

Seafloor Mapping on the U.S. West Coast

Introduction: This worksheet presents some of the most pressing needs and uses for detailed seafloor mapping in the nearshore waters of California, Oregon, and Washington. Presently, detailed bottom mapping exists for only about 65% of this area in California, 5% in Oregon, and 13% in Washington.

Scientific and Policy Consensus

Scientific consensus for seafloor mapping has been established in the three west coast states through public meetings, workshops and scientific publications showing the benefits and need for mapping data. In response, comprehensive seafloor mapping of state waters has been identified as an important and unifying goal of the West Coast Governors' Agreement on Ocean Health. These data have many high priority uses.

Marine and Habitat Science



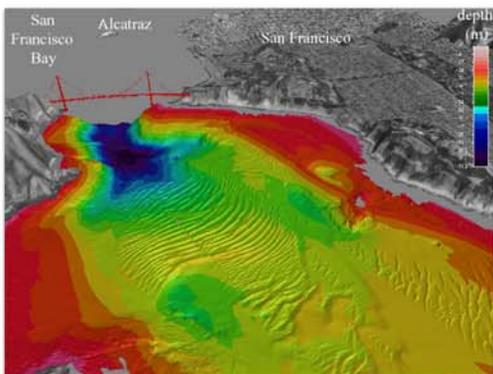
We now understand that many west coast fish and other marine life are dependent upon spatially explicit, yet limited, seafloor habitat features. Describing and classifying these habitats are essential components of effectively assessing and managing west coast marine resources. Seafloor mapping is the fundamental starting point for modeling nearshore fish populations for both the Federal Essential Fish Habitat process and State fisheries management. Mapping is also needed to identify the marine debris that locally degrades important habitats.

Coastal Erosion, Sea Level Rise Impacts

West coast states have been experiencing significant coastal erosion, threatening property, infrastructure, recreation, and coastal economies. Coastal erosion and significant flooding from large winter storms will become even more important as sea level continues to rise in the coming decades. Protecting the coastline and regional sediment management are among the many coastal zone management challenges that require high-resolution near-shore bathymetry and coastal topography. Seafloor mapping data provide the basis for modeling ocean circulation, currents, waves, and sediment transport, needed to develop mitigation strategies.



Navigation and Safe Commerce



Nautical charting is of critical importance to safe navigation and commerce, and depends upon detailed seafloor data. Many areas along the west coast presently are charted based on data collected during the 19th and 20th centuries using lead weights at the end of a rope. Not only are these data of poor quality, the nearshore seabed is constantly changing, requiring modern new data. Modern surveys in these areas have revealed numerous unknown navigation hazards. High-resolution seafloor mapping data supports safe navigation and maritime commerce as well as providing base map data for engineering, scientific and commercial activities.

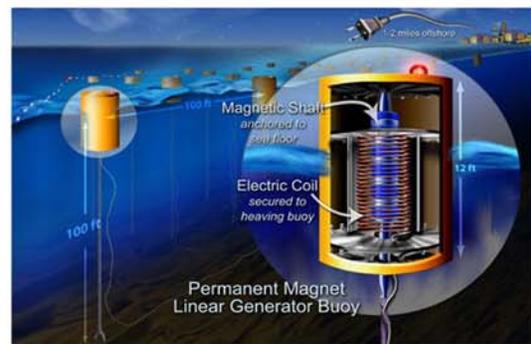
Tsunami Inundation Forecasting

Oregon, Northern California, Washington and Vancouver Island, face a 20-70% probability of experiencing a magnitude 8-9 subduction zone earthquake and tsunami in the next 50 years, much like the 2004 disaster in Indonesia. Given the impacts of the 2004 event, we are just now beginning to understand what a similar disaster will mean for the populations of the west coast. We are unable to accurately model tsunami inundation because the models depend on detailed coastal seafloor maps (and other factors) that presently do not exist. Data will also provide information on active nearshore faults and submarine landslides capable of generating smaller, locally important tsunamis.



Ocean Energy

The same storms, waves and tides that contribute to erosion along our coast can be used to generate renewable power through the application of emerging energy technologies. In fact, areas for future wave “farms” and tidal generators have already been proposed and demonstrations of power-generating buoys have been successful. Seafloor mapping is necessary for identifying and evaluating and siting potential wave power installations along the west coast.



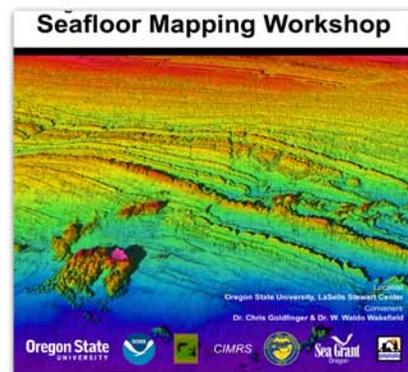
Seafloor Mapping Workshops

Since 2005, state seafloor mapping workshops have been held in California, Oregon, and Washington with representatives from relevant state and federal agencies, local governments, governors offices and state legislators, academia, environmental organizations, and the fishing industry and private sector interests.

Workshop topics:

- A summary of the state of knowledge within state waters and the U.S. EEZ
- Status of current mapping efforts in the three states
- Current developments in seafloor mapping technology and data delivery
- Important regional issues that can be addressed by seafloor mapping
- State specific ocean zoning and marine reserves processes
- Development of habitat maps and other important derivative map products
- Developing partnerships and opportunities for advancing state seafloor mapping

Workshop sponsors/convenors: California Coastal Conservancy, Oregon Department of Fish and Wildlife, Oregon Governor's Office, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Department of Ecology, California State University Monterey Bay, Moss Landing Marine Laboratories, Oregon State University, U.S. Geological Survey, NOAA National Marine Fisheries Service, NOAA National Marine Sanctuaries, Sea Grant, NOAA Office of Coast Survey.



Solution

The West Coast Governors Agreement on Ocean Health Sea Floor Mapping Action Team has developed plans and priorities based on those of the three participating states and their respective stakeholders and scientific communities. These plans include comprehensive high-resolution mapping, “groundtruth” and production of derivative products such as habitat maps and map folios for distribution, and institutional archiving of all digital data in a widely accessible web-based data system.

The plan will accomplish these tasks while providing local benefit to coastal communities through job creation in both the public and private sectors, capacity building in these new and emerging technologies, and student training in the new fields of seafloor mapping and habitat science.