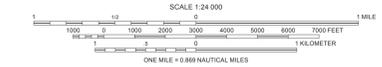


Derivative elevation data from NOAA Coastal Services Center. Data collected by EarthData International in 2002-2005 and from U.S. Army Corps of Engineers data collected by Pope Pappas, in 2005. Original shaded-relief bathymetry from map area sheet 2, this report, California's State Waters limit from NOAA Office of Coast Survey.

Universal Transverse Mercator projection, Zone 11N

NOT INTENDED FOR NAVIGATIONAL USE



**DESCRIPTION OF MAP UNITS**

**DEPTH ZONE 2—INTERTIDAL TO 30 METERS WATER DEPTH**

SLOPE CLASS 1—0 TO 5 DEGREES

- Fine to medium-grained smooth sediment—Low backscatter, low rugosity; typically mud to medium-grained sand; often rippled and (or) burrowed
- Mixed smooth sediment and rock—Moderate to very high backscatter, low rugosity; typically coarse-grained sand, gravel, cobbles, and bedrock
- Rock and boulder, rugose—High backscatter, high rugosity; typically boulders and rugose bedrock
- Rugged anthropogenic material—High backscatter, high rugosity; related to development by humans
- Smooth, hard anthropogenic material—High backscatter, low rugosity; related to development by humans

**DEPTH ZONE 3—30 TO 100 METERS WATER DEPTH**

SLOPE CLASS 1—0 TO 5 DEGREES

- Fine to medium-grained smooth sediment—Low backscatter, low rugosity; typically mud to medium-grained sand; often rippled and (or) burrowed
- Mixed smooth sediment and rock—Moderate to very high backscatter, low rugosity; typically coarse-grained sand, gravel, cobbles, and bedrock
- Rock and boulder, rugose—High backscatter, high rugosity; typically boulders and rugose bedrock
- Rugged anthropogenic material—High backscatter, high rugosity; related to development by humans
- Smooth, hard anthropogenic material—High backscatter, low rugosity; related to development by humans

**EXPLANATION OF MAP SYMBOLS**

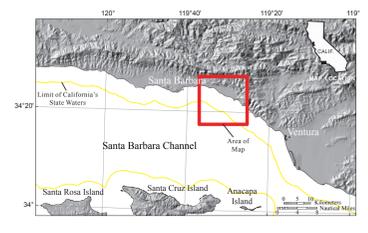
- Area of "no data"—Areas near shoreline not mapped owing to insufficient high-resolution seafloor mapping data; areas beyond 3-nautical-mile limit of California's State Waters were not mapped as part of California Seafloor Mapping Program
- 3-nautical-mile limit of California's State Waters

**DISCUSSION**

This seafloor-character map of the Offshore of Carpinteria map area in southern California was produced using video-supervised, maximum-likelihood classification of the bathymetry and backscatter (intensity of return) signals from sonar systems (a summary of the video data collected for the purpose of supervising the classification is shown on sheet 6). Rugosity (a GIS-derived characterization of roughness) and backscatter intensity were used as variables in the classification. The interpreted classifications were then draped over shaded-relief bathymetry (see sheet 2).

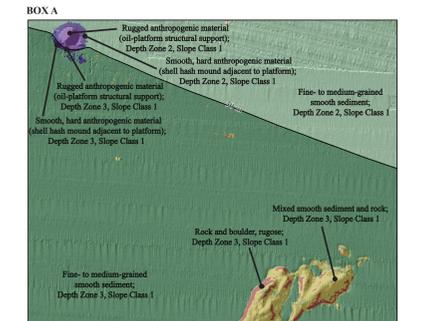
The substrate classes mapped in this area have been divided into the following California Marine Life Protection Act depth zones: Depth Zone 2 (intertidal to 30 m), and Depth Zone 3 (30 to 100 m). In addition, the following slope class is represented on this map (Coastal and Marine Ecological Classification Standard slope zone is shown in parentheses): Slope Class 1 (0° to 5° (flat)), Depth Zone 1 (intertidal), Depth Zones 2 and 3 (greater than 5° and 5° greater than 100 m), and Slope Classes 2 to 4, greater than 5° (sloping to vertical) are not present in this map area.

