

Onshore elevation data from NOAA Coastal Services Center (data collected by EarthData International in 2002-2003). California's State Waters limit from NOAA Office of Coast Survey.
Universal Transverse Mercator projection, Zone 11N
NOT INTENDED FOR NAVIGATIONAL USE

APPROXIMATE MEAN OCCUPATION, 2010

SCALE 1:24 000
1 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 2 KILOMETER
BATHYMETRIC CONTOUR INTERVAL 10 METERS
ONE MILE = 0.869 NAUTICAL MILES

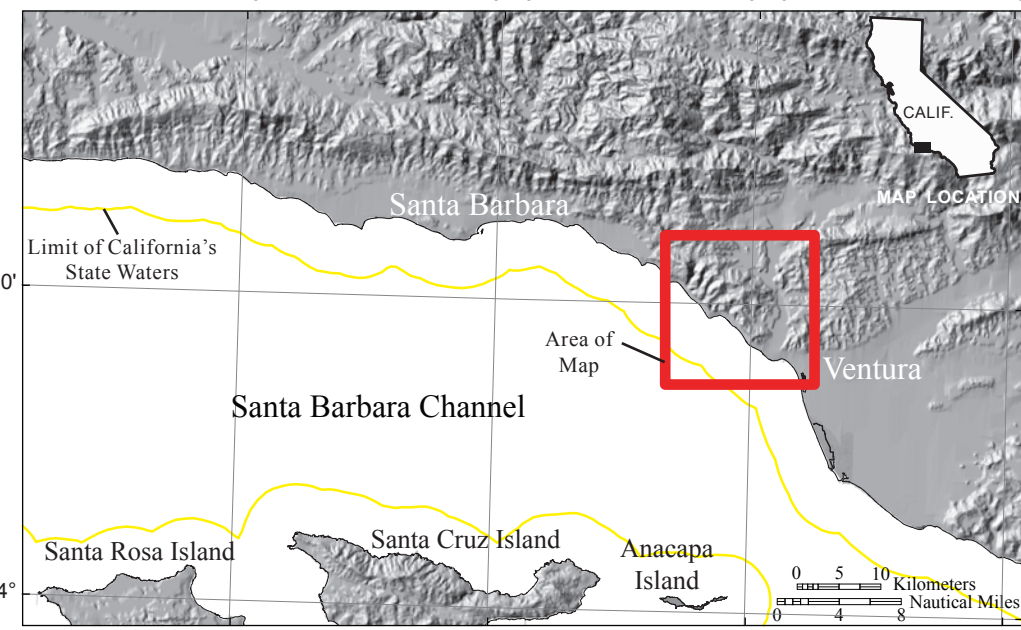
MAP LOCATION

Potential marine benthic habitats mapped by Charles A. Endris, H. Gary Greene, and Nadine E. Golden, 2011.
Bathymetric contours by Andrew C. Richey, 2011.
GIS database and digital cartography by Charles A. Endris, Nadine E. Golden, and Marcellus D. Erley.
Edited by Tanya A. Lindquist.
Manuscript approved for publication March 11, 2012.

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

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2013

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DESCRIPTION OF MAP UNITS

UNCONSOLIDATED CONTINENTAL SHELF SEDIMENTS

Ss(s)_ru?	Soft, unconsolidated rippled sediment (sand); inferred
Ss(s)m_ru	Soft, unconsolidated sediment (sand and mud), predominantly rippled
Ss(s)m_h_eu	Pockmarks or depressions in soft, unconsolidated sediment (sand and mud)
Ss(s)ghw_r/su	Soft, mobile sediment window that has hummocky, unconsolidated, and rippled sediment waves overlying scored lag pavement of sand and gravel
Ss(s)g_l_u	Soft, unconsolidated sediment (sand and gravel) on flat shelf
Ss(s)g_l_hu	Hummocky, unconsolidated sediment (sand and gravel)
Ssm_u	Soft, unconsolidated sediment mound

HARD SUBSTRATE

Sme_c/u	Mixed habitat of soft, unconsolidated sediment overlying hard, consolidated sedimentary bedrock
She_c	Hard, consolidated sedimentary-bedrock outcrop
Sh(b)ip_c	Hard, consolidated sedimentary rock, boulders, or pinnacle

ANTHROPOGENIC FEATURES

Ss(s)g_l_a-dm	Anthropogenically deposited, unconsolidated sediment (sand and gravel), in dredge mound adjacent to man-made island (Rincon Island)
Smm_a-p/u	Mound of soft, unconsolidated sediment overlying hard anthropogenic feature (pipeline)
Smm_h_a-p/u	Linear depression in soft, unconsolidated sediment overlying hard anthropogenic feature (pipeline)
Sh_a-g	Hard anthropogenic feature (groin or jetty)
Sh_a-p	Hard anthropogenic feature (pipeline)

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)—Derived from modified 10-m-resolution bathymetry grid. Contour intervals: 10 m	

DISCUSSION

This map shows "potential" marine benthic habitats in the Offshore of Ventura 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 Ventura map area: high-resolution bathymetry (sheets 1, 2), backscatter (sheet 3), shaded-relief-profile imagery (sheet 4), seafloor character (sheet 5), and ground-truth information (sheet 6). This map also uses information from usSEABED 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-attribution code developed by Greene and others (1999, 2007). In this map series, habitat-classification codes are based on the deepwater habitat-characterization 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-sonar data, converted to bathymetric depth grids (seafloor digital elevation models; sheets 1, 2), are essential to development of the habitat map. Shaded-relief-profile imagery (sheet 4) 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 outcrop protruding through sediment cover (pinnacles 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" indentation (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 Ventura map area contains 15 potential marine benthic habitat types, which range from primarily soft, unconsolidated sediment (mud to sand and gravel) to hard bedrock exposures. Sedimentary-bedrock outcrops (some partly covered with sediment to produce a mixed hard-soft habitat type), pockmarks, and mounds complete the variety of habitats identified in the map area.

