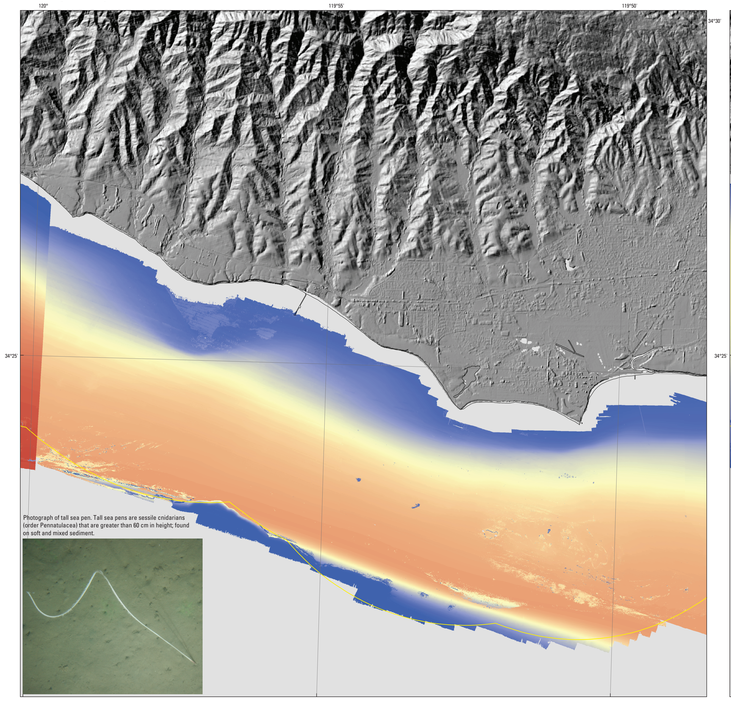
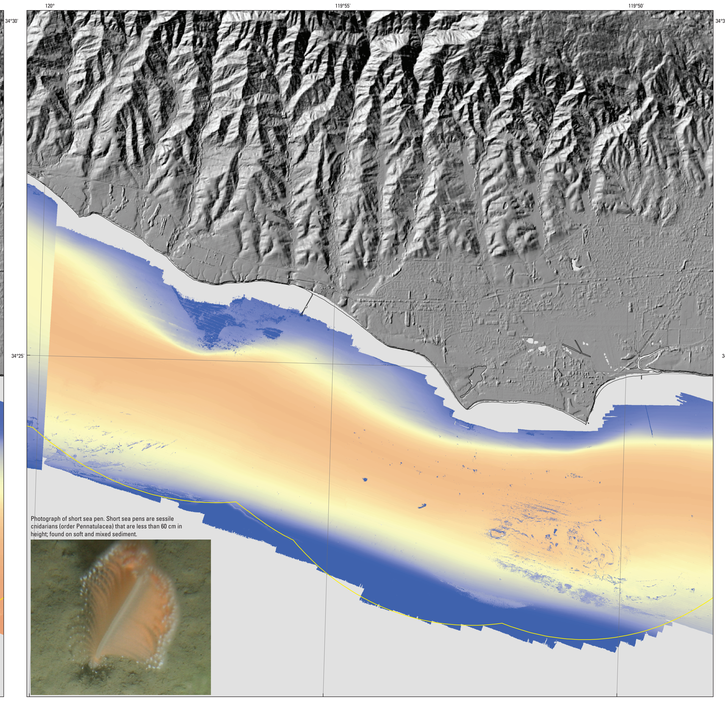
U.S. Department of the Interior
U.S. Geological Survey

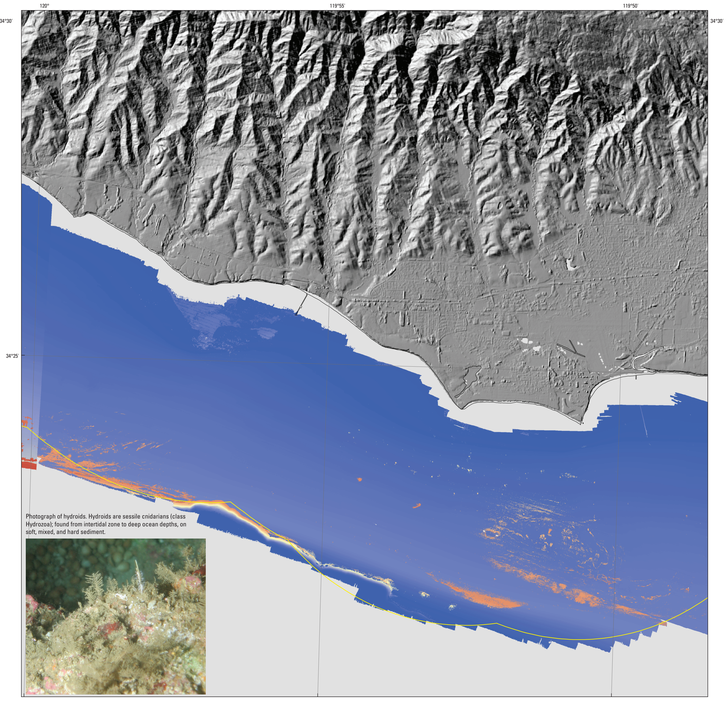
Scientific Investigations Map 3302
Sheet 12 of 12
Pamphlet accompanies map



