



CALIFORNIA OCEAN PROTECTION COUNCIL

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MEMORANDUM

TO: California Ocean Protection Council

FROM: Sheila Semans, Project Manager, State Coastal Conservancy

DATE: June 14, 2007

RE: California State Seafloor Mapping Campaign

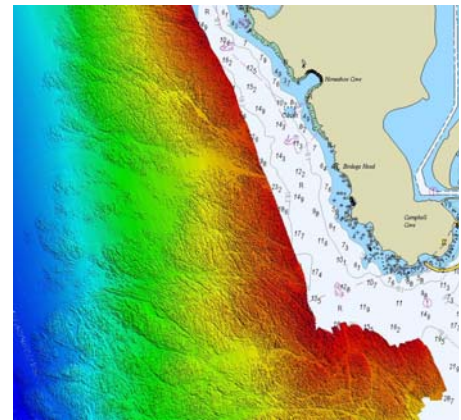
Objective: to create a comprehensive coastal/marine geologic and habitat base map series for all state waters (mean high water out to 3 nautical miles). This memo is intended to provide the Ocean Protection Council with a progress update on the current mapping effort and identify the cost, scope and possible approaches to completing mapping in California to help inform and guide the Council's expenditure of Proposition 84 funds on seafloor mapping.

Area left unmapped: Approximately 375 nm² or 66% of state waters

Projected cost: \$25-35 million¹

Project period: November 2007- 2012

Need: California's state waters are among the most productive in the world. 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 and monitoring marine reserves, understanding sediment transport and sand delivery, ensuring shipping safety, identifying dredging and dumping sites, helping identify fault dynamics, helping describe tsunami potential, regulating 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. Detailed bathymetric maps are also critical in the development of an ocean circulation model that will allow us to better predict ocean response to natural and human-induced changes. Although small sections of the coast, including some adjacent federal waters, have been mapped to varying



Color bathymetry map off Bodega

¹ This figure includes data collection and processing, ground truthing, and the creation of tiers 1-3 data products, as referenced in *Statewide Marine Mapping Planning Workshop*, Dec. 2005. This report can be found at http://euclase.csumb.edu/DATA_DOWNLOAD/StrategicMapgWrkshp05/MappingWorkshop12_13/Final_Report/CA%20Habitat%20Mapping%20Rpt.pdf

extents and resolutions, a comprehensive and seamless map of the state's near- and offshore benthic and marine resources does not currently exist.

Status: To date, only 33% of California's submerged lands have been mapped in sufficient detail for the identification of habitats and geologic features. Proposition 84 and the OPC strategic plan both identify seafloor mapping as a priority because benthic habitat maps have become one of our most powerful resource management tools.

One of the first projects supported by the OPC was the North Central Coast Mapping Project, initiated to support the Marine Life Protection Act Initiative's Marine Protected Area designation. This effort committed over \$4 million in support for mapping from Ano Nuevo to Pt. Arena (excluding the nearshore strip from Bolinas to Pt. Arena). All mapping is complete, ground truthing is planned for this fall, and some early products are being produced and provided to the resource managers working on the new MLPA study region and the monitoring plan for the recently designated marine protected areas.

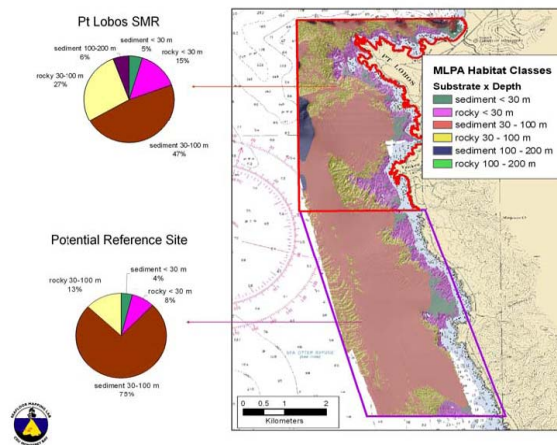
Agency/university/industry partnership of the North Central Coast Mapping Project:
CSU Monterey Bay Seafloor Mapping Lab
Fugro Pelagos, Inc.
United States Geological Survey
Moss Landing Marine Laboratories, Center for Habitat Studies
California Geological Survey
National Marine Sanctuary Program
State Coastal Conservancy

