

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED CONTINENTAL SHELF SEDIMENTS

- Shsly_u Soft, unconsolidated delta sediment (fine silt and mud)
- Ssalm_rlu Soft, unconsolidated sediment (sand and mud), predominantly rippled
- Ssalm_u Deposition in soft, unconsolidated sediment (sand and mud)
- Ssalm_wlu Sediment waves in soft, unconsolidated, rippled sediment (sand and mud)
- Ssalm_slu Scarp of soft, unconsolidated sediment (sand and mud)
- Ssalm_hlu Unconsolidated dynamic mound of sediment (sand and mud)
- Ssalm_hru Hummocky and current-scoured, soft, unconsolidated sediment (sand and mud)
- Ssdl_u Soft, unconsolidated sediment (sand), predominantly rippled
- Ssdl_glu Soft, unconsolidated sediment (sand or gravel)
- Ssdl_hlu Hummocky and current-scoured, soft, unconsolidated sediment (coarse sand and gravel)
- Ssdl_hru Soft, mobile sediment window that has unconsolidated and rippled sediment waves, overlying scoured lag pavement of sand and gravel (sorted bedforms)

MIXED SUBSTRATE ON CONTINENTAL SHELF

- Ssm_u Mixed habitat of soft, unconsolidated sediment, overlying hard, consolidated sedimentary bedrock
- Ssm_gu Mixed habitat of soft, unconsolidated sediment, overlying hard, granitic bedrock

HARD SUBSTRATE ON CONTINENTAL SHELF

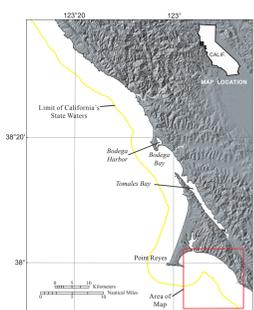
- Shd_cof Faulted, fractured, deformed, and differentially eroded sedimentary bedrock
- Shd_g Bedrock outcrop of hard granitic rock
- Shd_p Boulder or pinnacle of hard sedimentary bedrock
- Shd_p_g Boulder or pinnacle of hard granitic rock

ANTHROPOGENIC FEATURES

- Ssm_a? Mixed habitat of sediment-covered hard mounds composed of unidentified material, possibly marine debris, inferred
- Sh_a? Hard anthropogenic feature (shipwreck)

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 2-m-resolution bathymetry grid. Contour interval: 10 m



DISCUSSION

This map shows "potential" marine benthic habitats in the Drakes Bay and Vicinity 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 Drakes Bay and Vicinity 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 the usSFBED 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 (fig. 1).

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-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-sound data, converted to bathymetric depth grids (seafloor digital elevation models, sheet 1), are essential to development of the habitat map, as is shaded-relief imagery (sheet 2), which allows for visualization of seafloor terrain and provides 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.

Backscatter maps (sheet 3) also are essential for developing potential benthic habitat maps. 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" substratum (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 scours 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 Drakes Bay and Vicinity map area contains 19 potential marine benthic habitat types, covering 146.06 km², all of which are located on the continental shelf ("Shelf" megahabitat). These include unconsolidated continental shelf sediments (11 habitat types), mixed substrate on the continental shelf (2 habitat types), hard substrate on the continental shelf (4 habitat types), and anthropogenic features (2 habitat types). The predominant habitat type by area is soft, unconsolidated sediment, which covers 135.23 km² (92.6 percent). Exposed hard bedrock covers 7.37 km² (5.0 percent), and sediment-covered bedrock, which is of the mixed hard-soft induration class, covers 2.83 km² (1.9 percent). One shipwreck is present, although statistically insignificant; both hard and mixed anthropogenic features (unidentified, but possibly related to marine debris) cover 0.53 km² (0.4 percent). Rock outcrops and rubble are considered the primary habitat types for rockfish and lingcod (Cass and others, 1990; Love and others, 2002), both of which are recreationally and commercially important species. In addition, the shipwreck and other anthropogenic features may provide additional good potential habitat for rockfish.

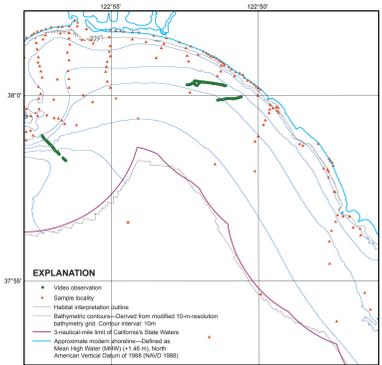


Figure 1. Map showing video observation locations and sample localities for Drakes Bay and Vicinity map area.

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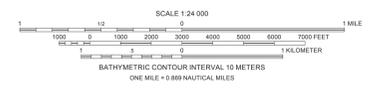
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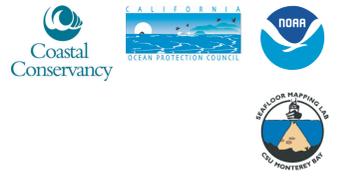
Drake elevation data from U.S. Geological Survey's National Elevation Dataset (available at <http://ned.srs.gov/>)
California's State Waters limit from NOAA Office of Coast Survey
Universal Transverse Mercator projection, Zone 104
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Potential marine benthic habitats mapped by H. Gary Greene, Charles A. Endris, and Bryan E. Dieter, 2015. Bathymetric contours by Mercedes D. Erdey, 2012.
GIS database and digital cartography by Charles A. Endris, Mercedes D. Erdey, and Erik N. Lowe.
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Potential Marine Benthic Habitats, Drakes Bay and Vicinity Map Area, California
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