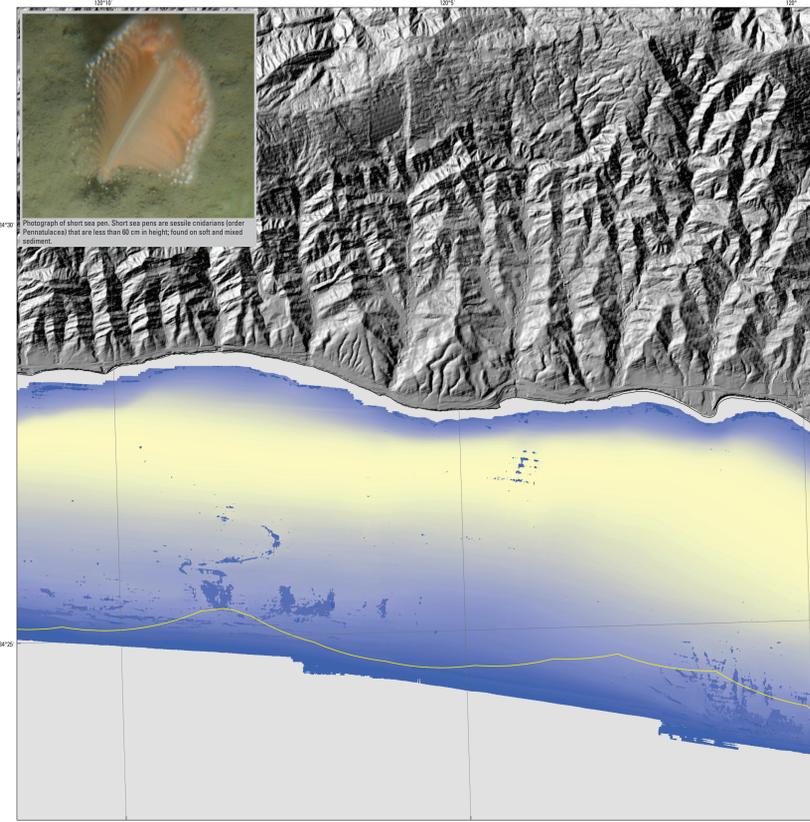
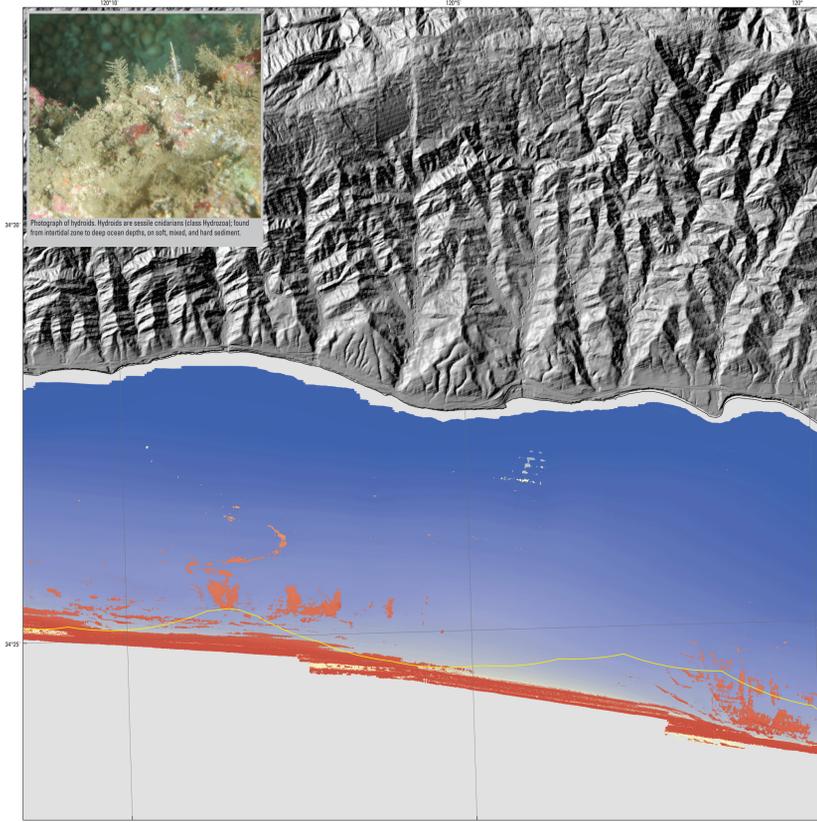


Map A – Predicted Distribution of Tall Sea Pens, Offshore of Refugio Beach Map Area



Map B – Predicted Distribution of Short Sea Pens, Offshore of Refugio Beach Map Area



Map C – Predicted Distribution of Hydroids, Offshore of Refugio Beach 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 15 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 Homeone 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 (Krigsman and others, 2012). This sheet shows five predictive-distribution maps (Maps A-E) for the Offshore of Refugio Beach map area, which is depicted by a red outline in the Santa Barbara Channel regional maps (Map 3).

