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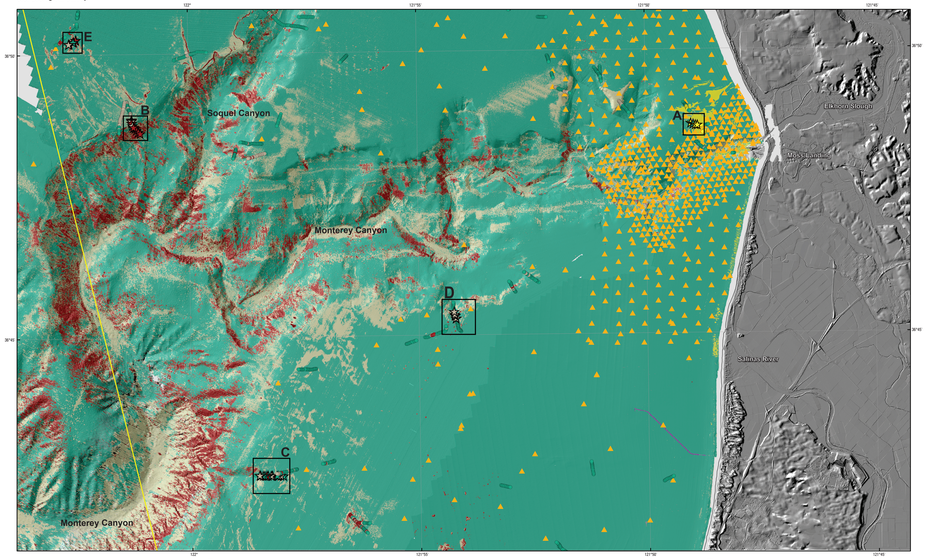
U.S. Department of the Interior
U.S. Geological Survey

Open-File Report 2016–1072
Sheet 6 of 10
Pamphlet accompanies map



Bathymetric elevation data from National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management's Digital Coast (available at http://www.csc.noaa.gov/digitalcoast/data/coastallidar) and from U.S. Geological Survey's National Elevation Dataset (available at http://ned.usgs.gov). Data sources for offshore bathymetry from map sheet 2 this report; California's State Waters lost from NOAA Office of Coast Survey.
Universal Transverse Mercator projection, Zone 10N

NOT INTENDED FOR NAVIGATIONAL USE

APPROXIMATE MEAN DECLINATION, 2016

SCALE 1:50 000
MILES
KILOMETER
NAUTICAL MILES
ONE MILE = 0.869 NAUTICAL MILES

MAP LOCATION

Seafloor character map simplified from map on sheet 3 of this report. Data compiled from digital still photographs taken in 2010 and 2012. Sample locations from ucSEARCH (Reid and others, 2006).
Digital compilation and cartography by Pauline E. Golden and Mercedes D. Erdey.
Manuscript approved for publication May 16, 2016

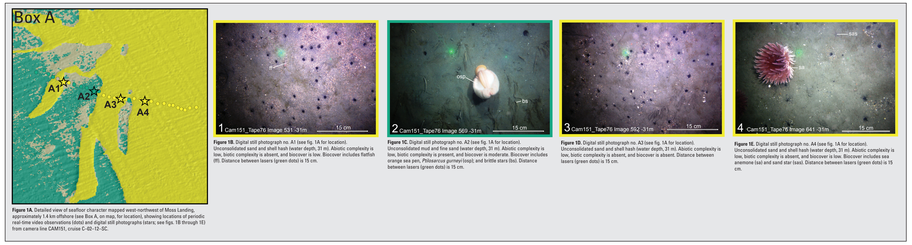


Figure 1A. Detailed view of seafloor character mapped west-northwest of Moss Landing, approximately 1.4 km offshore (see Box A, on map, for location), showing locations of periodic real-time video observations (dots) and digital still photographs (stars; see figs. 1B through 1E) from camera line CAM151, cruise C-02-12-SC.

Figure 1B. Digital still photograph no. A1 (see fig. 1A for location). Unconsolidated sand and shell hash lester depth, 31 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes flatfish (fl). Distance between lasers (green dots) is 15 cm.