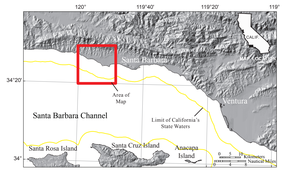
Map A – Predicted Distribution of Tall Sea Pens, Offshore of Coal Oil Point Map Area



Map B – Predicted Distribution of Short Sea Pens, Offshore of Coal Oil Point Map Area



Map C – Predicted Distribution of Hydroids, Offshore of Coal Oil Point Map Area



DISCUSSION

Information presented on this sheet is based on ground-truth surveys (see sheet 6) conducted by the U.S. Geological Survey and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service for the California Seafloor Mapping Program. Benthic community structure was determined from 35 video towed-camera transects within California's State Waters limit in the Santa Barbara Channel. These transects produced a total of 923 10-second observations from Refugio Beach (34.5° N., 120.1° W.) to Haueneme Canyon (34.1° N., 119.2° W). Presence-absence data were collected for 29 benthic, structure-forming, nonmobile taxa. Generalized linear models were developed to predict the probability of occurrence and to create predictive-distribution maps for the most frequently observed macro-invertebrates (tall sea pens, short sea pens, cup corals, hydroids, and brittle stars), which are all structure-forming components of valuable habitat for groundfish species (Krigsman and others, 2012). This sheet shows five predictive-distribution maps (Maps A–E) for the Offshore of Coal Oil Point map area, which is depicted by a red outline in the Santa Barbara Channel regional maps (Map F).

Covariates in the generalized linear models were geographic location, bathymetry, and seafloor character. Geographic location was derived from analysis of five of the six map areas along the mainland coast of the Santa Barbara Channel, excluding the Offshore of Carpinteria map area where data were insufficient. From the five map areas, three statistically different locations were identified on the basis of a community-structure analysis of the invertebrate taxa and associated covariates (sometimes resulting in distinctly different predicted distributions across map boundaries): (1) the Haueneme Canyon and vicinity and Offshore of Ventura map areas; (2) the Offshore of Santa Barbara and Offshore of Coal Oil Point map areas; and (3) the Offshore of Refugio Beach map area. Data for the two other covariates were provided in sheet 2 (shaded-relief bathymetry) and sheet 5 (seafloor character map).

Although probability of occurrence for each invertebrate taxon was predicted for the entire Santa Barbara Channel region (Map F), this sheet highlights predictions for the Offshore of Coal Oil Point map area (Maps A–E). Almost the entire Offshore of Coal Oil Point map area is made up of soft sediment and mixed sediment, with a few small areas of isolated rocks and boulders. Both soft sediment and mixed sediment are considered to be suitable habitat for tall and short sea pens. At water depths of about 45 m, tall sea pens (Map A) have a moderate probability of occurrence, which increases as depth increases. The probability of occurrence of short sea pens (Map B) peaks at water depths of between 35 and 75 m and then decreases as depth increases. In depths greater that 90 m, cup corals and hydroids (Maps D and C, respectively) have a high probability of occurrence in areas of mixed sediment and rugose rock. In depths below 90 m in the same type of habitat, cup corals have a higher probability of occurrence than that of hydroids. Brittle stars (Map E) in the sediment, observed by arms protruding from the substrate, have a moderate probability of occurrence at water depths of between 30 and 60 m, but the probability of occurrence decreases as depth either increases or decreases.

REFERENCES CITED

Gotshall, D.W., 2005, Guide to marine invertebrates—Alaska to Baja (2d ed.): Monterey, Calif., Sea Challengers, 117 p.

Krigsman, L.M., Yoklavich, M.M., Dick, E.J., and Cochrane, G.R., 2012, Models and maps—Predicting the distribution of corals and other benthic macro-invertebrates in shelf habitats: Ecosphere, v. 3(1), article 3, 16 p., doi:10.1890/ES11-00295.1.

