

Environmental Studies Program: Ongoing Studies

Study Area(s): Mid-Atlantic (Offshore Maryland)

Administered By: State of Maryland, Department of Natural Resources

Title: Determining Offshore Use by Marine Mammals and Ambient Noise Levels Using Passive Acoustic Monitoring

BOEM Information Need(s) to be Addressed: Geographic information describing marine mammal presence, distribution and seasonality is needed for siting and environmental permitting of offshore wind energy projects under the National Environmental Policy Act. In addition, in order to fulfil consultation requirements under the Marine Mammal Protection Act and the Endangered Species Act, BOEM needs data to understand the potential impacts from underwater noise that may occur during activities related to the development of offshore wind energy facilities upon marine mammals and other aquatic species, as well as information regarding baseline noise levels and empirical operational acoustic data.

Total Cost: (in thousands) \$2,104

Period of Performance: FY 2014-2018

Conducting Organization(s): University of Maryland Center for Environmental Science and Bioacoustics Research Program, Cornell University

Principal Investigator(s): Helen Bailey (hbailey@cbl.umces.edu)

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Description:

Background: While there are marine mammal data collection efforts ongoing currently, including the Atlantic Marine Assessment Program for Protected Species (AMAPPS) (funded by BOEM), the Biodiversity Research Study (funded by DOE), and the Virginia Aquarium study (funded by VA), these studies suffer from the traditional detection biases of limited duration and geographic coverage. To help fill the gaps, the State of Maryland expressed interest in collaborating, and cost-sharing, with BOEM on a passive acoustic monitoring study for the offshore Maryland Wind Energy Area (WEA). Passive acoustic recordings allow for continuous monitoring of sound producing animals and can provide information on the daily cycles of behavior, habitat use and regional distributions of marine animals, as well as provide information on inter-annual and seasonal variation. Using three types of sound recording devices that will encompass a range of frequencies will enable the detection of vocalizations from large whales (low frequencies) and small cetaceans (mid to high frequencies) continuously over long time periods. This baseline data on marine mammals and ambient noise levels, as well as operational activity acoustic data, will be useful to BOEM and developers during the offshore wind energy leasing process and the subsequent construction and operation phases.

Objectives: The goals of this research are to provide an assessment of the species composition and geographic distributions of marine mammals present in the vicinity of the Maryland WEA and to provide a baseline of ambient underwater noise. Passive acoustic monitoring (PAM) can provide species presence information, and by using a grid-configured array, recording units can also provide location information via triangulation. Thus, with sufficient data, PAM can be used for presence-absence modeling and location-based analyses.

Methods:

- Produce a database of the temporal occurrence and spatial distributions of vocalizing marine mammals (including right whales, fin whales, humpback whales, minke whales and any small cetacean species) identified using a combination of automated call detection software and expert human validation,
- Estimate specific spatial locations and movements of North Atlantic right whales within and near the Maryland WEA, using an acoustic localization array,
- Undertake statistical analysis of location data, and
- Develop spatially explicit noise statistics to define baseline levels of underwater ambient noise.
- Collect operational acoustic data during high resolution geophysical surveys and meteorological tower installation conducted by U.S. Wind in the Maryland Wind Energy Area.
- Analyze SM3M hydrophone data to identify the timing of the HRG survey events and linking them to the corresponding time period for the dolphin detections from the C-PODs.

Current Status: This study is running according to schedule and has met all relevant milestones, as originally proposed. The acoustic recording units have been successfully deployed and synchronized since November 2014 and, depending on the type of device, have been retrieved for data collection and re-deployed within 3-6 months of each deployment. During this period of the twenty-ninth to thirty-fourth month of the project we have focused on retrieving and re-deploying the C-PODs and SM3Ms, and downloading and processing the C-POD and SM3M data from July to November 2016. A 25% sample of the MARU data from November 2014 to July 2016 has been analyzed, including the localization of some right whale calls during November 2014 to April 2015. Manuscripts for the dolphin analyses are currently being developed.

Data collection was supposed to end in November 2015, however since US Wind plans to conduct additional high resolution geophysical surveys and install a meteorological tower in the MD WEA between summer 2016 and summer 2017; this provided a unique opportunity for an additional year of baseline data collection, as well as collecting independent, empirical operational data. BOEM therefore extended the data collection and study period for one year.

Final Report Due: May 31, 2018

Publications Completed:

Wingfield, J.E., M. O'Brien, V. Lyubchich, J.J. Roberts, P.N. Halpin, A.N. Rice and H. Bailey. 2017. Year-round spatiotemporal distribution of harbour porpoises within and around the Maryland wind energy area. PLoS ONE 12(5): e0176653.
<https://doi.org/10.1371/journal.pone.0176653>.

Affiliated WWW Sites:

<https://marinecadastre.gov/epis/#/search/study/100069>

<http://www.umces.edu/cbl/project/monitoring-impact-offshore-wind-power-marine-life>.

Revised Date: June 14, 2017