Figure 1C. Digital still photograph no. A2 (see fig. 1A for location). Unconsolidated mud and fine sand (water depth, 31 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes orange sea pen, *Ptilosarcus gurneyi* (soft), and brittle stars (bs). Distance between lasers (green dots) is 15 cm.

Figure 1D. Digital still photograph no. A3 (see fig. 1A for location). Unconsolidated sand and shell hash lester depth, 31 m). Abiotic complexity is low, biotic complexity is absent, and boccover is absent. Distance between lasers (green dots) is 15 cm.

Figure 1E. Digital still photograph no. A4 (see fig. 1A for location). Unconsolidated sand and shell hash lester depth, 31 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes sea anemone (sa) and sand star (sas). Distance between lasers (green dots) is 15 cm.

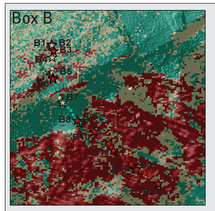


Figure 2A. Detailed view of seafloor character mapped west of Moss Landing, approximately 19 km offshore (see Box B, on map, for location), showing locations of periodic real-time video observations (dots) and digital still photographs (stars; see figs. 2B through 2G) from camera line CAM134, cruise C-02-12-SC.

Figure 2B. Digital still photograph no. B1 (see fig. 2A for location). Rock outcrop (water depth, 94 m). Abiotic complexity is high, biotic complexity is present, and boccover is high. Boccover includes orange sea pen, *Ptilosarcus gurneyi* (sa), crinoids, *Florometra serratissima* (crc), vermillion star, *Mediaster aequalis* (ve), and cup corals (cc). Distance between lasers (green dots) is 15 cm.

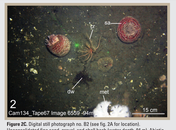


Figure 2C. Digital still photograph no. B2 (see fig. 2A for location). Unconsolidated fine sand and mud (water depth, 94 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes sea anemones (sa), white plumed anemones, *Meridium* spp. (met), crinoids, *Florometra serratissima* (crc), and driftwood (dw). Distance between lasers (green dots) is 15 cm.

Figure 2D. Digital still photograph no. B3 (see fig. 2A for location). Rock outcrop (water depth, 94 m). Abiotic complexity is high, biotic complexity is present, and boccover is moderate. Boccover includes crinoids, *Florometra serratissima* (crc), brachiopods (bra), cup corals (cc), sea cucumbers (scc), and multiple species of sea stars (ss). Distance between lasers (green dots) is 15 cm.

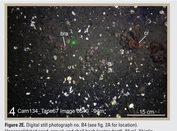


Figure 2E. Digital still photograph no. B4 (see fig. 2A for location). Rock outcrop (water depth, 94 m). Abiotic complexity is high, biotic complexity is present, and boccover is moderate. Boccover includes crinoids, *Florometra serratissima* (crc), and brachiopods (bra). Distance between lasers (green dots) is 15 cm.

Figure 2F. Digital still photograph no. B5 (see fig. 2A for location). Rock outcrop (water depth, 94 m). Abiotic complexity is high, biotic complexity is present, and boccover is high. Boccover includes crinoids, *Florometra serratissima* (crc), sea cucumber (scc), cup coral (cc), and lingcod, *Ophiodon elongatus* (lc). Distance between lasers (green dots) is 15 cm.

Figure 2G. Digital still photograph no. B6 (see fig. 2A for location). Rock outcrop (water depth, 100 m). Abiotic complexity is high, biotic complexity is present, and boccover is high. Boccover includes crinoids, *Florometra serratissima* (crc), cup corals (cc), brittle stars (bs), and bryozoans (bry). Distance between lasers (green dots) is 15 cm.

Figure 2H. Digital still photograph no. B7 (see fig. 2A for location). Rock outcrop (water depth, 116 m). Abiotic complexity is high, biotic complexity is present, and boccover is moderate. Boccover includes crinoids, *Florometra serratissima* (crc), cup corals (cc), sea stars (ss), and tube anemone (ta). Distance between lasers (green dots) is 15 cm.

