, a natural extension from the benthic habitat maps being created is the development of ecological habitat maps. These maps would incorporate the detailed benthic habitats with physical oceanographic data (e.g. waves, currents) and species distribution data to help visualize and assess marine ecosystems. Because many of these data sets are difficult and expensive to collect, are variable both spatially and temporally, and require the collaboration of multiple disciplines of science, these products have not been created in the marine environment. Working with the MPA Monitoring Enterprise, NOAA, the USGS, and the universities, the proposed grant funds would help seed a pilot effort to explore this very difficult undertaking. It is anticipated that additional funding will be available for this pilot project from multiple CSMP partners.

Video and photography ground-truthing is also currently being undertaken by the USGS with help from the National Marine Fisheries Service. Real-time observations of sea floor geology and biological cover are needed to scientifically verify the habitats depicted in the bathymetry data and create the final map products. Therefore, a portion of the grant funds received in this project will be awarded to the USGS for continued ground-truthing.

PROJECT GRANTEE:

The CSMP has achieved much success through a strong university-industry-agency collaboration, which include the following entities:

- United States Geological Survey, Coastal and Marine Geology Program
- National Oceanographic and Atmospheric Administration
- California State University Monterey Bay Seafloor Mapping Lab
- Moss Landing Marine Laboratories, Center for Habitat Studies
- Fugro Pelagos, Inc.
- California Geological Survey
- State Department of Fish and Game
- State Coastal Conservancy

This collaboration has been very effective and will continue through this phase of the program. The proposed grant funds would be used, in part, to augment existing agreements with the USGS, NOAA or CSUMB. The USGS has been responsible for all ground-truthing work to date

and will continue in that role throughout the project. Timing constraints related to the grant funds, weather conditions, and vessel/staff availability all affect where and how much ground-truthing can be accomplished in 2010.

The USGS is also uniquely qualified to oversee production of the 10-map folio series, and continues to offer substantial in-kind support to the program. The CIAP funds were awarded entirely for CSMP map production, and the bulk of this funding will go to the USGS, who will oversee the production of the folio series for at least 16 mapping blocks along the coast. This includes scientific interpretation of the data by numerous partners, map creation and display, peer review of all tier 3 maps (as defined in Exhibit A), and final map production in both hard copy and digital formats. Moss Landing Marine Labs will contribute to the production of the habitat maps, and the California Geological Survey will review all geology and habitat maps.

Until it is understood what will be involved with implementing the ecosystem habitat map pilot project, it is unclear how the proposed grant funds will be distributed. Many CSMP partner agencies will participate in this effort, and additional funds are being developed. It is likely that a Request for Proposals process will be initiated as part of the project.

SITE DESCRIPTION:

Project location includes all mapped state waters from the mean high tide line out three nautical miles. Ground-truthing cruises in this phase of the program will focus on data collection from 10 meters water depth (or the depth of safe vessel navigation) to the state 3-mile limit.

PROJECT HISTORY:

The OPC initiated the California Seafloor Mapping Program in 2005 with the intention of supporting the MLPA Initiative and other state priorities by funding a strategic planning workshop to set mapping priorities for the state. The Statewide Marine Mapping Planning Workshop Report (<http://seafloor.csumb.edu/StrategicMappingWorkshop.htm>) identified standards and protocols for seafloor mapping and highlighted priority areas to conduct mapping during a pilot phase of the program (Santa Barbara Channel and Half Moon Bay to Pt. Arena). Early success in the pilot phase led to the development of a statewide program, with OPC providing \$15 million of Proposition 84 funding (Exhibits 1 and 2). At this time, because bathymetric data collection requirements for navigational charting and habitat mapping are essentially the same, a strong collaboration with NOAA Office of Coast Survey developed that will result in updated navigational charts for California state waters.

