

Characterizing Fisheries Habitat Along the California Continental Margin

Gary Greene and Rikk Kvittek

San Jose State University—Moss Landing Marine Laboratories; California State University, Monterey Bay

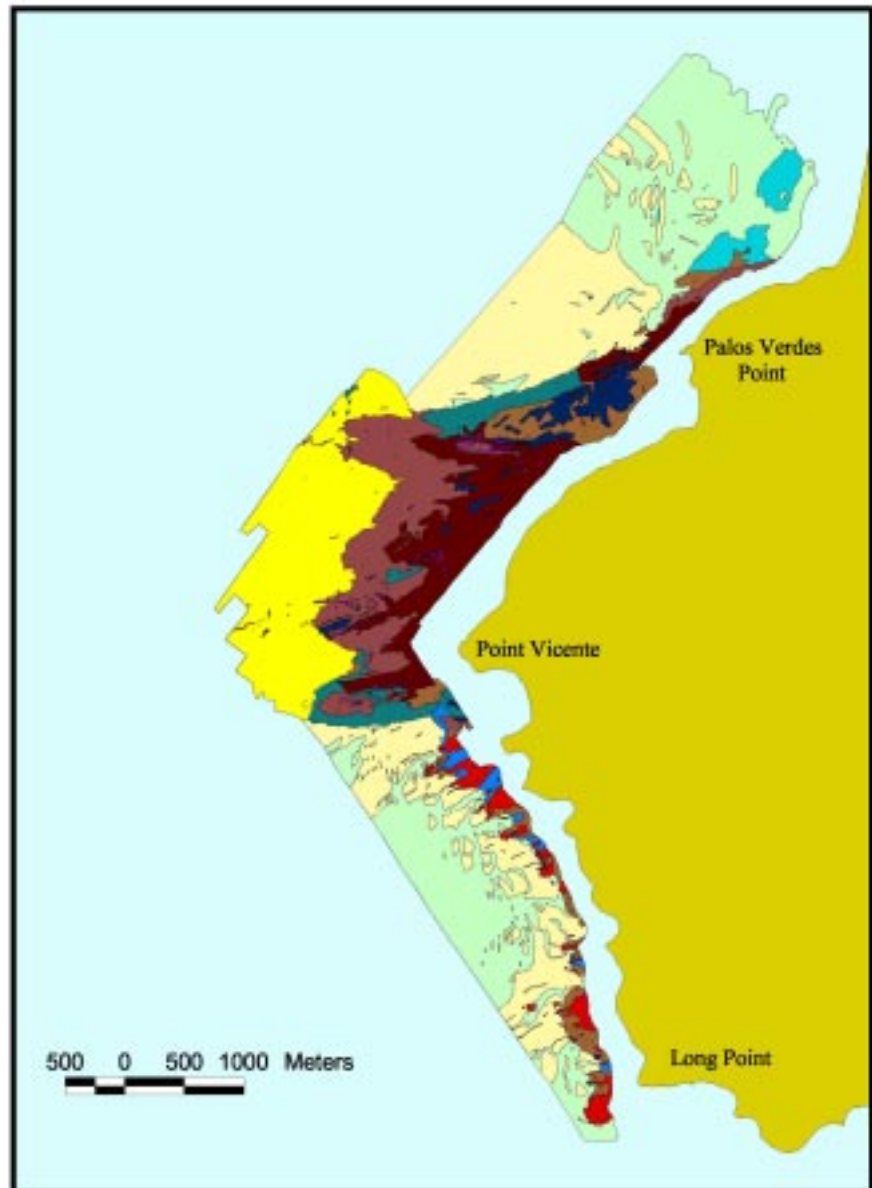
Background

B iologists have long recognized that fishes are not uniformly distributed up and down the coast but instead congregate in certain environments. This somewhat obvious fact has gone relatively unstudied because of the technical difficulties of imaging underwater landscapes. With advances in underwater vehicles and sonar imaging techniques, however, biologists now have the tools they need to map the benthic habitats that sustain the state's bottom-dwelling fishes.