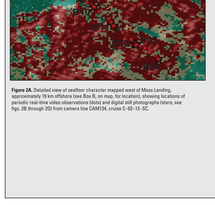


Figure 3A. Detailed view of seafloor character mapped southwest of Moss Landing, approximately 13.8 km offshore (see Box C, on map, for location), showing locations of periodic real-time video observations (dots) and digital still photographs (stars; see figs. 3B through 3O) from camera line CAM140, cruise C-02-12-SC.

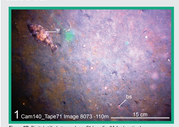


Figure 3B. Digital still photograph no. C1 (see fig. 3A for location). Unconsolidated fine sand and shell hash lester depth, 110 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes flatfish (ff) and brittle stars (bs). Distance between lasers (green dots) is 15 cm.

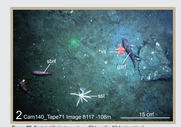


Figure 3C. Digital still photograph no. C2 (see fig. 3A for location). Unconsolidated fine sand, shell hash, and scattered boulders (water depth, 109 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes sea star (ss); vermillion star, *Mediaster aequalis* (ve); greenstipped rockfish, *Sebastes elongatus* (gsrf); and shortbelly rockfish, *Sebastes jordani* (sbrf). Distance between lasers (green dots) is 15 cm.

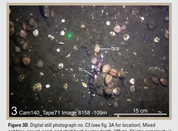


Figure 3D. Digital still photograph no. C3 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 109 m). Abiotic complexity is low, biotic complexity is absent, and boccover is high. Boccover includes brachiopods (bra); vermillion star, *Mediaster aequalis* (ve); and cusk eel (ce). Distance between lasers (green dots) is 15 cm.

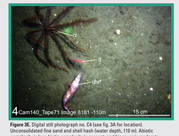


Figure 3E. Digital still photograph no. C4 (see fig. 3A for location). Unconsolidated fine sand and shell hash lester depth, 110 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes crinoid, *Florometra serratissima* (crc); gorgonian (gc); and chilipepper rockfish, *Sebastes goodei* (chrf). Distance between lasers (green dots) is 15 cm.

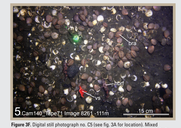


Figure 3F. Digital still photograph no. C5 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 111 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes brachiopods (bra); vermillion star, *Mediaster aequalis* (ve); and halfbanded rockfish, *Sebastes semicinctus* (rbrf). Distance between lasers (green dots) is 15 cm.

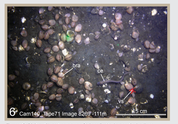


Figure 3G. Digital still photograph no. C6 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 111 m). Abiotic complexity is low, biotic complexity is absent, and boccover is high. Boccover includes brachiopods (bra); vermillion star, *Mediaster aequalis* (ve); and cusk eel (ce). Distance between lasers (green dots) is 15 cm.

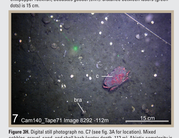


Figure 3H. Digital still photograph no. C7 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 112 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes crab (cr) and brachiopods (bra). Distance between lasers (green dots) is 15 cm.

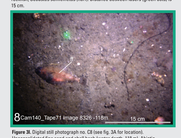


Figure 3I. Digital still photograph no. C8 (see fig. 3A for location). Unconsolidated fine sand and shell hash lester depth, 118 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes flatfish (ff). Distance between lasers (green dots) is 15 cm.

Figure 3J. Digital still photograph no. C9 (see fig. 3A for location). Rock outcrop (water depth, 127 m). Abiotic complexity is high, biotic complexity is present, and boccover is moderate. Boccover includes gorgonian (gc); crinoid, *Florometra serratissima* (crc); vermillion star, *Mediaster aequalis* (ve); and two species of rockfish (rf). Distance between lasers (green dots) is 15 cm.

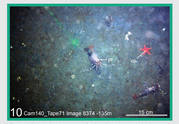


Figure 3K. Digital still photograph no. C10 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 135 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes spot prawn, *Pandalus platyceros* (pr); and vermillion star, *Mediaster aequalis* (ve). Distance between lasers (green dots) is 15 cm.