When California bond funds were frozen in December 2008, all projects were stopped, adding additional costs to the program. NOAA provided additional funds to the industry contractor that put 3 mapping boats back in the water, while funds from PG&E, Resources Law Legacy Fund and a federal grant to the USGS kept the rest of the team working through 2009. During 2009, over \$8 million of non-state funding was developed for CSMP and distributed directly to agencies participating in the CSMP.

Creating seafloor maps for all California waters was identified as an early goal of the OPC and was written into its 5-Year Strategic Plan as a high priority (see consistency section below). Furthermore, seafloor mapping was specifically identified for funding in the Proposition 84. Seafloor mapping is very widely endorsed; most recently supported by the West Coast Governors' Agreement on Ocean Health and identified as a critical data set by the federal Ocean Policy Task Force.

PROJECT FINANCING FOR THIS AUTHORIZATION

NOAA	\$300,000
MMS	<u>\$1,410,000</u>
Total Project Costs	\$1,710,000

Funding for the proposed disbursement of \$300,000 for CSMP ground-truthing and product development is expected to be provided under a grant from the National Oceanic and Atmospheric Administration. The fund were appropriated by the federal FY 2010 budget to NOAA, National Ocean Service as a "Congressionally-designated item" specifically for use by the Conservancy for the "California Seafloor Mapping Program".

Funding for the proposed disbursement of \$1,410,000 for CSMP projects is to be provided under a grant from the United States Minerals Management Service's (MMS) Coastal Impact Assistance Program (CIAP) by which MMS may provide funds to the Conservancy for projects for conservation, protection or restoration of coastal areas including wetlands. The MMS CIAP grant will be used to develop seafloor bathymetry data, which has a direct application to coastal conservation efforts. Bathymetry data has been used in the San Francisco South Bay Salt Ponds Restoration Project to set the baseline for sediment distribution in the Bay as well as help determine the rate and extent of habitat transition (from mudflat to marsh) in the wetlands once the levees are removed. In San Diego, seafloor mapping data is a key component of the Tijuana Estuary Sediment Fate and Transport Demonstration Project, which will determine the effects of placing sediment collected from the upper Tijuana River watershed into nearshore waters. If successful, this could have the dual benefit of protecting the estuary from excessive siltation as well as nourishing the sand starved beaches.

Where available, seafloor data is now being integrated into models that also utilize wave and ocean current information to help understand, quantify and forecast coastal erosion. Sediment and contaminant transport models are also using seafloor data to quantify sand movement within a littoral cell. At Ocean Beach, seafloor bathymetry data helped show that better placement of sand dredged from SF Bay could actually nourish the sand starved local beaches in the area instead of being lost out of the system altogether. As seafloor mapping data becomes available for more areas of the coast, these types of applications will become more common.

Seafloor mapping data has been an essential part of the Marine Life Protection Act Initiative to designate marine protected areas (MPAs) in state waters. Once benthic habitats are known, determining representative habitats to preserve is much more straightforward. Creating habitat maps that also incorporate biological and physical data is of particular interest to the MPA Monitoring Enterprise, which is tasked with determining the most effective means of monitoring these MPAs once they are established.

Of the total MMS CIAP grant, \$1,175,000 will be disbursed to existing grantees or to additional federal or state public entity recipients. The balance of \$235,000 will be applied to the costs of the Conservancy staff for management, administration and oversight of the CSMP work

Breakdown by Grantee of Expected Financing

As stated above, many variables will determine how much ground-truthing can be accomplished in 2010. The USGS will oversee the production of fully interpreted final mapping products, with help from numerous other CSMP collaborators. OPC staff will work with NOAA to determine how implement the ecological habitat mapping pilot project. At this time, it is an

USGS	\$1,000,000
Moss Landing Marine Laboratories	\$300,000
California Geological Survey	\$75,000
NOAA?	<u>\$50,000</u>
TOTAL	\$1,425,000

CONSISTENCY WITH CALIFORNIA OCEAN PROTECTION ACT:

As described in previous staff recommendations this project remains consistent with the Ocean Protection Act (Public Resources Code Sections 35500 *et seq.*), as detailed in the October 25, 2007 staff recommendation (Exhibit A).

