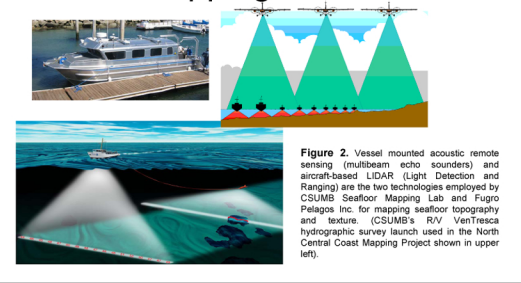


California North Central Coast State Waters Mapping Project

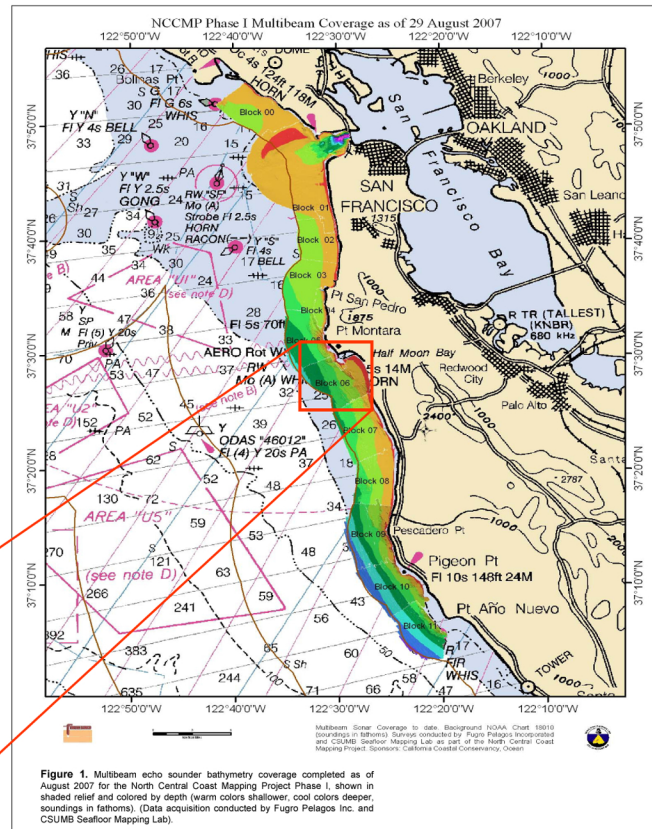
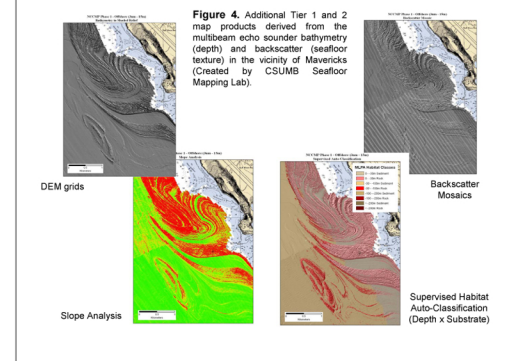
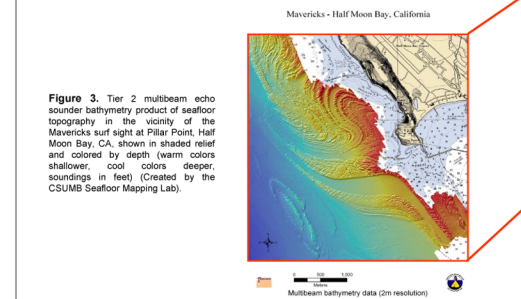
Partnering Sponsors
 California Ocean Protection Council
 California Department of Fish & Game
 California State Coastal Conservancy
 National Marine Sanctuary Program

Collaborating Institutions
 CSUMB Seafloor Mapping Lab
 Fugro Pelagos Inc.
 US Geological Survey
 Moss Landing Marine Labs Center for Habitat Studies
 California Geological Survey

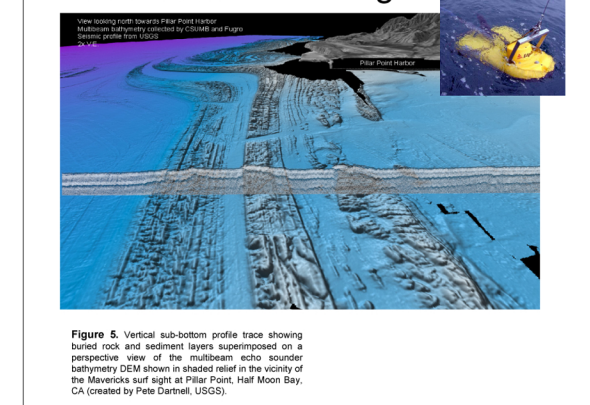
Seafloor Mapping



Tier 1 & 2 Products



Sub-bottom Profiling



Poster Prepared by
 Rikk Kvitsek – California State University, Monterey Bay Seafloor Mapping Lab (<http://seafloor.csumb.edu>)