Next Phase: Pending final action on the 07/08 budget, staff plans to bring a project to the OPC in October that requests up to \$15 million of the proposition 84 money designated for ocean-related activities be dedicated to continuing our seafloor mapping efforts. The total estimated cost to complete seafloor mapping in state waters is \$25-35 million. Staff has been working diligently to find additional funds to leverage the state's contribution from our federal partners.

Based on our current mapping experience, there are four main decision points involved in developing a plan for executing the California State Seafloor Mapping Campaign so as to maximize overall value, quality and speed: Who should do the work (expertise), how should it be done (methods and technology), what should the products be, and how should the funding be structured?

Approaches and Options: Should our efforts to obtain full funding for this project fall short, staff is considering two options:

Habitat Abundance: Pt Lobos SMR vs Potential Reference Site



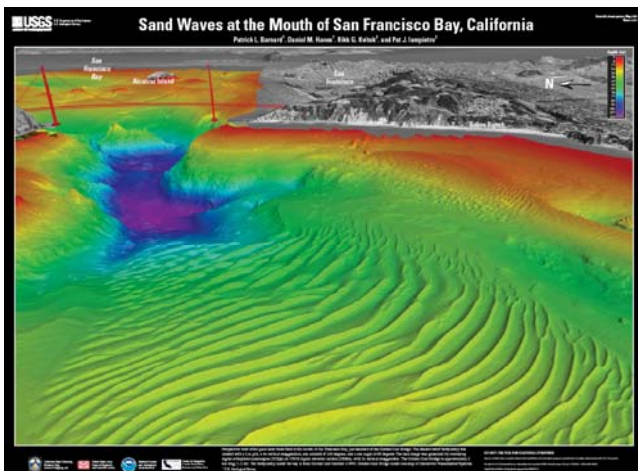
Auto-classified benthic habitat map created with high-resolution multibeam sonar data that was created to help the MPA monitoring design.

1. Collect all the data in state waters and develop more funding to create map products
2. Collect data only in priority areas and create end products for those areas

At this time, option 1 seems preferable for the following reasons: it is better to collect all the data within the same timeframe so you get a snapshot of similar conditions; we don't know where the next MLPA study region will be; having all the data will allow us the flexibility to quickly respond to future priorities as they arise (e.g. coastal commission development issues); and once we have the data, it will be easier to develop products.

For \$15 million, it is possible that we could get most or all of the data collected (budget projections below are configured on the high side). If we can't get all the data, the more expensive nearshore strip could be dropped in less critical areas.

However, as we continue to seek funding from a variety of sources, we will remain flexible about the best approach to completing this project. It is important to stress that we are still working out many of the details that will inform the final recommendation. We will continue to attempt to address multiple management objectives where possible.



Giant submarine dune field discovered under the Golden Gate bridge during the collaborative multibeam sonar mapping project looking at sediment transport in relation to maintenance of the San Francisco Bay entrance and erosion at Ocean Beach.

The following are two options for completing the work:

Option 1: Contract through NOAA Office of Coast Survey IDIQ contract

Founded in 1807, the Office of Coast Survey (OCS; part of National Ocean Service within NOAA) has been surveying the coast and producing navigational charts for our nation's ports for centuries. NOAA contracts out a majority of its survey work to private industry using a contracting vehicle called the Indefinite Delivery, Indefinite Quantity (IDIQ). Through the IDIQ, NOAA has pre-qualified a pool of firms that bid on survey work as it is identified. NOAA currently offers this contracting service to state and local partners *at no cost* (no overhead). If we

partner with NOAA, it could fund the collection of additional data needed to update our navigational charts (last updated in the 1940s), provide much needed technical oversight, and handle all the contracting for our portion of the data collection. It is possible OCS will contribute funds over and above what is needed for navigational charting. OPC staff plans on meeting with OCS in Washington DC in late June 2007 to further discuss this potential partnership.