Fine to medium-grained smooth sediment (sand and mud) makes up 98.0 percent of the map area (139.1 km<sup>2</sup>), 47.0 km<sup>2</sup> is in Depth Zone 2, and 92.1 km<sup>2</sup> is in Depth Zone 3. Mixed smooth sediment (sand and gravel) and rock (sediment typically forming a veneer over bedrock, or rock outcrops having little to no relief) make up 1.6 percent of the area mapped (2.3 km<sup>2</sup>), 1.2 km<sup>2</sup> is in Depth Zone 2, and 1.1 km<sup>2</sup> is in Depth Zone 3. Rock and boulder, rugose (rock and boulder outcrops having high surficial complexity) makes up 0.3 percent of the map area (0.4 km<sup>2</sup>), 0.4 km<sup>2</sup> is in Depth Zone 2, and less than 0.1 km<sup>2</sup> is in Depth Zone 3. Rugged anthropogenic material (oil-platform structural supports) makes up 0.1 percent of the map area (0.1 km<sup>2</sup>), less than 0.1 km<sup>2</sup> is in Depth Zone 2, and 0.1 km<sup>2</sup> is in Depth Zone 3. Smooth, hard anthropogenic material (shell hash mound adjacent to platform) makes up less than 0.1 percent of the map area (<0.1 km<sup>2</sup>), less than 0.1 km<sup>2</sup> is in Depth Zone 2, and less than 0.1 km<sup>2</sup> is in Depth Zone 3 (table 1).

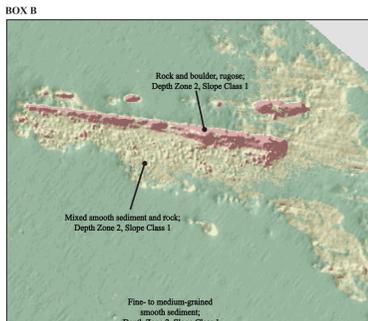


**Table 1. Coverage of classified seafloor, in square kilometers (sq km) and percent of total area, broken into California Marine Life Protection Act Depth Zones 2 and 3.**

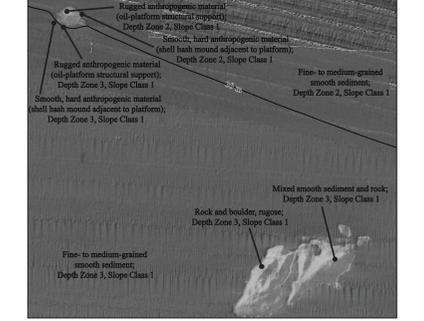
	Total		Depth Zone 2 (water depth 0–30 m)		Depth Zone 3 (water depth 30–100 m)	
	sq km	percent of total	sq km	percent of total	sq km	percent of total
Fine to medium-grained smooth sediment	98.0	139.1	33.1	47.0	64.9	92.1
Mixed smooth sediment and rock	1.6	2.3	0.8	1.2	0.8	1.1
Rock and boulder, rugose	0.3	0.4	0.2	0.4	0.1	<0.1
Anthropogenic (rugged)	0.1	0.1	<0.1	<0.1	0.1	0.1
Anthropogenic (smooth, hard)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1