Figure 3L. Digital still photograph no. C11 (see fig. 3A for location). Unconsolidated sand and shell hash lester depth, 140 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes flatfish (ff) and cusk eel (ce). Distance between lasers (green dots) is 15 cm.

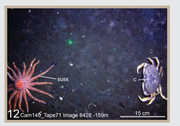


Figure 3M. Digital still photograph no. C12 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 156 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes sunflower sea star (suss) and crab (c). Distance between lasers (green dots) is 15 cm.

Figure 3N. Digital still photograph no. C13 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 170 m). Abiotic complexity is low, biotic complexity is absent, and boccover is moderate. Boccover includes sunflower sea star (suss); flatfish (ff); vermillion star, *Mediaster aequalis* (ve); and spotted ratfish, *Hydrolagus colliei* (rat). Distance between lasers (green dots) is 15 cm.

Figure 3O. Digital still photograph no. C14 (see fig. 3A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 170 m). Abiotic complexity is low, biotic complexity is absent, and boccover is moderate. Boccover includes vermillion star, *Mediaster aequalis* (ve); flatfish (ff); and spot prawn, *Pandalus platyceros* (pr). Distance between lasers (green dots) is 15 cm.

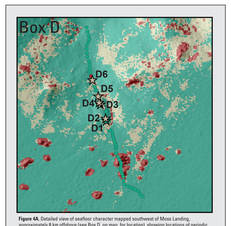


Figure 4A. Detailed view of seafloor character mapped southwest of Moss Landing, approximately 8 km offshore (see Box D, on map, for location), showing locations of periodic real-time video observations (dots) and digital still photographs (stars; see figs. 4B through 4G) from camera line CAM147, cruise C-02-12-SC.

Figure 4B. Digital still photograph no. D1 (see fig. 4A for location). Unconsolidated fine sand and mud (water depth, 109 m). Abiotic complexity is low, biotic complexity is present, and boccover is low. Boccover includes orange sea pen, *Ptilosarcus gurneyi* (sp); and crinoid, *Florometra serratissima* (crc). Distance between lasers (green dots) is 15 cm.

Figure 4C. Digital still photograph no. D2 (see fig. 4A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 108 m). Abiotic complexity is low, biotic complexity is present, and boccover is low. Boccover includes flatfish (ff); and crinoid, *Florometra serratissima* (crc). Distance between lasers (green dots) is 15 cm.

Figure 4D. Digital still photograph no. D3 (see fig. 4A for location). Mixed cobbles, gravel, sand, and shell hash lester depth, 121 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes crinoid, *Florometra serratissima* (crc); gorgonian (gc); cup coral (cc); and sea cucumber (sc). Distance between lasers (green dots) is 15 cm.

Figure 4E. Digital still photograph no. D4 (see fig. 4A for location). Mixed boulders, cobbles, sand, and shell hash lester depth, 123 m). Abiotic complexity is low, biotic complexity is present, and boccover is low. Boccover includes crinoids, *Florometra serratissima* (crc), and sea anemone (sa). Distance between lasers (green dots) is 15 cm.

Figure 4F. Digital still photograph no. D5 (see fig. 4A for location). Mixed boulders, cobbles, sand, and shell hash lester depth, 124 m). Abiotic complexity is low, biotic complexity is present, and boccover is moderate. Boccover includes crinoids, *Florometra serratissima* (crc); and vermillion stars, *Mediaster aequalis* (ve). Distance between lasers (green dots) is 15 cm.

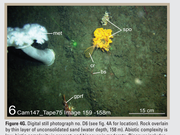


Figure 4G. Digital still photograph no. D6 (see fig. 4A for location). Rock overhang (water depth, 108 m). Abiotic complexity is high, biotic complexity is present, and boccover is moderate. Boccover includes white plumed anemone, *Meridium* spp. (met); brittle stars (bs); crinoid, *Florometra serratissima* (crc); graneyspotted rockfish, *Sebastes chlorostictus* (gsrf); and two species of sponge (spo). Distance between lasers (green dots) is 15 cm.