Advantages:

- NOAA’s technical oversight of data collection and quality control.
- NOAA’s contract management is a big help to OPC staff with limited time.
- Pre-qualified firms and contracts are already in place.
- Updated navigational charts (approx. 13 uncharted hazards to navigation were found in our current mapping effort).
- NOAA is a valued partner and this is an opportunity to further our institutional relationship.

Disadvantages:

- Cost for data collection is pre-determined, muting market competition during bidding.
- OCS doesn’t have track record working with States in this capacity.
- Unknown at this time if NOAA funding is available.
- Cannot contract for mapping with universities or other “outside sources”.
- State mapping efforts may get slowed down by simultaneously completing surveying requirements.

Option 2: Contract directly with a private firm or university to collect the data, and consult with NOAA on technical issues

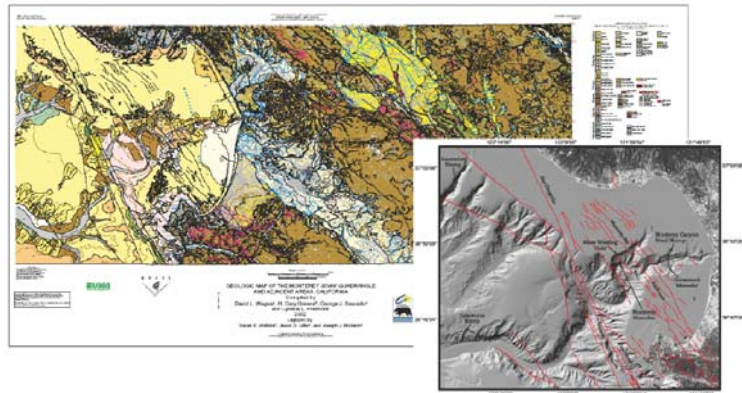
Advantages:

- We are not reliant on one entity to complete work and are therefore more flexible.
- It will likely produce a more competitive bidding process in the open market.
- We could fund both industry and the university.

Disadvantages:

- Contract management for a project of this size is a strain on limited OPC staff, especially if there are multiple contracts.
- NOAA’s role would be far more limited.
- NOAA can only accept data from its pool of pre-qualified

firms for navigational charting; if we contract with anyone else, the data collected could not be used for this purpose (primarily for liability reasons).



Fully interpreted and attributed geological map of Monterey Bay and surrounding terrestrial area. (Source: Center for Habitat Studies, Moss Landing Marine Labs)

Budget:

		Depth	Cost (in millions)
Data Collection			
	Nearshore	6m-20m	13
	Deepwater *	20m-3nm	9
	Coastal LiDAR**	shore-6m	3
	Ground Truth		3
	Data Processing		3
Product Production			3
Project Management			1
TOTAL			35

* Ship time estimated at \$15,000/day.

** UC Army Corps of Engineers Coastal Mapping Project may collect bathymetric LiDAR data in CA in 2008. Resolution would be coarse.

The nearshore strip is more expensive to map than the deeper waters because as the boat gets into shallower waters, the multibeam covers less surface area, requiring more survey paths. The nearshore strip represents roughly half of the total area still to be mapped. Accurate products require timely and thorough groundtruthing through the use of video or physical sampling of the seafloor, and where appropriate, sub-bottom profiling to determine the thickness of sediment layers. Once this step is completed, map production is not time dependent, and can happen when funds become available.

Next Steps:

1. Get funding estimates from NOAA OCS and determine if this is the preferable option
2. Release a call for concept proposals to firm up budget estimates. Possibly get private IDIQ contractors to submit two proposals, one inside the IDIQ, one outside
3. If preferable option, set up agreement with NOAA and get Department of General Service's approval
4. Set up advisory group made up of resource managers – who will be the end users of these data products – to help refine priorities once the budget develops (e.g. DFG to discuss the next MLPA region; Coastal Commission to discuss coastal development issues; State Lands to discuss leased tidelands; and the Coastal Sediment Management work group for beach nourishment).