

Onshore elevation data from NOAA Coastal Services Center (data collected by EarthData International in 2002-2005) and from U.S. Army Corps of Engineers data collected by Fugro Paragon in 2008.
Universal Transverse Mercator projection, Zone 11N
NOT INTENDED FOR NAVIGATIONAL USE

APPROXIMATE BEAM
DECLINATION (m)

SCALE 1:24,000
1 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 2 3 4 5 6 7 8 9 10 KILOMETER
BATHYMETRIC CONTOUR INTERVAL: 10 METERS
ONE MILE = 1.609 NAUTICAL MILES

MAP LOCATION

Potential marine benthic habitats mapped by Charles A. Endris, H. Gary Greene, and Nadine E. Golden, 2011.
Bathymetric contours by Andrew C. Heide, 2011.
GIS database and digital cartography by Elyse L. Phillips, Charles A. Endris, Nadine E. Golden, and Mercedes C. Erley.
Edited by Terry A. Lindquist
Manuscript approved for publication June 13, 2013

Potential Marine Benthic Habitats, Offshore of Carpinteria Map Area, California

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2013

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- DESCRIPTION OF MAP UNITS**
- UNCONSOLIDATED CONTINENTAL SHELF SEDIMENTS**
- Se(s/m)_ru Soft, unconsolidated, rippled sediment (sand and mud)
 - Se(s/m)_u7 Terraces, or possibly delta or fan, made up of soft, unconsolidated sediment (sand and mud); inferred
 - Se(s/m)_eu7 Pockmarks or depressions, in soft, unconsolidated sediment (sand and mud)
 - Se(s/g)_u Soft, unconsolidated sediment (sand and gravel), on flat shelf
 - Se(s/g)_u Soft, unconsolidated sediment (sand and gravel), on nearshore delta
 - Se(s/g)_hu Hummocky, soft, unconsolidated delta sediment (sand and gravel)
 - Ssm_u Soft, unconsolidated sediment mound
- MIXED SUBSTRATE ON CONTINENTAL SHELF**
- Sme_cvu Mixed habitat of soft, unconsolidated sediment, overlying hard, consolidated sedimentary bedrock
 - Smm_uvu Mixed habitat of soft, unconsolidated sediment, overlying edges of hard, carbonate mound
- HARD SUBSTRATE ON CONTINENTAL SHELF**
- Shm_l Hard mound made up of carbonate rock
 - She_c Hard, consolidated sedimentary-bedrock outcrop
 - Shd_cld Deformed and differentially eroded, consolidated sedimentary-bedrock outcrop
 - Shv(y)_c Hard, consolidated sedimentary rock, boulder, or pinnacle
- ANTHROPOGENIC FEATURES**
- Se(s/m)_a-btu Trawl grooves and marks, in soft, unconsolidated sediment (sand and mud)
 - Se(s/m)_av(t) Oil-platform-generated shell hash mixed with soft, unconsolidated sediment (sand and mud)
 - Se(s/g)_a-sm Anthropogenically deposited, soft, unconsolidated sediment (sand and gravel), in dredge mound adjacent to man-made island (Rincon Island)
 - Ssm_av(t) Soft, unconsolidated sediment and shell-hash mound, adjacent to oil platform (anthropogenic)
 - Shv_a-sv Oil-platform-related depressional features east of platform "A," in soft, unconsolidated sediment; inferred
 - Smm_a-pvu Mixed habitat of soft, unconsolidated sediment, forming linear ridge over hard anthropogenic feature (pipeline)
 - Smm_a-cvu Mixed habitat of soft, unconsolidated sediment, in linear trough overlying hard anthropogenic feature (pipeline)
 - Smm_a-s(t) Mixed habitat of soft, unconsolidated sediment, in linear trough overlying hard anthropogenic feature (cable)
 - Shm_a-s(t) Oil-platform structural-foundation framework (legs and pipes) and shell mound
 - Sh_a-g Hard anthropogenic feature (pipeline)
 - Sh_a-p Hard anthropogenic feature (grain or jetty)