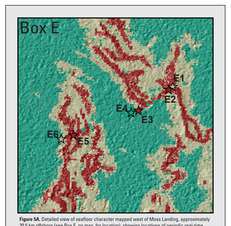


Figure 5A. Detailed view of seafloor character mapped west of Moss Landing, approximately 20.5 km offshore (see Box E, on map, for location), showing locations of periodic real-time video observations (dots) and digital still photographs (stars; see figs. 5B through 5G) from camera line CAM133, cruise C-03-12-SC.

Figure 5B. Digital still photograph no. E1 (see fig. 5A for location). Rock outcrop overlain by thin layer of unconsolidated sand and shell hash lester depth, 91 m). Abiotic complexity is moderate, biotic complexity is present, and boccover is high. Boccover includes white plumed anemone, *Meridium* spp. (met); sunflower sea star (suss); driftweed (dw); and brachiopods (bra). Distance between lasers (green dots) is 15 cm.

Figure 5C. Digital still photograph no. E2 (see fig. 5A for location). Interface between rock outcrop and sand channel that contains shell hash lester depth, 92 m). Abiotic complexity is moderate, biotic complexity is present, and boccover is low. Boccover includes sea cucumber (sc), brachiopod (bra), gorgonian (gc), and cup coral (cc). Distance between lasers (green dots) is 15 cm.

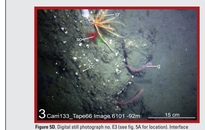


Figure 5D. Digital still photograph no. E3 (see fig. 5A for location). Interface between rock outcrop and unconsolidated sand lester depth, 92 m). Abiotic complexity is moderate, biotic complexity is present, and boccover is moderate. Boccover includes crinoid, *Florometra serratissima* (crc); gorgonian (gc); cup coral (cc); and sea cucumber (sc). Distance between lasers (green dots) is 15 cm.

Figure 5E. Digital still photograph no. E4 (see fig. 5A for location). Unconsolidated fine sand and mud lester depth, 92 m). Abiotic complexity is low, biotic complexity is absent, and boccover is low. Boccover includes lingcod, *Ophiodon elongatus* (lc); and brittle stars (bs). Distance between lasers (green dots) is 15 cm.

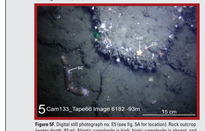


Figure 5F. Digital still photograph no. E5 (see fig. 5A for location). Rock outcrop (water depth, 93 m). Abiotic complexity is high, biotic complexity is absent, and boccover is moderate. Boccover includes sea cucumber (sc), cup coral (cc), and sea star (ses). Distance between lasers (green dots) is 15 cm.

Figure 5G. Digital still photograph no. E6 (see fig. 5A for location). Interface between rock outcrop and sand channel that contains shell hash lester depth, 93 m). Abiotic complexity is moderate, biotic complexity is present, and boccover is moderate. Boccover includes brachiopods (bra) and cup corals (cc). Distance between lasers (green dots) is 15 cm.

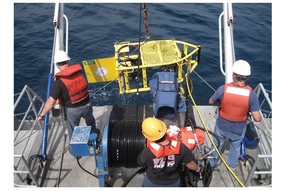


Figure 6. USGS-designed camera sled being launched off research vessel in preparation for ground-truth studies. Components onboard sled include four digital video camcorders, one 8-megapixel digital SLR camera, lasers for scale, and various strobe and video lights, as well as telemetry instrumentation that records depth, altitude, and compass heading.

Ground-Truth Studies, Monterey Canyon and Vicinity Map Area, California

By
Mercedes D. Erdey,[1] Guy R. Cochrane,[1] Lisa M. Krigsman,[2] and Nadine E. Golden[1]

2016

[1]U.S. Geological Survey;
[2]National Oceanic and Atmospheric Administration, National Marine Fisheries Service

DISCUSSION

Between 1998 and 2014, the seafloor in the Monterey Canyon and Vicinity map area in central California was mapped by California State University, Monterey Bay (CSUMB), the Monterey Bay Aquarium Research Institute (MBARI), and the U.S. Geological Survey (USGS), using both multibeam echosounders and bathymetric sidescan-sonar systems (see sheets 1, 2, 3). These mapping missions combined to collect bathymetry and acoustic-backscatter data from about the 10-m isobath to out beyond the limit of California's State Waters. In order to characterize the bathymetry and acoustic-backscatter data into geologically and biologically useful information, the USGS ground-truth-surveyed the data by a towing camera sled (fig. 6) over specific locations throughout the map area in 2010 and 2012.

