

Environmental Studies Program: Ongoing Study

Field	Study Information
Title	Seafloor Condition OCS Monitoring: BIGHT'23 (PC-22-02)
Administered by	Pacific OCS Regional Office
BOEM Contact(s)	Susan Zaleski (susan.zaleski@boem.gov), Zhen Li (zhen.li@boem.gov)
Procurement Type(s)	Cooperative Agreement
Conducting Organization(s)	Southern California Coastal Water Research Project (SCCWRP)
Total BOEM Cost	\$349,837 (includes Environmental Studies Program and Pacific Region funds; with \$30,000 cost-share and in-kind support from SCCWRP)
Performance Period	FY 2022–2026
Final Report Due	December 31, 2025
Date Revised	November 1, 2023
Problem	Incomplete information about the condition of the seafloor near existing Pacific OCS platforms affects BSEE's ability to decide on alternatives for Decommissioning Plans and BOEM's ability to develop a scientifically up-to-date programmatic Environmental Impact Statement for decommissioning.
Intervention	Make existing information accessible, and additionally sample sites near Pacific OCS platforms, in coordination with the already funded regional sampling, to create a platform-specific comparison to the regional condition.
Comparison	Compare the similarities of communities and sediments in undisturbed and disturbed sediments and over time.
Outcome	Assess the condition of the seafloor near Pacific OCS platforms relative to reference conditions using data collected over 20 years offshore southern California, and make the results accessible to the public.
Context	Southern California OCS (focus on Santa Barbara Channel)

BOEM Information Need(s): This study implements BOEM's Outer Continental Shelf Lands Act charge to monitor the marine environments adjacent to OCS operations and to have some measure of evaluating impacts from past and ongoing operations. Information on seafloor invertebrate species and their abundances in the vicinity of most existing platforms in the Pacific OCS was last collected over 17 years ago yet is still the basis of current environmental assessments. This study builds on BOEM's prior involvement in the 2018 regional monitoring (BIGHT'18) to regionally assess and rank the degree of disturbance for biological communities in areas surrounding platforms, with a focus in the Santa Barbara Channel portion of the southern California OCS. This information will be used in planned decommissioning Environmental Impact Statements, specifically to address potential sediment contamination.

Background: The use of regional reference condition is a well-established method in southern California for evaluating impacts from stream and offshore areas. A regional reference condition captures the full range of natural variability, enables a more robust analysis, and prevents potential false-positive findings

from a single site comparison. To assess impacts from multiple sources and to improve capacity for regional assessments, the Southern California Coastal Water Research Project (SCCWRP) facilitates a regional seafloor effort every five years to sample fishes, invertebrates, and sediments. Local, state, and Federal agencies partner through SCCWRP to sample over 350 locations in southern California, from estuaries to beyond the continental slope (Gillett et al. 2017). A regional reference condition termed "Benthic Response Index" is used regularly for inner- and mid-shelf impact studies out to 200 m. As a pilot effort and part of the previous monitoring effort (BIGHT'18), soft-sediment samples were taken 0.25-3 km from four platforms in the Santa Barbara Channel. The pilot design was successful and should be repeated at more platforms, with results indicating a lower toxicity response yet overall good condition relative to regional sampling (Gillett et al. 2020). This pilot also revealed there is missing and incorrect mapping of the structures and habitats surrounding some of the platforms. These errors need to be corrected at some platforms with remote sensing and video data resampled to verify the seafloor habitat near the platforms.

Prior work (Gillett et al. 2019) analyzed 20 years of samples in depths from 200 to 500 m depicting three distinct biogeographic communities in the Santa Barbara Channel that separate generally by depth. As a result, infaunal communities' response to impacts are different depending on their depth, and existing indices are likely not applicable to depths greater than 400 m (Gillett et al. 2021). Distinct climate-related shifts to the oceanography in this region also may impact assessment approaches (Bograd et al. 2008, 2019). The methodologies for assessing bottom disturbance impacts in outer shelf (200–400 m) and upper slope (> 400 m) environments need to be advanced among regional regulators and scientists to develop a common understanding and evaluate potential approaches.