- EXPLANATION OF MAP SYMBOLS**
- Contact
 - Area of "no data"—Areas near shoreline not mapped owing to insufficient high-resolution seafloor mapping data; areas beyond 3 nautical-mile limit of California's State waters were not mapped as part of California Seafloor Mapping Program
 - 3-nautical-mile limit of California's State Waters
 - Bathymetric contour (in meters)

This map shows "potential" marine benthic habitats in the Offshore of Carpinteria map area. Marine benthic habitats represent a particular type of substrate, geomorphology, seafloor process, or any other attribute that may provide a habitat for a specific species or an assemblage of organisms. Such maps are based largely on seafloor geology, and this map integrates seafloor geology (sheet 10) with information depicted on several other thematic maps of the Offshore of Carpinteria map area: high-resolution bathymetry (sheet 1), shaded-relief imagery (sheet 2), backscatter (sheet 3), seafloor character (sheet 5), and ground-truth information (sheet 6). This map also uses information from seABED bottom sampling compilation by Reid and others (2006). The combination of remotely observed data (for example, multibeam bathymetry and backscatter, seismic-reflection profiles) and directly observed data (for example, camera transects, sediment samples) translates to higher confidence in the ability to interpret broad areas of the seafloor.

To avoid any possible misunderstanding of the term "habitat," the term "potential habitat" (as defined by Greene and others, 2005) is used herein to describe a set of distinct seafloor conditions that in the future may qualify as an "actual habitat." Once habitat associations of a species are determined, they can be used to create maps that depict actual habitats, which then need to be confirmed by "ground-truth" surveying using in situ observations, video, and/or photographic documentation.

Marine benthic habitats are classified using the Benthic Marine Potential Habitat Classification Scheme, a mapping-attribute code developed by Greene and others (1999, 2007). In this map series, habitat-classification codes are based on the deepwater habitat classification scheme developed by Greene and others (1999), which was created to not only easily distinguish marine benthic habitats but also to facilitate ease of use and queries within GIS and database programs. The code, which is summarized in chapter 6 in the accompanying pamphlet, is derived from several categories of the Benthic Marine Potential Habitat Classification Scheme (Greene and others, 1999, 2007), and it can be subdivided on the basis of the spatial scale of the data.

High-resolution, multibeam-sound data, converted to bathymetric depth grids (seafloor digital elevation models; sheet 1), are essential to development of the habitat map. Shaded-relief imagery (sheet 2) allows for visualization of seafloor terrain, providing a foundation for interpretation of submarine landforms. Areas of seafloor-bedrock exposures are identified by their common sharp edges and high relative relief; these may be contiguous outcrops, isolated parts of outcrops protruding through sediment cover (pinacles or knobs), or isolated boulders. High backscatter is further indication of "hard" bottom, consistent with interpretation as rock or coarse sediment. In many locations, areas within or around a rocky feature appear to be covered by a thin veneer of sediment, identified on the habitat map as "mixed" indication in other words, containing both rock and sediment). Broad, generally smooth areas of the seafloor that lack sharp and angular edge characteristics are mapped as "sediment" and are further defined by various sedimentary features such as erosional scars and depressions, as well as depositional features such as dunes, mounds, or sand waves. Low backscatter, indicative of a "soft" bottom, also significantly aids identification and classification of sedimentary habitats.

The Offshore of Carpinteria map area is mostly flat with local small areas of low-relief sedimentary-bedrock exposures and a coarse-grained delta offshore of Rincon Point. Backscatter data (sheet 3) show that most of the area is underlain by "soft" materials, consistent with the interpretation that unconsolidated sediment dominates the habitat types in the map area. Habitat types range from predominantly soft, unconsolidated sediment (sand and mud to gravel) to small areas of hard bedrock exposures and coarse-grained sediment (gravel to boulders). In some places, rock exposures and adjacent sediment combine to produce a hard-soft mixed habitat type. Twenty-four potential marine benthic habitat types are delineated in the map area, all on the continental shelf ("Shelf" megahabitat). The meso- and macrohabitats include bedrock exposures, terraces, delta, and carbonate mounds, with pockmarks, depressions, and anthropogenic features as modifiers.

