**Environmental Studies Program: Ongoing Study**

**Study Area(s):** Mid and South Atlantic OCS

**Administered By:** Gulf of Mexico OCS Region

**Title:** Atlantic Deepwater Ecosystem Observatory Network (ADEON) – An Integrated System for Long-Term Monitoring of Ecological and Human Factors on the OCS (NSL AT-16-08a; AT-16-08b)

**BOEM Information Need(s) to be Addressed:** BOEM requires a mechanistic understanding of variable biological, physicochemical, and human use dynamics in Atlantic deep waters to address the potential impacts of offshore activities across program areas. This study will establish an ecosystem observatory network in Mid and South Atlantic deep waters to provide baseline measurements and environmental monitoring capabilities across multiple disciplines, to help fulfill BOEM's obligations under the Outer Continental Shelf Land Act and other laws. Biological data on prey (e.g., plankton), fish, and marine mammal distributions and habitat use, as well as soundscape, are required for Essential Fish Habitat (EFH) and Endangered Species Act (ESA) consultations, in addition to MMPA Rulemaking. Physicochemical measurements of ocean currents, water quality, and meteorology/pollutants will provide associated habitat characteristics and improve BOEM's modeling capabilities.

**Total BOEM Cost:** $4,000,000 (+ co-sponsor funds) **Period of Performance:** FY 2016–2021

**Conducting Organization(s):** University of New Hampshire (Contractual portion of study); NOAA Southwest Fisheries Science Center (IA portion of study)

**Principal Investigator(s):** Dr. Jennifer Miksis-Olds (J.MiksisOlds@unh.edu)

**BOEM Contact(s):** Dr. Rebecca Green (rebecca.green@boem.gov)

**Description:**

Background: Sustained deep water measurements of biological, physicochemical, and human use factors are currently rare in the Mid and South Atlantic. An ecosystem-based approach is required in offshore waters that provides an integrated perspective across multiple disciplines to enhance BOEM's role in environmental stewardship. A sustained network of deep water observatories would provide this ecosystem perspective through collection of multi-year, year-round measurements of regional processes and human use as part of an integrated system. Offshore Atlantic waters encompass a complex oceanographic regime and highly productive biological domain, as influenced by the shelf-slope break, the Gulf Stream, submarine canyons, and atmospheric/climatic forcing. The observatory will be part of the new generation of biologically-enabled ocean observing systems which can provide long-term measurements of plankton, fish, and marine mammal distributions. Passive acoustic data serves the dual purpose of providing both animal distributions and baseline soundscapes, including contributions

from human activities. As well, physical oceanographic, water quality, and air quality measurements obtained from the observatory network will provide habitat data and inform BOEM's modeling capabilities and respective NEPA cumulative-impact analyses. Overall, the network will provide much needed baseline data in this region and will provide capability for monitoring long-term environmental changes and testing BOEM mitigations.

Objectives: The overarching goal of this 5-year study is to collect and analyze year-round ecological and human-use datasets to provide improved mechanistic understanding of ecosystem variability, including soundscape, and to develop a long-term monitoring presence in Mid and South Atlantic deep waters.

Methods: This is a National Oceanographic Partnership Program (NOPP) project with sponsoring agencies including BOEM, ONR, and NOAA, all of whom have interest in improved soundscape measurements. The interdisciplinary objectives of this study will be met through multi-year (initial 3 year) deployment of an integrated array of instrumented moorings in Mid and South Atlantic deep waters. The Government anticipates that moorings and other observing assets will be distributed from a northern extent off Virginia (Norfolk Canyon area) to a southern extent off Georgia (Blake Ridge area), with exact mooring location based on regional resources and processes of interest. Mooring instrumentation will include sensors for: (1) Biology and Soundscape – prey, fish, and marine mammal species and ambient noise levels, (2) Water Quality –oxygen, chlorophyll, and nutrients, and (3) Physical Oceanography – pressure, temperature, salinity, and ocean currents. Regular ship-based support will provide mooring deployment, validation sampling, and instrumentation maintenance. Finally, time series analyses will be performed for all measured parameters and will provide a mechanistic understanding of forcing factors (e.g., storm events, anthropogenic activities, etc.) driving variability.

**Current Status:** The Post-Award Meeting was held at the NOPP office in Arlington, VA. Draft documents developed and available on the ADEON website include: the Soundscape and Modeling Metadata Standard, Calibration and Deployment Good Practice Guide, Hardware Specification, and Data Processing Specification. The ADEON team successfully completed its first cruise in December 2017 and deployed all seven benthic bottom landers, which include instrumentation for passive acoustic monitoring, active Acoustic Zooplankton Fish Profilers, and oceanographic properties.

**Final Report Due:** September 19, 2021

**Publications Completed:** -

**Affiliated WWW Sites:**

https://adeon.unh.edu/

https://marinecadastre.gov/espis/#/search/study/100143

**Revised Date:** February 14, 2018