Environmental Studies Program: Ongoing Study

Study Area(s):   Mid and South Atlantic

Administered By: Headquarters

Title: Deep SEARCH: Deep Sea Exploration and Research of Coral/Canyon/Seep Habitats (NSL #AT-17-06)

BOEM Information Need(s) to be Addressed: This study builds on and leverages partnerships from the successful multi-agency Mid-Atlantic Canyons study that provided important and new baseline information about deepwater habitats and species. The Bureau of Ocean Energy Management (BOEM) requires additional such information from other priority geographic areas in the Mid and South Atlantic to support the agency's mission across program areas. Study results will directly benefit BOEM's pre- and post-lease responsibilities by improving the scientific and legal adequacy of National Environmental Policy Act (NEPA) Environmental Impact Statements (EIS), supporting interagency consultations, and informing early planning for potential mitigation strategies.

Total BOEM Cost: $3,923,511   **Period of Performance:** FY 2017−2022
(+ ~$10,000,000 agency partner funding
and in-kind support)

Conducting Organization(s): TDI Brooks International, Inc. [BOEM contractor]; U.S. Geological Survey (USGS) and National Oceanic and Atmospheric Administration's (NOAA's) Office of Ocean Exploration and Research (OER) [agency partners]

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Description:
Background: Authoritative baseline information for the Mid and South Atlantic is required by BOEM to inform decision making across program areas. Important differences between the Gulf and the Atlantic related to types of benthic habitats (*e.g.*, depth preferences) and species presence require improved description in EIS's and may also require BOEM to make adjustments to future mitigation assumptions and strategies. Previous cruises have documented numerous new deepwater coral communities and (unexpectedly) new chemosynthetic communities in the region but have left many potential sites unexplored. BOEM requires additional such information focused on the identification, biodiversity, ecology, and food-web dynamics of deepwater benthic communities associated with Atlantic hard bottoms and seeps.

Building upon the previous award-winning paradigm for deepwater research established by studies in the Gulf of Mexico and Atlantic, this study will continue BOEM's partnership with NOAA OER and the USGS, under the auspices of the National Ocean Partnership Program (NOPP), and direct interaction with the NOAA Deep Sea Coral

Research and Technology Program (DSCRTP) which will act as data portal and advise on overall national deep coral research and management. All partners benefited from the previous study results, which expanded the limited baseline information about Atlantic habitats and species in Baltimore and Norfolk Canyons, including unexpected discoveries of the structure-forming deepwater coral *Lophelia pertusa* and a dense methane seep community. Results also revealed that even neighboring canyons can have very different species presence and environmental controls. This study aims to investigate new Mid and South Atlantic priority areas possessing canyons, hard bottoms, and seep habitats likely to support undiscovered deepwater benthic communities. Potential geographic regions of interest include several unexplored canyon systems offshore of North Carolina as well as unmapped portions of the Blake Plateau; final target areas will be further developed with interagency partners and the contractor.

Objectives: This study will enhance insufficient baseline habitat information in specific offshore areas of the Atlantic Large Marine Ecosystem with relevance to BOEM activities across program areas. Mapping efforts focused on coverage gaps will enhance understanding of the fundamental geologic/geomorphic characteristics influencing species distributions and ecological functions and will improve predictive models used by managers. Biological characterization of the location, abundance, connectivity, and ecological importance of deepwater benthic communities, including structure-forming coral and seep-associated organisms, will lead to an improved understanding of disturbance sensitivity. Elucidating essential differences between Atlantic and Gulf habitats will be of particular importance when developing future mitigations. Measurement and analysis of relevant environmental conditions at the seafloor and in the water column (*e.g.*, turbidity, nutrient inputs) may reveal important biological controls and benthic-pelagic connections. Overall, this study will improve understanding of the functional role of benthic habitats within the wider Atlantic ecosystem and inform near-term and future management decisions regarding its balanced stewardship.

Methods: Learning from the previous study's proven scientific and administrative methods will help ensure successful implementation of this study. National Oceanographic Partnership Program sponsorship and senior management support from all partner agencies will help ensure exceptional communication and collaboration between all parties. Each agency will provide its unique expertise and capabilities: BOEM will focus on fulfilling management needs; the USGS will provide multidisciplinary scientific expertise; and NOAA OER for education and outreach, data management, and ship/submersible coordination abilities. A broad range of interdisciplinary methods will be employed to sample and characterize selected coral and chemosynthetic communities and benthic-pelagic environmental conditions. Appropriate high resolution, ship-based mapping technologies will delineate substrate types and document the distribution of hard bottom areas. Sophisticated submergence facilities (*e.g.*, Remotely Operated Vehicles, Autonomous Underwater Vehicles) will provide additional seafloor imagery and enable collection of seafloor samples and environmental parameters. Collected data will be analyzed using appropriate laboratory materials/protocols and software systems in order to describe community composition,

complexity, and sensitivity to impacts. Data management best practices and annotation consistent with the Coastal and Marine Ecological Standard will be followed to ensure information accessibility, with coral and sponge locations submitted in a format consistent with the NOAA Deep Sea Coral Research and Technology Program (DSCRTP) national geodatabase. Study results will be made available via peer-reviewed literature, a final report, and as datasets in usable formats such as geographic information system (GIS) layers.

Current Status: Contract started on August 1, 2017. The fourth and final ocean research mission off the U.S. southeast coast on April 9 for the next phase of the DEEP SEARCH project sponsored by BOEM, USGS, and NOAA. Sailing aboard the NOAA Ship Ronald H. Brown, the expedition will explore and characterize seeps, corals, canyons and associated fauna along the Atlantic margin between Virginia and Georgia.

Final Report Due: January, 2022

Publications Completed:

N/A

Affiliated WWW Sites: https://marinecadastre.gov/espis/#/search/study/100208

Revised Date: March 29th, 2019