Environmental Studies Program: Ongoing Study

Title	Passive Acoustic Monitoring in the Massachusetts and Rhode Island Wind Energy Areas in Support of the Partnership for an Offshore Wind Energy Regional Observation Network (POWERON) (AT 22-x14)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	Kyle Baker kyle.baker@boem.gov
Procurement Type(s)	Contract
Conducting Organization(s)	LGL Ecological Research Associates Inc
Total BOEM Cost	$846,737.92
Performance Period	FY 2023–2025
Final Report Due	July 1, 2025
Date Revised	May 11, 2023
PICOC Summary	
Problem	Offshore wind development may impact marine mammals.
Intervention	Monitoring areas prior to, during, and after development may determine the impacts to marine mammals.
Comparison	Comparison of marine mammal distributions before and after offshore wind development.
Outcome	Demonstration of changes or lack of change in the distribution of marine mammals.
Context	Southern New England Area

BOEM Information Need(s): The U.S. has set a goal to deploy 30 gigawatts (GW) of offshore wind energy by 2030. The Bureau of Ocean Energy Management (BOEM) oversees the exploration and development of oil, natural gas, and other minerals and renewable energy on the nations' Outer Continental Shelf (OCS). The program not only supports decisions made within the Department of the Interior, but also provides coastal states, tribes, and local governments with the information necessary to ensure that all stages of offshore energy and mineral activities are conducted in a manner to protect both human and natural environments.

Background: The majority of wind energy projects over the next 5 years are expected to be constructed on the Atlantic OCS with rapid development expected on OCS wind energy leases. The construction and operation of offshore wind farms will occur within protected species habitats, including areas that vocal species of marine mammals and fish utilize for foraging, migration, and reproduction. Several papers and workshops that have focused on monitoring the impacts of offshore wind have identified passive acoustic monitoring as a valuable tool to detected species year-round before, during, and after construction of offshore wind farms (Field et al. 2021; Kraus et al. 2019; Southall et al. 2021; Van Parijs et al. 2021).

Passive acoustic monitoring (PAM) will play a key role in assessing year-round marine mammal vocalizations that can be analyzed independently, as well as with other data sets. Changes in vocalization patterns across space and time can provide insights about potential shifts in animal distributions. Before and after gradient (BAG) studies can be useful for detecting changes in marine mammal vocalizations by comparing time-series of vocalizations within and outside wind energy areas adjacent to areas without development. Development of the first projects is planned within the WEAs offshore Massachusetts and Rhode Island. Deployments of PAM instruments within these areas will provide much needed pre-construction data, as well as post-construction data within the first planned projects. Ongoing efforts with the Regional Wildlife Science Collaborative and NOAA include instrument deployments south of Nantucket Shoals – an area that consistently has been an important habitat for large whales. Together these deployments will provide a "string" of receivers across wind energy areas to allow for a more robust comparison of vocalization activity in these areas.

Objectives: The objective of this task order is to obtain contractor support to conduct year-round passive acoustic monitoring of marine mammal and cod vocalizations, as well as characterize anthropogenic noise (e.g., vessel noise) to establish an acoustic ecological baseline in and around the Massachusetts and Rhode Island wind energy areas.

Methods: Marine mammal species of interest include: North Atlantic right whales (Eubalaena glacialis); fin whales (Balaenoptera physalus), blue whales (Balaenoptera musculus), sei whales (Balaenoptera borealis); humpback whales (Megaptera novaeangliae), and minke whales (Balaenoptera acutorostrata). Depending on the recorder capabilities or attachment of FPODs to the moorings, secondary focal species may include small cetaceans and seal vocalizations. Deployments within these wind energy areas will provide much needed pre-construction PAM data, as well as post-construction data for the first planned projects. Leveraging a partnership with NOAA, recorder locations will be planned in coordination with existing NOAA instruments in an area adjacent to offshore wind leases that has recently been identified as important habitat for baleen whales. A "string" of recorders across key locations in wind energy areas will allow a more robust comparison of vocalization activity in these areas as part of the BOEM effort to establish a Partnership for an Offshore Wind Energy Regional Observation Network (POWERON). These long term data are necessary to conduct an evaluation of seasonal, and annual variation in species presence. Along with the current effort, an option to deploy additional fixed bottom archival passive acoustic monitoring recorders across the wind energy area for multiple years may occur contingent upon funding and approval by BOEM.

The exact PAM deployment locations are expected to be chosen based on BOEM's recommended 20 x 20 km grid design within and surrounding lease areas, and a 40 x 40 km grid design in between WEAs (https://www.northeastoceandata.org/CXmDWZCf) (Van Parijs et al. 2021). Specific deployment locations will be determined in coordination with BOEM, NOAA, Navy, and developers. Deployment and maintenance of archival PAM recorders, and a preliminary analysis of acoustic data will be required. Data analysis shall include, at a minimum, a record of vocalizations of five baleen whale species and Atlantic cod, detections of vessel presence, and ambient noise metrics. Specific details on the data products to be derived are described in further detail below. Beyond creation of these initial data products, further analysis is not required, since the aim of this study is to complement other PAM efforts expected in the region via federal state, and industry partners coordinated through the Regional Wildlife Science Collaborative (https://neoceanplanning.org/rwse) (https://www.northeastoceandata.org/CXmDWZCf). The raw PAM data shall be archived in a public data repository with appropriate metadata, to enable future, more comprehensive analyses.

Specific Research Question(s):

What is the seasonal and annual distributions of marine mammals in the Southern New England area?

How has wind development changed or not changed this distribution?

Current Status: The kick-off meting was held on January 25, 2023. Deployment of the passive acoustic instruments will occur in summer 2023.

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Field, P, Baker K, Van Parijs SM, Staaterman E, Cody MB. 2021. Improving Monitoring, Data Consistency, Archiving, and Access for Improved Regional Integration of Renewable Energy Science. Workshop Summary on Passive Acoustic Monitoring and Marine Mammals - June 2-3, 2021. Sterling, VA: Workshop report prepared by Consensus Building Institute for the U.S. Department of the Interior, Bureau of Ocean Energy Management.

Kraus, SD, Kenney RD, Thomas L. 2019. A Framework for Studying the Effects of Offshore Wind Development on Marine Mammals and Turtles.

Southall, B, Morse L, Williams KA, Jenkins E. 2021. State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts.

Urazghildiiev, IR, Van Parijs SM. 2016. Automatic grunt detector and recognizer for Atlantic cod (Gadus morhua). The Journal of the Acoustical Society of America. 139(5):2532-2540.

Van Parijs, SM, Baker K, Carduner J, Daly J, Davis GE, Esch C, Guan S, Scholik-Schlomer A, Sisson NB, Staaterman E. 2021. NOAA and BOEM Minimum Recommendations for Use of Passive Acoustic Listening Systems in Offshore Wind Energy Development Monitoring and Mitigation Programs. Frontiers in Marine Science. 8(1575).