

## **Environmental Studies Program: Ongoing Study**

**Study Area(s):** Southern California

**Administered By:** Pacific OCS Region

**Title:** Regional Importance of OCS Oil and Gas Platforms as Rockfish Nurseries (PC-10-01)

**BOEM Information Need(s) to be Addressed:** Ecosystem-level understanding of the environment depends upon successful integration of biologic, geologic, and oceanographic information. This integration allows prediction of regional consequences from events occurring within a limited spatial scale. Such predictive capability is important in OCS permitting, mitigation, and decommissioning decisions. This study proposes to integrate seafloor habitat maps, current flow patterns, and field surveys to quantify the role oil/gas platform habitat may have in rebuilding stocks of overfished species. Currently, shallow habitats of OCS oil/gas platforms host large numbers of economically important juvenile species, especially rockfishes. Small-scale studies indicate that juvenile fish grow and survive better at platform habitats compared to natural reefs. Using biological and physical data, this study will (1) perform a stock assessment of rockfish juveniles within the Southern California Bight, and (2) describe potential connectivity pathways between juvenile and adult habitats within the Santa Barbara Channel region and San Pedro Basin, focusing on platform-natural reef links.

**Total BOEM Cost:** \$475,000

**Period of Performance:** FY 2010–2016

**Conducting Organization(s):** U.S. Geological Survey Pacific Coastal & Marine Science Center

**Principal Investigator(s):** Dr. Guy R. Cochrane

**BOEM Contact(s):** [Donna Schroeder](#)

### **Description:**

**Background:** To obtain an ecosystem-level understanding of the OCS, biological and physical databases must be integrated. To date, most ecological studies are restricted in scale due to limited funds and information. With the completion of region-wide oceanographic and geologic surveys, it is timely to link and expand biological surveys to match the spatial scale of these physical databases. Such integration will be important to all aspects of permitting, mitigation, and decommissioning decisions of the OCS.

The majority of marine species observed at oil platforms and natural reefs do not reside in these habitats for their entire life history. Population connectivity within and among habitats varies according to the life history of each species, oceanographic patterns, and distribution of hard bottom. One consequence of a spatially complex life history is that impacts of a reefed platform may propagate across regions and habitats and affect other populations. Therefore, some understanding of connectivity processes, both physical and biological, must precede predictions regarding the environmental consequences of

platform decommissioning alternatives. We believe we now have sufficient knowledge to finally address these large scale questions. Shallow water habitats of platforms are of particular interest to BOEM because these habitats function as nurseries to commercially important juvenile fishes, and because potential decommissioning options eliminate this habitat. BOEM information needs thus include establishing how the removal of such habitat will impact regional environments.

The BOEM-funded study *Assessing the Fate of Juvenile Rockfish at Offshore Platforms and Natural Reefs in the Santa Barbara Channel* (NSL PC-04-02) and the proposed companion study *Spatial and Seasonal Variation in the Biomass and Size Distribution of Juvenile Fishes Associated with a Petroleum Platform off the California Coast* for FY 2008 are studies conducted at a local scale, primarily at Platforms Grace and Gilda. The present study represents the final component in a coordinated program that extends local scale studies across the entire region of interest to OCS activities.

Objectives: The objectives of this study are to:

1. Assemble and update seafloor habitat maps into one GIS framework within two OCS study areas of interest: the Santa Barbara Channel region and San Pedro Basin;
2. Using life history information on abundance distribution in relation to depth, temperature, and substrate to generate “potential habitat” layers for species of interest;
3. Conduct region-wide field surveys using a random stratified design developed from potential habitat layers;
4. Generate stock assessment of juvenile fishes and quantify the contribution of oil/gas platform habitat to regional production;
5. Using oceanographic data and potential habitat information, describe potential connectivity pathways between juvenile and adult habitats, focusing on platform-natural reef links.

Methods:

1. Partnering with USGS, update a GIS system with new seafloor habitat, temperature, and bathymetry information;
2. After consultation with managers, produce a list of “species of interest” important in determining impacts of OCS activities. Obtain from the scientific literature information on abundance distribution of life history stages (juvenile and adult) in relation to depth, temperature, and substrate type, and generate “potential habitat” layers for each species of interest. These potential habitat layers can be used for other OCS studies and assessments;
3. Use region-wide patterns of surface currents and potential habitat layers for two overfished species, lingcod and bocaccio, that have pelagic larvae which reside in the upper water column, and generate “connectivity envelopes” across areas of interest (Santa Barbara Channel region and San Pedro Basin) that outline likely pathways of larval transport, and potential juvenile-adult migration patterns. Connectivity envelopes for adult-pelagic larvae stages are constructed using larval duration periods combined with seasonal current vectors and overlaid onto potential habitat layers. Possible juvenile-adult migration patterns will be identified by potential

habitat layers of each stage and distance to nearest habitat patches. In both types of analyses, platform-natural reef links will be featured;

4. Using standard scuba protocols, a field survey that encompasses a regional scale will be conducted to assess the absolute biomass/stock of juvenile rockfishes that inhabit shallow water habitats (both natural reefs and platforms) within the Santa Barbara Channel region. The scuba survey will, for the first time on the Pacific coast, utilize a randomized, stratified, and geo-referenced survey design that allows for proper statistical inference across the region.

**Current Status:** Objectives 1 through 5 have been completed. The draft final report is under review.

**Final Report Due:** June 2016

**Publications Completed:** Conference oral presentations at GeoHab 2014 and WSN 2014

**Affiliated WWW Sites:** <https://marinecadastre.gov/epis/#/search/study/26941>

**Revised Date:** February 3, 2017