Such information not only satisfies scientific curiosity but aids resource managers charged with implementing two state mandates: the Marine Life Management Act, which requires the California Department of Fish and Game to develop species-by-species management plans for rockfish (species that typically inhabit rock-bottomed areas), and the Marine Life Protection Act, which calls for the agency to consider establishing a network of no-take reserves. Additionally, habitat maps benefit federal fisheries managers charged with delineating essential habitat areas for finfish and shellfish species, under the Magnuson-Stevens Fishery Conservation and Management Act, and the Sustainable Fisheries Act.

The Project

Marine geology professor Dr. Gary Greene at the Moss Landing Marine Laboratories was funded to produce a series of marine benthic maps for California's continental margin. These maps, a first of their kind, identify distinct features on the seafloor—submarine canyons, rock outcrops, pinnacles, boulders, sand,



The map, above, shows benthic fish habitats off Point Vincent in Rancho Palos Verdes, produced by Dr. Gary Greene of Moss Landing Marine Laboratories from multibeam and back-scatter acoustic images. Different habitat areas are color-coded. Green, for instance, stands for "soft unconsolidated sand and gravel," brown for "hard deformed differentially eroded bedrock."

Image: Joe Bizzarro, Moss Landing Marine Laboratories.

mud and gravel—that provide critical habitat for species of management concern.

This two-year project, now in its final year, has three distinct parts. In the first, which has been completed, Dr. Greene and colleagues collected and analyzed previously proprietary industry data on the seafloor's topography and composition. The bulk of this data comes in the form of sonar images collected by oil companies prospecting for offshore reserves in the 1970s and 1980s. In the second, ongoing part, Dr. Rikk Kvittek of California State University at Monterey Bay is conducting multibeam and sidescan sonar surveys of areas in which existing data is sparse.

Lastly, as the new data come in, Dr. Greene will manually identify all the various geologic features that can be discerned from the collection of sonar images. Features are then circled, color-coded and put on a map legend. The final maps will be presented in color-coded, GIS format, suitable for inclusion in a digital atlas.

Dr. Greene said of the Sea Grant project: "The value of the maps is considerable. The maps will not only be used for fisheries management,

but they will be invaluable in the selection of marine protected areas.

"With the maps, resource managers can identify candidate sites in areas that may be most attractive to the various rockfish that may be endangered."

Applications

The marine benthic maps being produced through this project provide the foundation for identifying critical benthic topographies and geologies that sustain bottom-dwelling fishes. Because the nearshore rockfish fishery will soon be managed on a species-by-species level, Dr. Greene's project has immediate applications for meeting new fisheries mandates. Bottom habitat characterizations are also key to helping resource managers identify coastal areas that are "sources" of fish. A growing body of research suggests that protecting highly productive "source" areas could help revive and sustain fish stocks.

Dr. Greene's work has already been used by the California Department of Fish and Game to plan field research and define species-habitat relationships in existing reserve areas. Further reflecting this

project's relevance for fisheries management, much of the information from this project will be incorporated into the California Department of Fish and Game's atlas of fish habitat maps.

Telecommunication companies including MCI and AT&T have also requested copies of the final maps, as have government agencies such as the U.S. Navy, National Marine Fisheries Service, and the California Division of Mines and Geology. Canada plans to duplicate Dr. Greene's methods in a parallel effort to identify key habitats for bottom-dwelling fish.

Cooperating Organizations

California Department of Fish and Game
California Division of Mines and Geology
Monterey Bay Aquarium Research Institute
U.S. Geological Survey

For more information:

Dr. Gary Greene
San Jose State University
Moss Landing Marine Laboratories
Tel.: (831) 632-4438 or
(831) 633- 7268
Email: greene@miml.calstate.edu

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University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0232
Phone: (858) 534-4440 Fax: (858) 453-2948 Web site: <http://www-csgc.ucsd.edu>