CONSISTENCY WITH THE OPC'S STRATEGIC PLAN:

The project remains consistent with the OPC's Five-year Strategic Plan, for the reasons specified in the October 25, 2007 staff recommendation (Exhibit A).

CONSISTENCY WITH THE OPC'S GRANT PROGRAM FUNDING GUIDELINES:

The proposed project remains consistent with the OPC's Project Funding Guidelines, as those guidelines were revised on November 20, 2008, in the following respects:

Required Criteria

- 1. Directly relate to the ocean, coast, associated estuaries, or coastal-draining watersheds:**
The CSMP strives to map coastal and marine habitats within California state waters, from mean high water out to three nautical miles.
- 2. Support of the public:** Aside from the long list of project collaborators, the CSMP enjoys broad support from the public, coastal managers, and state and federal legislators. As more seafloor maps become available to the public, more opportunities for collaboration emerge.
- 3. Greater-than-local interest:** The data that will be produced from the CSMP will, for the first time, allow scientists and managers to understand subsurface geomorphology and identify habitats and fault dynamics off our coast. This is a foundational data set that will contribute to the understanding of many physical and biological processes in the coastal

ocean. California has also set the standard for other mapping project being undertaken around the country.

Additional Criteria

4. **Innovation:** The proposed project will promote technologically innovative seafloor mapping techniques, combine disparate data sets into maps and displays, and develop efficient ways to deliver very large data sets out to the public.
5. **Improvements to management approaches or techniques:** The California Ocean Protection Act subsequent adopted documents of the Ocean Protection Council emphasize that it is state policy to implement ecosystem-based approaches to manage coastal and marine resources using sound science. Implementation of ecosystem-based management (EBM) strategies requires consideration of interactions between species, their habitats, and human activities. Many of these interactions are not well understood, and significant data and information gaps hinder achievement of effective EBM. Statewide, California's resource managers and scientists must often make decisions based on a patchy picture of the habitats that lie offshore. Accurate statewide mapping of seafloor substrate, marine habitat types, and bathymetry (underwater topography) of California's coastal and nearshore waters is a crucial component necessary to guide multiple ocean management decisions. Designating marine reserves, understanding sediment transport systems, locating shipping lanes, identifying dredging and dumping sites, regulation of offshore coastal development, and illuminating the dynamics of fisheries and other marine species, are just a few of the applications that would benefit from coastal and marine mapping data and products.
6. **Resolution of more than one issue:** Marine substrate and habitat mapping will support a variety of needs, including marine protected areas management, fisheries management, offshore development regulation, protection of rare and endangered species, and improved navigation.
7. **Leverage:** See the "Project Financing" section above.
8. **Timeliness or Urgency:** There is general scientific consensus that statewide seafloor mapping is one of the foundational data sets needed for improved ocean management. Specifically, seafloor mapping data is needed now for implementation of the MLPA Initiative. Now that CSMP has collected a large amount of bathymetric data, funds an urgently needed to process that data into habitat and geology maps useful for management.
9. **Coordination:** The CSMP is a highly collaborative undertaking, and the proposed project will continue to involve the cooperation of numerous state and federal agencies, academic institutions, and researchers. The CSMP mapping team collectively has been involved with mapping virtually all California State waters covered to date.

CONSISTENCY WITH THE OPC'S PROGRAM PRIORITIES FOR 2009 THROUGH 2010:

Seafloor Mapping

The CSMP is collecting and interpreting seafloor mapping data throughout California state waters.

COMPLIANCE WITH CEQA:

The proposed project has not changed in its nature or scope. It remains categorically exempt from review under the California Environmental Quality Act (CEQA), pursuant to 14 Cal. Code of Regulations, Section 15306 (data collection, research and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource), as discussed in the October 25, 2007 staff recommendation (Exhibit A).