The soft, unconsolidated sediment habitat, which includes pockmarks and mounds, covers 97.7 km² of the map area, representing 97.2 percent of all of the potential habitat types identified. Sediment-covered bedrock, which includes the mixed hard-soft habitat type, covers 0.13 km² (0.1 percent). Areas where the soft, unconsolidated sediment is rippled and dynamic cover about 2.37 km² (2.4 percent). Hard bedrock exposures cover 0.24 km² (0.2 percent), whereas anthropogenic features cover less than 0.1 km² (<0.1 percent).

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Reid, J.A., Reid, J.M., Jenkins, C.J., Zimmerman, M., Williams, S.J., and Field, M.E., 2006, usSEABED—Pacific Coast (California, Oregon, Washington) offshore surficial-sediment data release: U.S. Geological Survey Data Series 182, available at <http://pubs.usgs.gov/ds/2006/182/>.

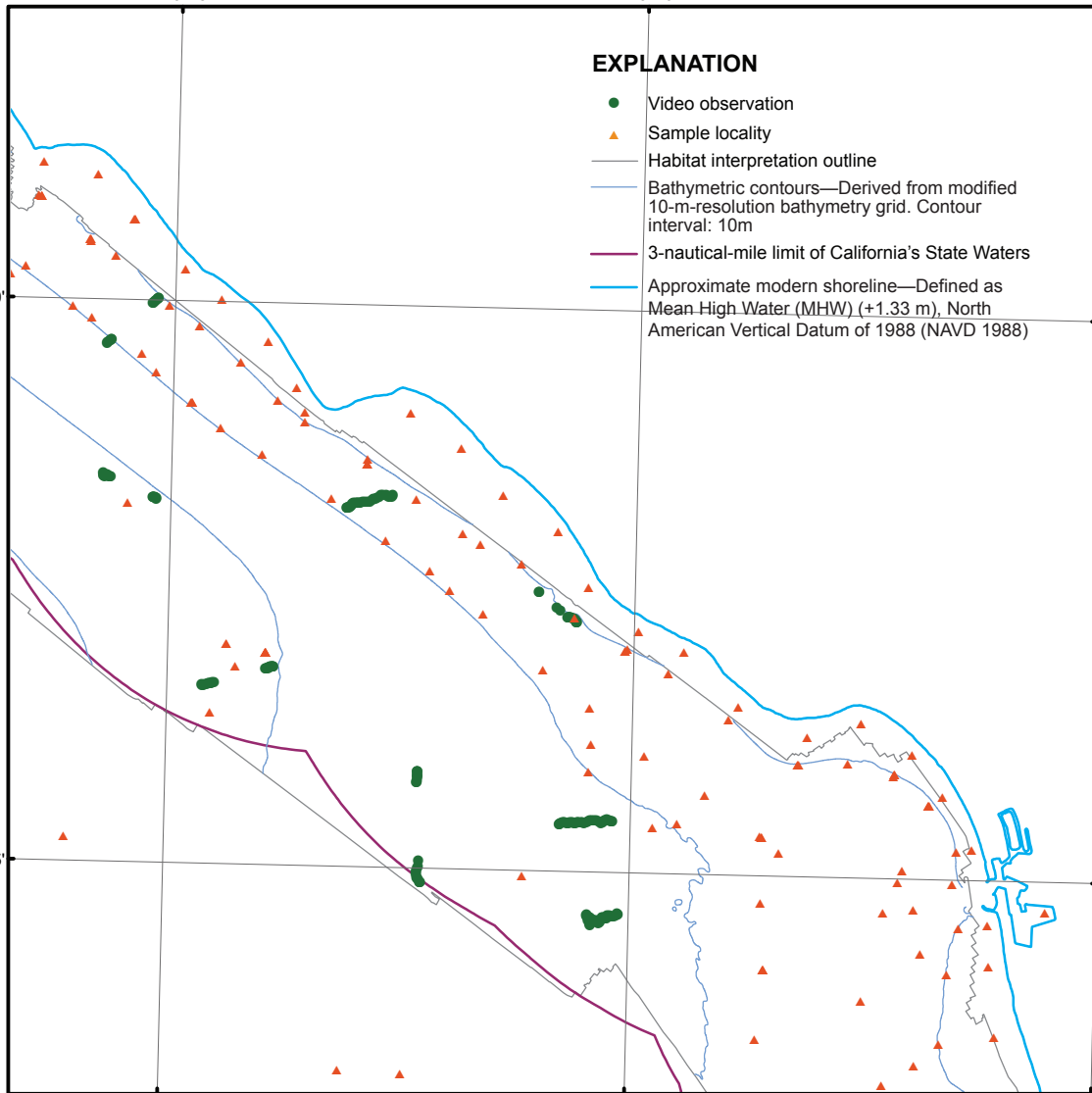


Figure 1. Map showing video-observation locations and sample localities for Offshore of Ventura map area.



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Suggested Citation: Endris, C.A., Greene, H.G., and Golden, N.E., 2013, Potential marine benthic habitats, Offshore of Ventura map area, California, sheet 7 of 11, Charles A. Endris, H. Gary Greene, and Nadine E. Golden, eds., California State Waters Map Series—Offshore of Ventura, California: U.S. Geological Survey Scientific Investigations Map 3254, pamphlet 62 of 11 sheets, scale 1:24,000, available at <http://pubs.usgs.gov/cim/2014/>.