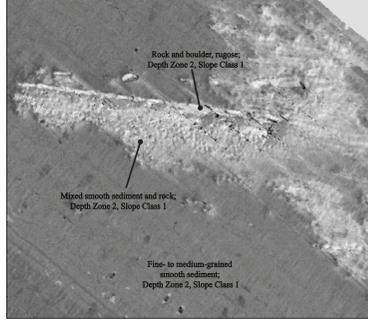
**Figure 1.** Detailed view of substrate classes mapped in area offshore of Carpinteria (see Box A, on map, for location). Depth Zones 2 and 3 (intertidal to 30 m) and Slope Class 1 (0°–5°). Fine to medium-grained smooth sediment is shown in shades of green; mixed smooth sediment and rock is shown in shades of tan; rock is shown in shades of pink and both rugged anthropogenic material (oil-platform structural support) and smooth, hard anthropogenic material (shell hash mound adjacent to platform) are shown in shades of purple. Bathymetric contour (30 m) added for depth reference.



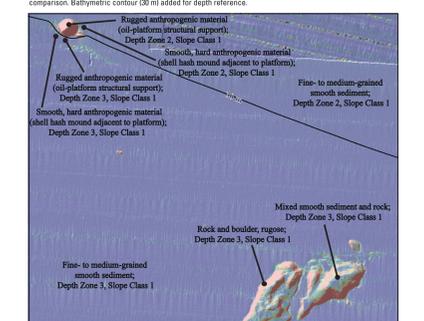
**Figure 4.** Detailed view of substrate classes mapped in area between Rincon Point and Rincon Island (see Box B, on map, for location). Depth Zone 2 (intertidal to 30 m) and Slope Class 1 (0°–5°). Fine to medium-grained smooth sediment is shown in shades of green; mixed smooth sediment and rock is shown in shades of tan; and rock is shown in shades of pink.



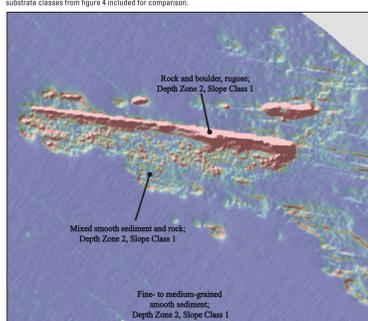
**Figure 2.** Acoustic-backscatter image (see sheet 3) draped over shaded-relief bathymetry (see sheet 2) for same area as figure 1 (Box A on map). Brighter areas indicate coarse-grained, rough, or hard seafloor; darker areas indicate unconsolidated (loosely packed) sediment; small black areas are data-processing artifacts. Interpolated substrate classes from figure 1 included for comparison. Bathymetric contour (30 m) added for depth reference.



**Figure 5.** Acoustic-backscatter image (see sheet 3) draped over shaded-relief bathymetry (see sheet 2) for same area as figure 4 (Box B on map). Brighter areas indicate coarse-grained, rough, or hard seafloor; darker areas indicate unconsolidated (loosely packed) sediment; small black areas are data-processing artifacts. Interpolated substrate classes from figure 4 included for comparison.



**Figure 3.** Rugosity characterization of roughness derived from bathymetry (see sheet 2) for same area as figure 1 (Box A on map). Rugosity values are displayed in muted "rainbow" color spectrum that ranges from purple (low rugosity) through green (medium rugosity) to red (high rugosity). Areas of high slope are indicated by high rugosity values (red), areas of low slope, by medium- to low-rugosity values (green to purple). Interpolated substrate classes from figure 1 included for comparison. Bathymetric contour (30 m) added for depth reference.



**Figure 6.** Rugosity characterization of roughness derived from bathymetry (see sheet 2) for same area as figure 4 (Box B on map). Rugosity values are displayed in muted "rainbow" color spectrum that ranges from purple (low rugosity) through green (medium rugosity) to red (high rugosity). Areas of high slope are indicated by high rugosity values (red), areas of low slope, by medium- to low-rugosity values (green to purple). Interpolated substrate classes from figure 4 included for comparison.

**Seafloor Character, Offshore of Carpinteria Map Area, California**  
By  
Elyne L. Phillips, Mercedes D. Erley, and Guy R. Cochrane  
2013

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