During the ground-truth-survey cruises, the camera sled was towed 1 to 2 m above the seafloor, at speeds of between 1 and 2 nautical miles/hour. The sled housed two standard-definition (640×480 pixel resolution) video cameras (one forward looking, the other downward looking), a high-definition (1,080×1,920 pixel resolution) video camera, and an 8-megapixel digital still camera, which captured a digital still photograph once every 30 seconds. The video was relayed in real time to the research vessel, where USGS and National Oceanic and Atmospheric Administration (NOAA) scientists recorded both the geologic and biologic character of the seafloor once every minute, using programmable keypads. The location and direction of the ground-truthed tracklines were chosen in order to visually inspect areas thought to represent the full range of bathymetric and backscatter variability.

In the context of marine-fisheries management, benthic-habitat complexity can be divided into abiotic (geologic) and biotic (biologic) components. Benthic-habitat complexity refers to the visual classification of local abiotic and biotic vertical relief and structure that may provide potential refuge for both juvenile and adult forms of various species. Only abiotic attributes (primary- and secondary-substrate composition) were used in the production of the seafloor-character map on sheet 5. Classifications of primary and secondary substrate are based on the Wentworth (1922) scale of sediment grain-size categories, and the sand, cobble, and boulder sizes are classified as in Wentworth (1922). However, the difficulty in distinguishing the finest divisions in the Wentworth (1922) scale during video observations made it necessary to aggregate some grain-size classes: the granule and pebble sizes have been grouped together into a class called "gravel," and the clay and silt sizes have been grouped into a class called "mud." In addition, hard bottom and clasts larger than boulder size are classified as "rock." Primary and secondary substrate, by definition, constitute greater than 50 and 20 percent of the seafloor during an observation, respectively.

This sheet contains a smaller, simplified (depth-zone symbology has been removed) version of the seafloor-character map (sheet 5), on which the camera-sled tracklines used to ground-truth-survey the sonar data are indicated by aligned colored dots, each dot representing the location of a recorded observation. Primary- and secondary-substrate compositions are shown by differently colored dots. The map also shows the locations of the detailed views of seafloor character along some of the tracklines (boxes A through E) that are highlighted on this sheet (figs. 1A, 2A, 3A, 4A, 5A). Also shown are locations of samples (triangles) from ucSEARCH (Reid and others, 2006) that were used to supplement the ground-truth surveys.

The seafloor-character map highlights the two major geomorphic features in the Monterey Canyon and Vicinity map area: the continental shelf, and the Monterey Canyon system (including Soquel Canyon). The continental shelf in the map area is predominantly covered with soft sediment (mud and muddy sand) but contains small, local exposures of sedimentary bedrock. Rock exposures of the Purisima Formation, which primarily are situated along the continental shelf, are mapped as outcrops of sandstone that are intermittently covered by fine- to coarse-grained sediment. Within the Monterey Canyon system, large areas of rock outcrop are mapped as a mixture of coarse-grained sediment (gravel, sand, and fine sand (Clean 1) covers the axial channel. The seafloor-character map shows the difference between smoother canyon walls, which mostly are covered by finer muddy sediments, and the steeper and rougher walls that have exposed rock outcrops (Class III) and coarse sediment (Class II).

Each detailed view (figs. 1A, 2A, 3A, 4A, 5A) shows the locations of camera-sled tracklines (aligned colored dots), as well as of the photographs (colored stars) taken along the tracklines. These photographs, which are representative of the seafloor, are displayed with a description of the observed seafloor characteristics recorded by USGS and NOAA scientists (figs. 1B through 1E, 2B through 2G, 3B through 3O, 4B through 4G, 5B through 5G). Only primary and secondary substrates are reported, although individual photographs may show more substrate types. Organisms, when present, are labeled on the photographs.