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 Homeone 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 3 (seafloor-character map).

Although probability of occurrence for each invertebrate taxon was predicted for the entire Santa Barbara Channel region (Map 3), this sheet highlights predictions for the Offshore of Refugio Beach map area (Maps A-E). The Offshore of Refugio Beach map area is made up of soft sediment and mixed sediment, as well as small areas of rugged rock. Both soft and mixed sediment are considered to be suitable habitat for tall and short sea pens (Maps A and B, respectively). At water depths of about 40 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 30 and 60 m and then decreases as depth increases. Cup corals and hydroids (Maps D and C, respectively) have a high probability of occurrence in areas of mixed sediment and rugged rock. In shallower depths of the same 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 in 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.

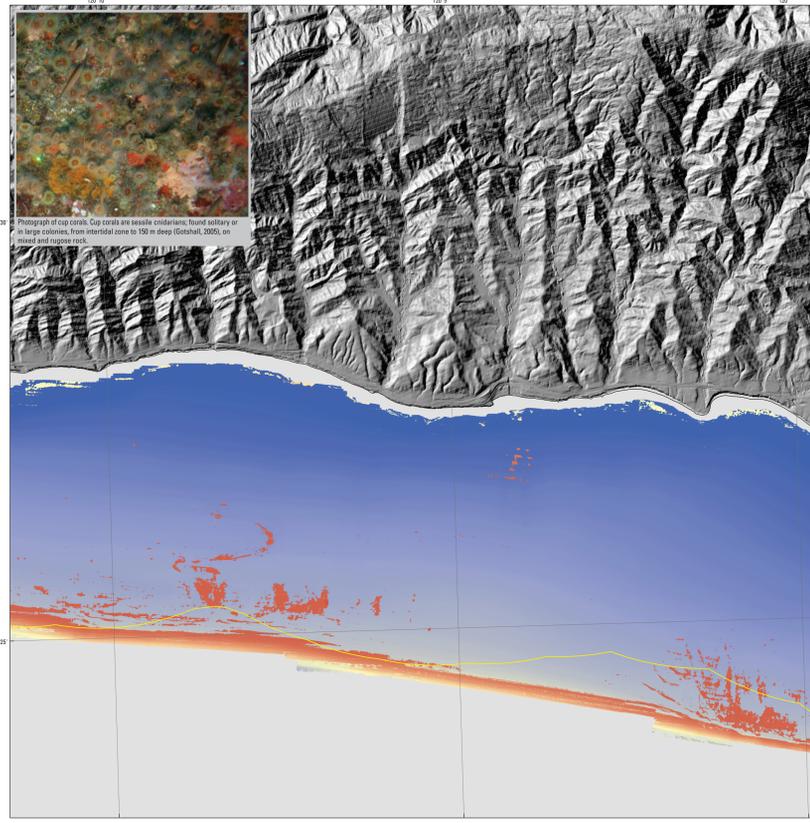
Krigsman, L.M., Yabluch, M.M., Dick, E.J., and Cochrane, G.R., 2012. Models and maps—Predicting the distribution of corals and other benthic macro-invertebrates in shelf habitats. *Ecosphere*, v. 3(1), article 3, 16 p., doi:10.1002/ES1.00295.1.

EXPLANATION

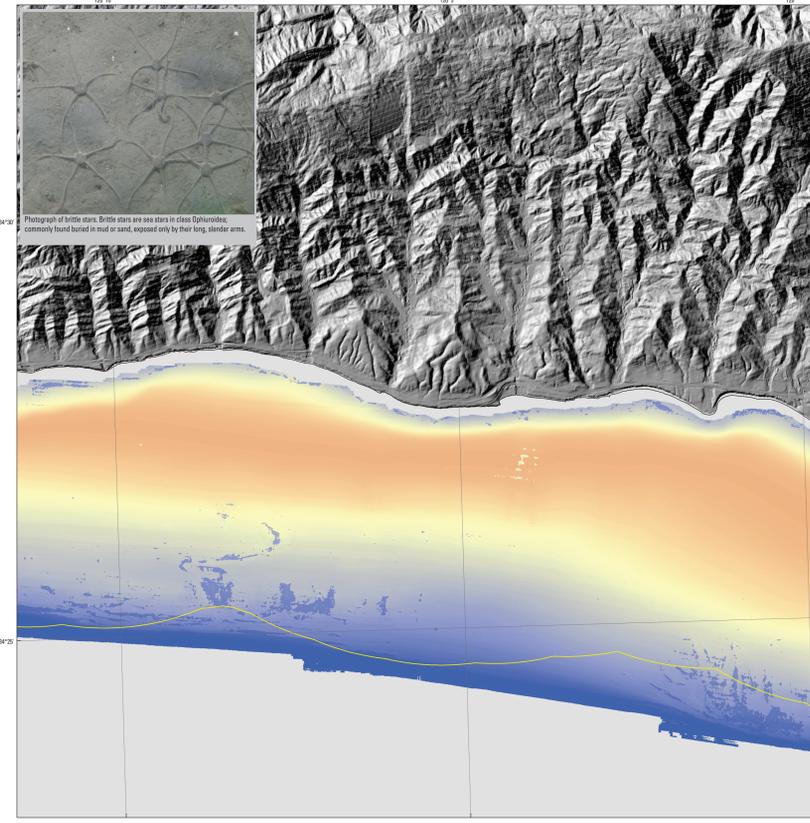
Probability of occurrence
 High (99.8%)
 Low (0.0%)

