

Environmental Studies Program: Studies Development Plan | FY 2026–2027

Field	Study Information
Title	Abyssal Data Collection through Strategic Environmental Field Operations (PC-26-02)
Administered by	Pacific OCS Regional Office, Marine Minerals Program (MMP)
BOEM Contact(s)	Jennifer Le (jennifer.le@boem.gov), Donna Schroeder (donna.schroeder@boem.gov), Jennifer Bucatari (jennifer.bucatari@boem.gov), Paul Knorr (paul.knorr@boem.gov), Mark Leung (mark.leung@boem.gov), Obediah Racicot (obediah.racicot@boem.gov)
Procurement Type(s)	Interagency Agreement, Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2026–2030
Final Report Due	TBD
Date Revised	August 25, 2025
Problem	BOEM needs environmental characterization data to support robust analyses and consultations that will be required for seabed minerals development activities. However, at-sea data collection is increasingly costly, especially in deep waters far offshore.
Intervention	Supplement planned field expeditions with strategic environmental operations to address BOEM data gaps at abyssal depths in areas of interest for seabed mineral resources.
Comparison	This study would collect key environmental characterization data in target areas. It would also leverage existing funding and partnerships for more efficient and effective field expeditions that meet interagency needs, e.g., “collect once, use many times.”
Outcome	High-quality, reliable data collections leading to improved analyses, consultations, and environmental protections
Context	Pacific OCS Region, including U.S. Territories

BOEM Information Need(s): BOEM needs environmental characterization information to incorporate into its environmental analyses and consultations required under regulations such as the National Environmental Policy Act and Magnuson-Stevens Fishery Conservation & Management Act. Representative understanding of target areas is integral to characterization of the affected environment, consideration of potential impacts, and development of proper mitigation measures. These information needs can vary with resource type, associated environment, and potential activities. At-sea science expeditions represent opportunities for BOEM to address key data gaps for both resource evaluation and environmental needs, which can often be studied simultaneously to maximize limited resources. The Pacific U.S. Territories have especially poorly characterized environments that co-occur with potential mineral resources found at abyssal depths (4,000-6,000 m) far offshore. This study would help

address these data gaps by opportunistically and strategically supplementing planned field expeditions with mission-focused, deep-water environmental operations.

Background: As industries move into deeper waters that are further offshore, associated deep-sea environments remain poorly characterized (e.g., Amon et al. 2022). These circumstances can make it difficult to manage OCS resources responsibly. Another complicating factor is the high and increasing cost of data collection in these areas. For example, resolution of surface vessel-based multibeam bathymetry is limited in deeper waters. Higher resolution (e.g., to delineate seafloor features) may require other approaches, such as the use of autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROVs), that further increase the cost of this work. However, such operations are necessary to obtain high-quality, reliable data to support accurate and robust environmental analyses.

BOEM lacks its own sea-going assets and must rely on its partners for at-sea data collection, especially because there are limited assets capable of operating at abyssal depths. In recent years, BOEM has successfully collaborated with Federal agencies, such as the USGS and NOAA, as well as other groups to align and address priorities on multiple scientific expeditions. Some examples include adding days-at-sea (DAS) to existing cruises survey priority areas for energy development (PC-19-06) and supporting additional environmental analyses to planned data collection (MM-23-02, PC-24-03, NT-21-01). These previous projects were opportunities to collect key environmental data for a fraction of what it would cost to plan and fund a BOEM-only project. BOEM's ability to support these efforts and be an active partner are integral to guide what operations are conducted and where. It is especially useful because not all expeditions are focused solely on the environment, but combined resource evaluation and environment investigations create a more holistic understanding for resource managers.

There are timely opportunities to which this profile could contribute. This profile could leverage assets planned to be in the vicinity of American Samoa, the Commonwealth of the Northern Mariana Islands, Hawai'i, Howland, Baker, and Wake Islands in 2026. It is likely that assets may stay in the Central and Western Pacific in following years, given priorities pursuant to EO 14285 (*Unleashing America's Offshore Critical Minerals and Resources*). There may be additional opportunities to co-locate mineral resource and environmental data through BOEM MMP. Given the ESP timeline of approximately 18 months from conception to funding, this profile would allow BOEM to respond to these types of opportunities more quickly and obtain abyssal habitat data.

Objective(s): The overall purpose of this study is to strategically address BOEM environmental data gaps with opportunistic deep-water operations for better understanding abyssal habitats. This study would allow BOEM to take field opportunities as they arise while fostering partnerships among BOEM programs, Federal agencies, and other groups.

Methods: This profile would be flexible and responsive to what opportunities arise. Methods would reflect where expeditions are planned, what operations are already included, how much time and/or space is available for abyssal investigations, and other cruise logistics. Previous examples of similar profiles will and have resulted in sediment analysis to understand organic carbon dynamics in abyssal plain areas (MM-23-02), net tows to collect voucher specimens for deep midwater species inventories (PC-24-03), and additional DAS to investigate potential critical minerals deposits with an AUV (NT-21-01).

Moving forward, this profile could support both site-specific investigations and regional understanding. Some examples include characterization of abyssal plain scavenger communities with baited lander

studies and descriptions of poorly explored mesopelagic to abyssopelagic systems with midwater trawl sampling. Surveys and sampling at several sites would help elucidate spatial patterns in biological communities and their habitats. The collected data would provide unprecedented deep-water characterization and enable comparison with other abyssal systems, such as the Clarion-Clipperton Fracture Zone where international interest for polymetallic nodules exists. Collection of oceanographic data would also contribute to proposed efforts, such as those to characterize mining-generated sediment plumes and their potential impacts on deepwater communities. In addition, the funded study “Critical Minerals Environmental Assessment Framework” (MM-24-01) will identify, describe, and prioritize specific environmental information gaps that can be addressed by this and other environmental studies, with sufficient funding.

Specific Research Question(s): Specific research questions may vary depending on what opportunities arise. The following represent examples of what could be addressed:

1. What geomorphology exists in the deep-water areas of interest? Is there evidence of sensitive and/or unique habitats?
2. What is the oceanographic regime, including currents, turbidity, nutrient profiles, etc., at the seafloor and in water column zones of interest?
3. What species exist in abyssal habitats, and what is their distribution and abundance? Are there areas or features where biomass or species concentrate?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Amon D, Gollner S, Morato T, Smith CR, Chen C, et al. 2022. Assessment of scientific gaps related to the effective environmental management of deep-seabed mining. *Marine Policy*. 138:105006.