Objective(s): The question to be answered by this study is: What is the ecological condition of the seafloor near platforms in Federal (OCS) waters of the Santa Barbara Channel in southern California? Two other important questions must be addressed to answer the above question: how do we best evaluate outer shelf and upper slope impacts with an approach that is systematic and regional (200–500 m); and can data collected in the 1970–1990s be recovered and added to these analyses?

Methods: This effort will gather and assess the feasibility of and need for incorporating and standardizing historic samples and collecting new ground truth samples to verify the accuracy of hard bottom and structures and to determine temporal trends.

Prior to the regional sampling in 2023 (BIGHT'23), effort is needed to develop an assessment approach for impacts to the outer shelf and slope depths from 200 to 1,200 m. Multiple options will be presented to regulators and scientists working in upper slope depths (~400–1,200 m) to develop a common understanding and evaluate potential approaches.

Taxonomic and chemical data will be collected in soft sediments by multiple state agencies in the summer of 2023. Statistical analyses will include processed data for organismal, physical, toxicology (including PAHs), and location data in the depth regions of platforms in Federal waters of the Santa Barbara Channel. Analyses will utilize multivariate statistical testing and correlations among biological, physical, and chemical parameters to test for similarities and differences among infauna samples.

There will be a focus on GIS and visual deliverables. Public display will be created to highlight all results in coordination with the West Coast Ocean Data Portal, existing SCCWRP, and other local portal efforts.

Specific Research Question(s):

1. How does the seafloor condition near platforms in Federal waters of the Santa Barbara Channel compare to the regional background?
2. What is the best methodology for assessing impacts in outer shelf (200–400 m) and upper slope (>400 m) environments?
3. How can data collected prior to 2000 benefit future assessments?

Current Status: The cooperative agreement between BOEM and SCCWRP was awarded on September 26, 2002; the period of performance began on October 1, 2022. The first fieldwork season was completed in September 2023 with all targeted sites sampled during the same time frame as the Bight wide surveys. Plans are underway for 2024 field sampling.

Publications Completed: None

Affiliated WWW Sites: None

References:

- Bograd SJ, Castro CG, Di Lorenzo E, Palacios DM, Bailey H, Gilly W, Chavez FP. 2008. Oxygen declines and the shoaling of the hypoxic boundary in the California Current. *Geophysical Research Letters* 35:1–6.
- Bograd SJ, Schroeder ID, Jacox MG. 2019. A water mass history of the Southern California current system. *Geophysical Research Letters* 46:6690–6698.
- Gillett DJ, Lovell LL, Schiff KC. 2017. Southern California Bight 2013 Regional Monitoring Program: Volume VI Benthic Infauna. Southern California Coastal Water Research Project, Costa Mesa, CA. <http://www.sccwrp.org/ResearchAreas/RegionalMonitoring>
- Gillett DJ, Gilbane L, Schiff KC. 2019. Benthic infauna of the Southern California Bight continental slope: Characterizing community structure for the development of an index of disturbance. U.S. Department of the Interior, Bureau of Ocean Energy Management, Pacific OCS Region, Camarillo, CA. OCS Study BOEM 2019-050. 166 p. https://espis.boem.gov/final%20reports/BOEM_2019-050.pdf
- Gillett DJ, Gilbane L, Schiff KC. 2020. Benthic habitat condition of the continental shelf surrounding oil and gas platforms in the Santa Barbara Channel, southern California. *Marine Pollution Bulletin* 160 (111662). doi: [10.1016/j.marpolbul.2020.111662](https://doi.org/10.1016/j.marpolbul.2020.111662)
- Gillett DJ, Gilbane L, Schiff KC. 2021. Characterizing community structure of benthic infauna from the continental slope of the Southern California Bight. *Frontiers in Marine Science* 8:605858. doi: [10.3389/fmars.2021.605858](https://doi.org/10.3389/fmars.2021.605858)