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

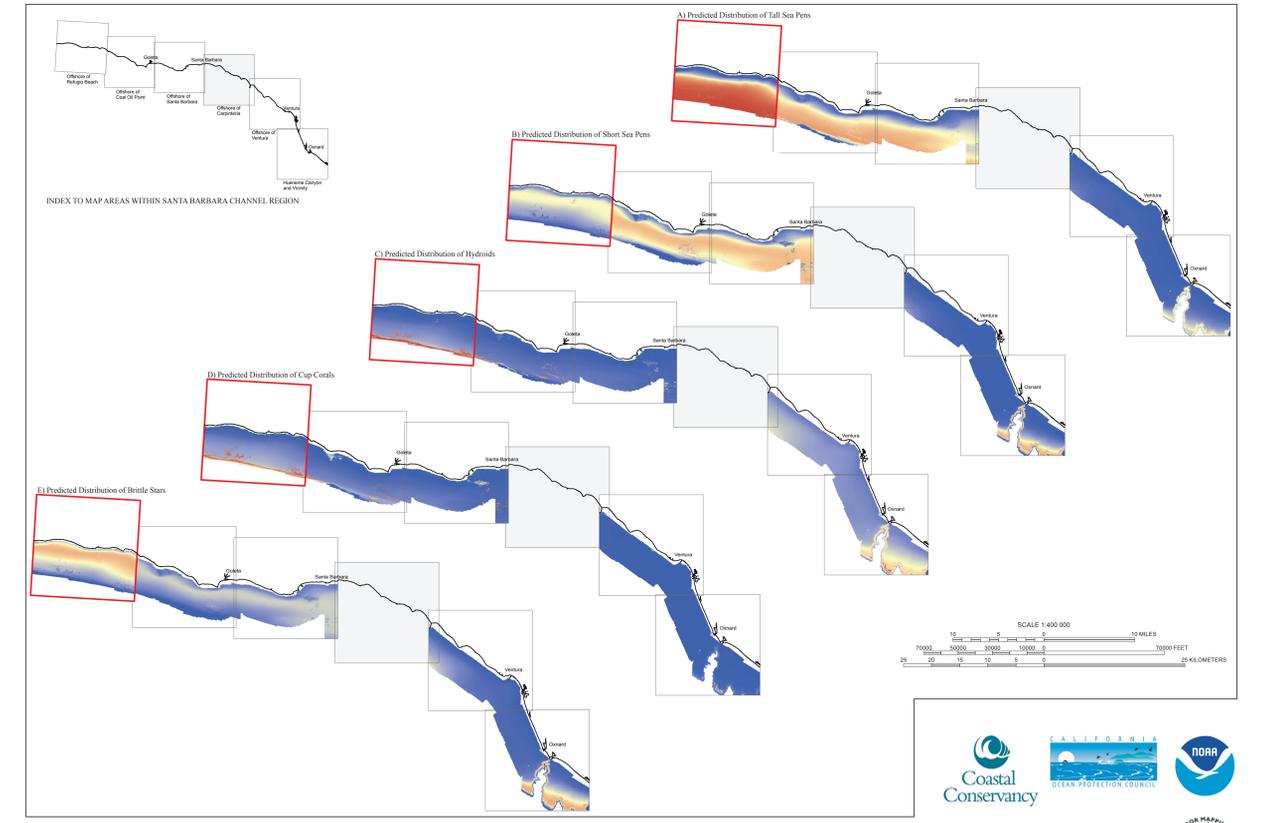
3-nautical-mile limit of California's State Waters



Map D – Predicted Distribution of Cup Corals, Offshore of Refugio Beach Map Area



Map E – Predicted Distribution of Brittle Stars, Offshore of Refugio Beach Map Area



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

Shoreline 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 Roger Hedges in 2001. Collections by U.S. State Waters limit from NOAA Office of Coast Survey. Universal Transverse Mercator projection, Zone 10N.

SCALE 1:500,000
 0 1 2 MILES
 0 1 2 KILOMETERS
 ONE MILE = 1.609 NAUTICAL MILES

MAP LOCATION

Predicted distributions mapped in 2011
 GIS database and digital cartography by Nadine E. Golden and Mary M. Yabluch
 Edited by Sarah E. Noyman
 Manuscript approved for publication February 4, 2015

Predicted Distribution of Benthic Macro-Invertebrates, Offshore of Refugio Beach Map Area and Santa Barbara Channel Region, California

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 2015

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