EXPLANATION

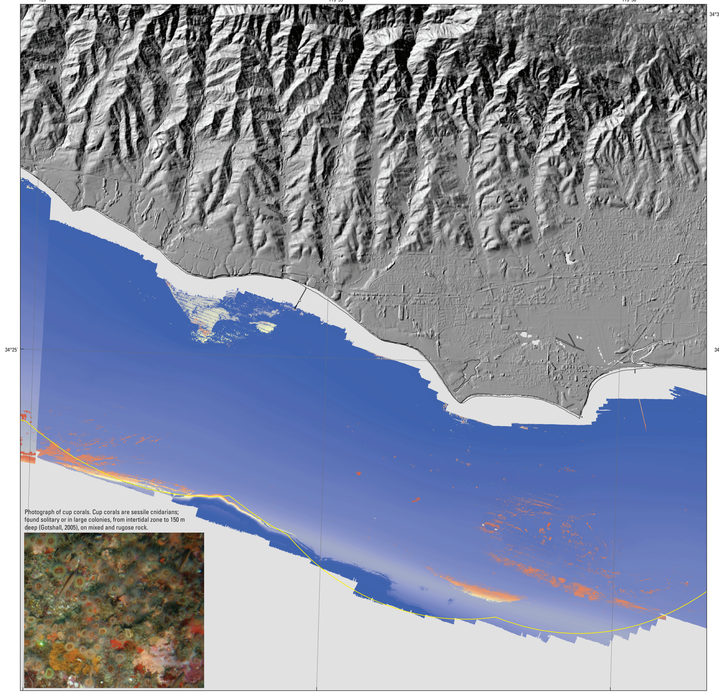
Probability of occurrence

High (99.0%)

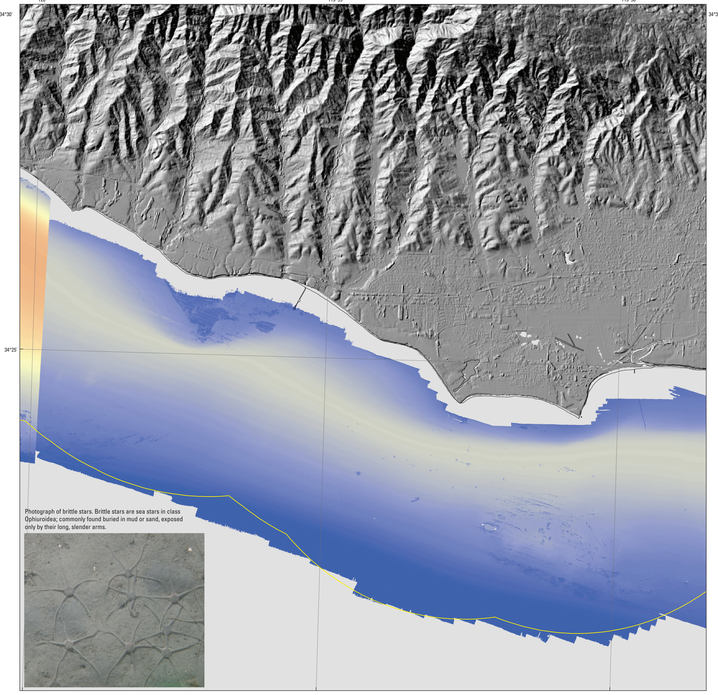
Low (0.0%)

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



Map D – Predicted Distribution of Cup Corals, Offshore of Coal Oil Point Map Area



Map E – Predicted Distribution of Brittle Stars, Offshore of Coal Oil Point Map Area

Map F – Predicted-Distribution Maps for Santa Barbara Channel Region

Onshore elevation data from NOAA Coastal Services Center (data collected by EarthData International in 2002-2003) and from U.S. Army Corps of Engineers (data collected by Fugro Pelagos in 2009). Offshore shaded-relief bathymetry from map on 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

APPROXIMATE MEAN DECLINATION, 2014

SCALE 1:50 000

ONE MILE = 0.869 NAUTICAL MILES

MAP LOCATION

Predicted distributions mapped in 2011
GIS database and digital cartography by Nadine E. Golden and Eliyna L. Phillips
Edited by Taryn A. Lindquist
Manuscript approved for publication June 2, 2014

Predicted Distribution of Benthic Macro-Invertebrates, Offshore of Coal Oil Point Map Area and Santa Barbara Channel Region, California

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2014

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