Although much of the map area is flat and appears to be fairly homogeneous, it also contains three locally exposed outcrops of differentially eroded sedimentary rock: these include overhangs and crevices, which are potentially good habitat for rockfish (Sebastes spp.). Significant anthropogenic features associated with oil production, such as platforms, pipelines, and shell mounds beneath platforms, as well as jetties and groins, also produce artificial habitats for rockfish. Small areas of carbonate mounds and pavement provide hard habitat on the soft, sediment-covered shelf and provide substrate for encrusting and sessile organisms.

The soft, unconsolidated sediment habitat, which includes pockmarks and carbonate mounds, covers 135.67 km² of the map area, representing 95.5 percent of all of the potential habitat types identified. Sediment-covered bedrock, which includes the hard-soft mixed habitat type, covers 2.15 km² (1.5 percent). Hard bedrock exposures cover 1.21 km² (0.9 percent), whereas anthropogenic features cover about 3.06 km² (<2.2 percent).

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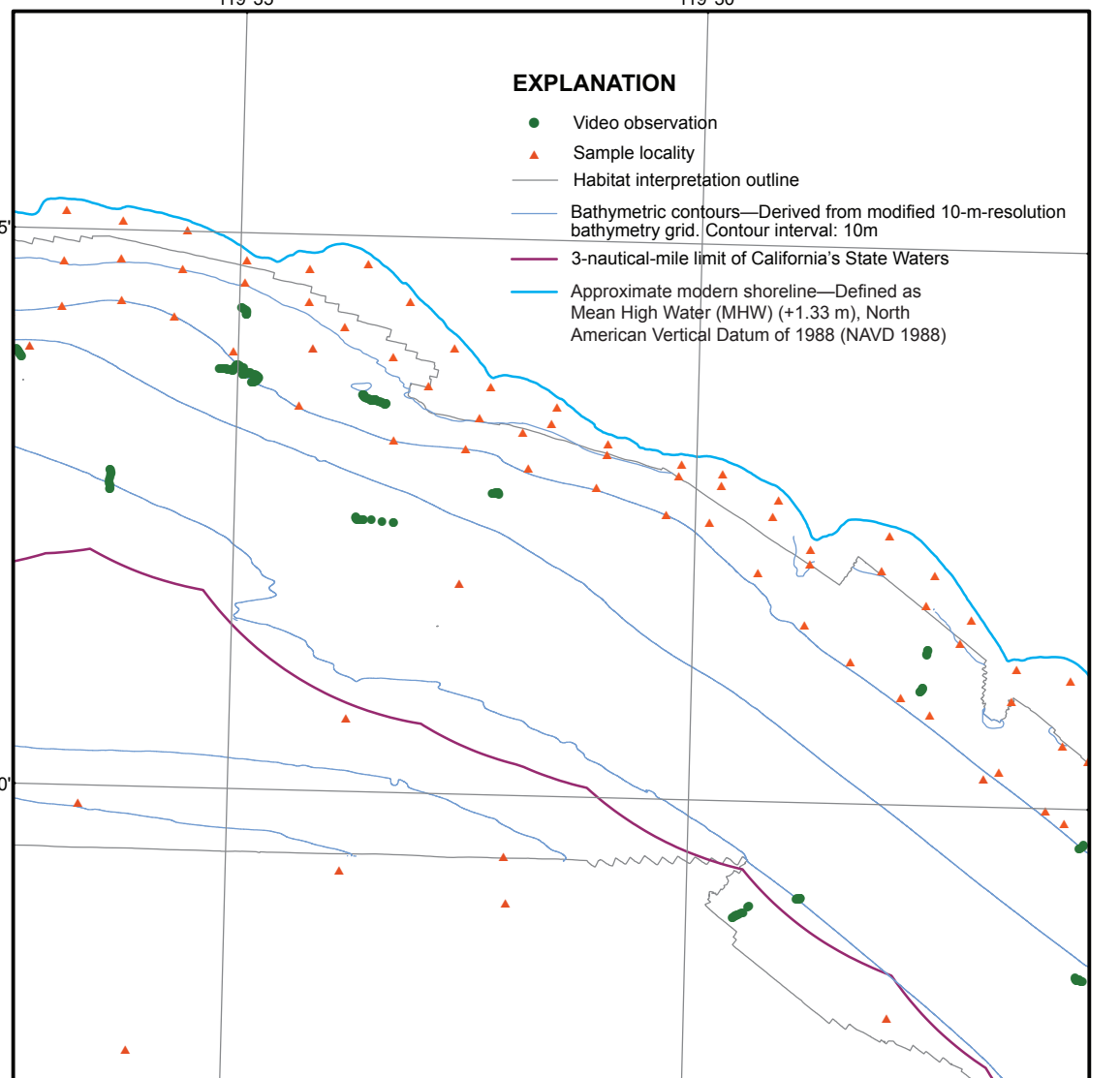
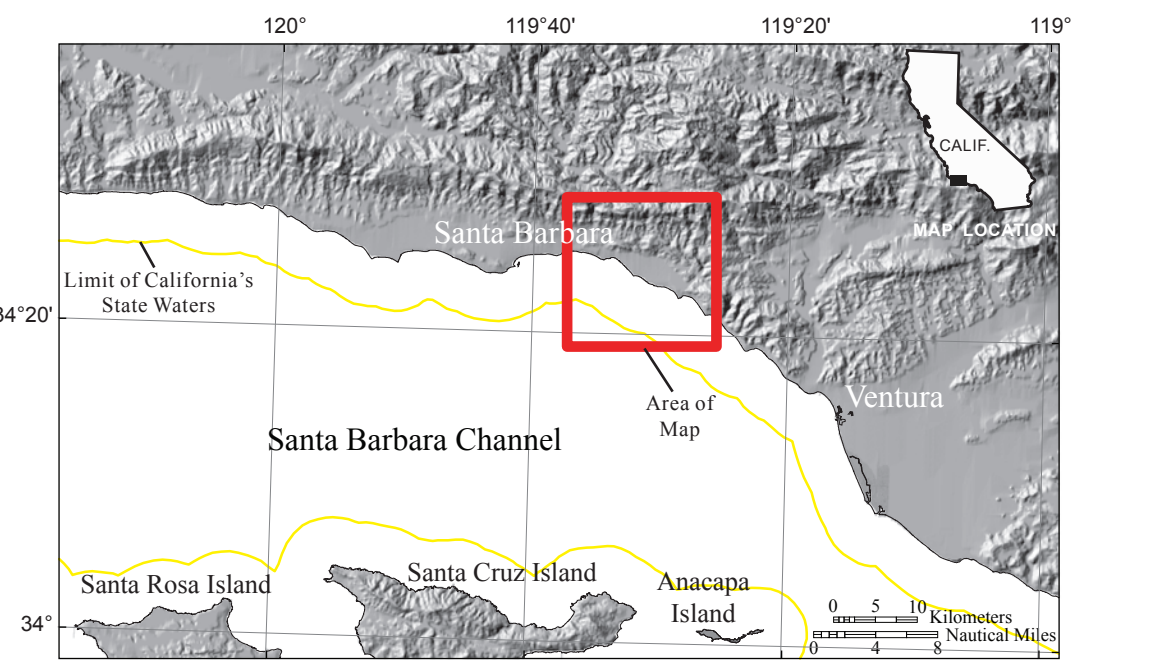


Figure 1. Map showing video observation locations and sample localities for Offshore of Carpinteria map area.