

Environmental Studies Program: Ongoing Study

Title	California Deepwater Investigations and Groundtruthing (Cal DIG) I (NSL #PC-17-02)
Administered by	Pacific OCS Region
BOEM Contact(s)	Lisa Gilbane (lisa.gilbane@boem.gov)
Procurement Type(s)	Intra-agency Agreement
Conducting Organizations(s)	U.S. Geological Survey
Total BOEM Cost	\$1,650,000
Performance Period	FY 2017–2021
Final Report Due	June 4, 2021
Date Revised	January 22, 2021
PICOC Summary	
<i><u>Problem</u></i>	BOEM issued a request for information for floating wind in two areas offshore of central California. There is little geological or biological existing information available for those areas.
<i><u>Intervention</u></i>	Conduct sampling cruises to collect remote and physical samples of the geology and biology for this region.
<i><u>Comparison</u></i>	Compare these new biological and environmental parameters.
<i><u>Outcome</u></i>	Create a baseline characterization and habitat maps of the region.
<i><u>Context</u></i>	Central California

BOEM Information Need(s): BOEM Pacific Region issued a request for information for floating wind in two areas offshore of central California. The general ecology of the shoreline/beach and nearshore kelp bed areas has been characterized. However, farther offshore the oceanic area of interest, 20-35 miles, 500-1000 m water depth, on the continental slope remains an unmapped and unstudied expanse. Specifically, mapping and sampling of slope communities is needed for informed decisions regarding potential wind turbine siting, distribution of habitats and historic sites, and the sensitivity of associated biological communities to impacts. The results of this study will help to define mitigations and identify hard bottom areas, archaeological sites, and any associated sensitive shelf and slope communities that energy development should avoid. Results will be used in potential NEPA documents and to fulfill consultation and analysis requirements under the Migratory Bird Treaty Act, Magnuson-Stevens Fisheries Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act for a wind energy commercial lease off south-central California.

Background: California is on track to be powered by 50% renewable energy sources by 2020 and the Governor has set a goal to meet 100% of the state's energy needs with renewable energy by 2045. Offshore wind power is set to play an important role in meeting this goal and south-central California offshore is an area with a significant and consistent wind source. Importantly onshore, Dynegy retired a power plant located on the shore at Morro Bay, but retained the connection to the California electrical

utility. The grid connection is sufficient to flow wind energy facilities' electrical production at maximum capacity into the California Central-Valley electrical backbone.

Prior to the start of Cal DIG I, there were no geophysical or surface anomaly maps or habitat characterizations for the area of interest using modern collection techniques. Early studies from the late 1970s and through the early 1980s were completed in locations 60-80 miles both south and north of the area of interest, where oil and gas potential existed. These habitats include significant populations of both low and high-relief hard bottom reefs, corals, gorgonians, and canyon/canyon-wall habitats (Greene et al. 2003) with some with high relief and a high diversity of associated attached communities (Hixon 1991). The Cal DIG I study is the first step in the process to define mitigations and identify hard bottom areas, archaeological sites, potential shallow hazards, and any associated sensitive deep shelf and slope communities that energy development should avoid.

Objectives: The goal of study is to conduct reconnaissance surveys of the outer continental shelf and slope of south central California for the purpose of improving regional models of seafloor (benthic) habitats, geologic hazards and sedimentary processes in anticipation of commercial wind energy installations. Specific objectives are as follows:

1. Collect data for surficial geology "benthic habitats" and sub-bottom faults and other geologic structures.
2. Collect samples designed to ground-truth or improve the classifications for geologic and habitat maps.
3. Create integrative mapping and modeling products.

Methods: Large-scale mapping was required to define substrate type and distribution of potential hard bottoms associated with canyons, pock mark features, and more distinct slope areas. Data collection is complete and utilized seven cruises to collect ship-based remote sensing, autonomous underwater vehicles (AUVs), remotely operated underwater vehicles (ROVs), piston coring, push cores, and towed fish for mapping. This project required the use of submerged instrumentation capable of high-resolution bottom imagery and sub-bottom profiling at depths of 500-1200 m.

Partners:

- **NOAA Office of Marine and Aviation Operations and Office of Coast Survey, Hydrographic Surveys Division** is contributing vessel days at sea aboard the NOAA vessel *Rainier* and multibeam data collection and processing. Principle contacts are [CAPT Rick Brennan](#), [Ashley Turner](#), [CO Rainier](#), and [Paul Turner](#).
- **Monterrey Bay Aquarium Research Institute (MBARI)** is contributing scientific review and complimentary data collection from three cruises aboard the *Western Flyer*. Principle contact is [Charlie Paull](#).

Specific Research Question(s):

1. What are the faults and key geological features of this area?
2. What are the key biological communities and habitats of this area?

Current Status and Highlights:

- The BOEM-USGS intra-agency agreement was awarded on June 5, 2017.
- NOAA vessel *Rainier* mapped 1 day bathymetry and backscatter for a high-priority area in October 2017.
- MBARI utilized the *R/V Western Flyer* and its ROV to collect 309 samples during 12 ROV dives in 2017 and 2018. MBARI deployed current meters, subbottom AUVs, ROV video, vibra-cores, and push-cores.
- NOAA vessel *Rainier* 22 days at sea in 2018 with USGS and BOEM staff collecting shallow seismic and multibeam data. In total, collected ~4600 km² of MBES data, 2800 line-km of MCS, and 210 line-km of Chirp data in the Cal DIG I study area during the 2018 Rainier survey. During the survey, USGS MCS and Chirp operations were conducted simultaneously with NOAA-operated MBES data collection.
- Commercial *R/V Bold Horizon* at sea for 13 days utilizing MBARI's ROV and crew for 10 sites and USGS's crew and piston coring rail system collected 41 piston and gravity cores in September 2019. One BOEM staff was a part of the ROV crew.
- NOAA vessel *Fairweather* mapped bathymetry and backscatter for remaining gaps in the study area in October 2019.
- MBARI utilized the *R/V Western Flyer* for 8 days and 16 dives in November 2019 with help from two BOEM and one USGS staff. MBARI retrieved current meters, deployed it's ROV the Doc Ricketts to collect video, vibra-cores, and push-cores for geologic and biological sampling.

Publications Completed: None

Affiliated WWW Sites:

<https://marinecadastre.gov/espis/#/search/study/100222>;
<https://www.usgs.gov/centers/pcmssc/science/express-expanding-pacific-research-and-exploration-submerged-systems>; <https://annualreport.mbari.org/2018/story/lending-expertise-in-the-pursuit-of-clean-energy-off-the-california-coast>

References:

Greene HG, Bizzarro JJ, Erdey DM, Lopez H, Murai L, Watt S, Tilden J. 2003. Essential fish habitat characterization and mapping of California continental margin. Moss Landing Marine Laboratories Technical Publication Series No. 2003-01, 29 p., 2 +CDs.

Hixon MA, Tissot BN, Pearcy WG. 1991. Fish assemblages of rocky banks of the Pacific northwest, Heceta, Coquille, and Daisy Banks. U.S. Department of the Interior, Minerals Management Service. OCS Study MMS 91-0052. 410 p.