Ground-truth surveys in the Monterey Canyon and Vicinity map area include approximately 137 trackline kilometers of video and more than 25,000 still photographs, in addition to 1,369 seafloor observations of abiotic and biotic attributes. A visual estimate of slope also was recorded.

GLOSSARY

Bagginess—A GIS-derived characterization of seafloor roughness, calculated as the ratio of the three-dimensional surface area of seafloor to the two-dimensional planar-base area, for each cell in the bathymetry grid.

Backscatter intensity—The amplitude of the reflected sonar signal (see sheet 3) used to infer the hardness of the seafloor. Backscatter data are corrected to remove (as much as possible) the effects of water depth, angle of reflection, and bottom roughness.

Bioconplexity—The assessment of the presence or absence of biological structures that have the potential of providing shelter for fauna, determined by estimating the scale, the amount, and the morphology of biological relief (as described by Tissot and others, 2006).

Biocover—The visual estimate of the proportion of biologic cover by encrusting organisms: high, greater than 50 percent; moderate, between 50 percent and 10 percent; low, less than 10 percent.

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EXPLANATION

Substrate class

- **Fine- to medium-grained smooth sediment**—Low backscatter, low roughness; typically mud to medium-grained sand, often rippled and (or) bedformed
- **Mixed smooth sediment and rock**—Moderate to very high backscatter, low roughness; typically coarse-grained sand, gravel, cobbles, and bedrock
- **Medium- to coarse-grained sediment**—Very high backscatter, low roughness; typically medium- to coarse-grained sediment, with varying amounts of shell hash; in scour depressions
- **Rock and boulder, rugose**—High backscatter, high roughness; typically boulders and rugose bedrock
- **Anthropogenic material**—Related to development by humans

Location of real-time video observation and interpreted substrate class of seafloor

- **Fine- to medium-grained smooth sediment**—Low backscatter, low roughness; typically mud to medium-grained sand, often rippled and (or) bedformed
- **Mixed smooth sediment and rock**—Moderate to very high backscatter, low roughness; typically coarse-grained sand, gravel, cobbles, and bedrock
- **Medium- to coarse-grained sediment**—Very high backscatter, low roughness; typically medium- to coarse-grained sediment, with varying amounts of shell hash; in scour depressions
- **Rock and boulder, rugose**—High backscatter, high roughness; typically boulders and rugose bedrock

Location of digital still photograph and interpreted substrate class of seafloor

- **Fine- to medium-grained smooth sediment**—Low backscatter, low roughness; typically mud to medium-grained sand, often rippled and (or) bedformed
- **Mixed smooth sediment and rock**—Moderate to very high backscatter, low roughness; typically coarse-grained sand, gravel, cobbles, and bedrock
- **Medium- to coarse-grained sediment**—Very high backscatter, low roughness; typically medium- to coarse-grained sediment, with varying amounts of shell hash; in scour depressions
- **Rock and boulder, rugose**—High backscatter, high roughness; typically boulders and rugose bedrock

Interpreted substrate class depicted in digital still photograph—Indicated by colored frame; assumed photograph (not shown on map; shown in figures only)

- **Fine- to medium-grained smooth sediment**—Low backscatter, low roughness; typically mud to medium-grained sand, often rippled and (or) bedformed
- **Mixed smooth sediment and rock**—Moderate to very high backscatter, low roughness; typically coarse-grained sand, gravel, cobbles, and bedrock
- **Medium- to coarse-grained sediment**—Very high backscatter, low roughness; typically medium- to coarse-grained sediment, with varying amounts of shell hash; in scour depressions
- **Rock and boulder, rugose**—High backscatter, high roughness; typically boulders and rugose bedrock

Sample location

- **From ucSEARCH (Reid and others, 2006)**

Area of "no data"—Areas near shoreline not mapped owing to insufficient high-resolution seafloor mapping data; areas beyond limit of California's State Waters were not mapped as part of California Seafloor Mapping Program

- **Limit of California's State Waters**

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