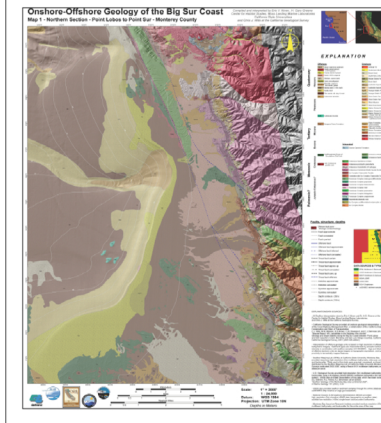
Introduction
 In 2006, the state of California initiated Phase I of a comprehensive seafloor mapping program designed to ultimately cover the remaining 9000 km² of unmapped state waters (3 nm – shore). This collaborative partnership involving industry (Fugro Pelagos Incorporated), university (California State University, Monterey Bay) and Moss Landing Marine Labs) and resource agency (U. S. Geological Survey and California Geological Survey) participation is supported by the California Ocean Protection Council, the State Coastal Conservancy, the California Department of Fish and Game, U.S. Geological Survey, and the NOAA National Marine Sanctuary Program. The five partnering institutions are now nearing the completion of the Phase I coverage from Sinsin Beach to Año Nuevo (Figure 1). Here we summarize the intended applications, coverage to-date, methods used, and products created.

Purpose
 The purpose of the mapping campaign is to create a high-resolution base map of all seafloor habitats and geological features within the California's 3 nautical mile state waters boundary. Although the first phase of this mapping campaign has been driven largely by the need to support the state's Marine Life Protection Act Initiative (MLPA) by aiding in the selection and design of Marine Protected Areas (MPAs) along the Central California Coast, the state-wide base map being created will enable unprecedented seafloor classification and change detection studies required to address a variety of coastal ocean management issues including:

- Coastal Erosion, sediment transport and beach loss
- Development and implementation of true Ecosystem Based Management
- Restoration of Degraded Habitats, Depleted Fish Stocks and Endangered Species
- Variability and stability of Essential Fish Habitats
- Monitoring of Marine Protected Areas
- Tracking and monitoring of Earthquake and Tsunami Hazards
- Maintenance and safety monitoring of Oil, Gas and Telecommunication Facilities
- Location and removal of Seafloor Debris and Derelict Fishing Gear
- Surveillance and protection of Submerged Archaeological Sites
- Managing offshore Sand and Aggregate Mining
- Maintaining Shipping Channels and Harbor Entrances
- Surveillance for submerged threats to Homeland Security

Methods & Products
 A variety of state-of-the-art mapping technologies are being employed to create a series of Tiered Map Products.

- **Tier 1** – Multibeam Echo Sounder and LIDAR technologies (Figure 2) are being used to create high-resolution 3D digital elevation models (DEMs) and seafloor texture (acoustic backscatter) map products (Figures 3 and 4).
- **Tier 2** – The DEM grids of the bathymetric sounding data are used to create a variety of algorithmically derivative map products including shade relief, slope analysis and supervised substrate classifications (Figures 3 and 4).
- **Sub-bottom profiling** – Acoustic sub-bottom profilers are used to image and quantify the thickness of seafloor sediment layers (Figure 5).
- **Video Groundtruthing** – towed sleds equipped with video and still cameras are used to confirm and document the seafloor substrate types identified in the Tier 1 and 2 products (Figure 6).
- **Tier 3** – California's most skilled and experienced marine geologists are interpreting the Tier 1 – 2 map products, video groundtruthing and sub-bottom profiling results to produce a series of detailed, 1:24,000 scale interpreted and classified habitat maps and geological strip charts spanning the terrestrial and marine landscapes within the state's coastal zone (Figure 7).



Tier 3 Products

Figure 6. USGS video groundtruthing tow sled being deployed (left), georeferenced video imagery (top right) and concordance of results in GIS superimposed with Tier 2 supervised substrate classification products (lower right).

Video Groundtruthing

Primary Facies Classification (from Horneshe Kyte Region)

- Rock/Rock
- Rock/Rock or Rock/Cobbles
- Camera Transit