Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Addressing Key Information Gaps in Acoustic Ecology of North Atlantic Right Whales (NT-23-01)
Administered by	Office of Environmental Programs
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Procurement Type(s)	Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2023–2025
Final Report Due	TBD
Date Revised	May 13, 2022
PICOC Summary	
Problem	Passive acoustic monitoring (PAM) is a highly effective tool for identifying the near real-time presence of acoustically active species. However: 1) information on availability bias (i.e., how often we expect to detect them) is lacking for North Atlantic right whale (NARW) in the mid-Atlantic, leading to uncertainty in species density estimations; and 2) the lack of data on the behavioral ecology (i.e., what they are doing when they are making particular vocalizations) of this species limits our ability to comprehensively analyze PAM data.
Intervention	Gather biologging data on the acoustic behavior of the NARW in the Mid-Atlantic.
Comparison	The results of this study will allow researchers to better assess potential impacts to NARW from human activities than would have been possible before.
Outcome	The data will: 1) improve abundance estimates; 2) increase the value of existing PAM data; 3) inform the assessment of the effectiveness of PAM as a mitigation strategy for these priority ESA-listed species; and 4) provide, short term habitat usage and movements of these species to assist in identifying currently unknown potentially important biological areas.
Context	Mid-Atlantic

BOEM Information Need(s): BOEM requires robust, current information on NARW to: 1) fully analyze and disclose the potential for impacts to this endangered species from Outer Continental Shelf (OCS) activities at the programmatic and site-specific level; 2) help ensure that a species is not jeopardized by activity or that critical habitat is not adversely modified by that activity pursuant to the Endangered Species Act (ESA); 3) minimize incidental take of marine mammals resulting from BOEM-permitted activities, thus meeting not only the small numbers and negligible impact requirement under the Marine Mammal Protection Act (MMPA) but also making every effort to maintain the health and stability of marine mammals and their ecosystem; and 4) fulfill Federal assessment and consultation responsibilities. Additionally, BOEM is required to design and implement mitigation measures to reduce or eliminate impacts from regulated activities on protected and managed species.

Background: The lack of information about acoustic behavior of the critically endangered NARW creates a high degree of variability in their detection probabilities and the analysis of data from passive acoustic monitoring, which is one of BOEM's primary mitigation and monitoring tools. BOEM relies on density and abundance data (Roberts et al., 2016) to assess the potential impacts on protected species from BOEM-permitted activities. However, acoustic behaviors of the NARW in the mid-Atlantic, particularly call rates, is poorly understood. For example, NARW have dramatically different acoustic behavior in the southeast versus northeast extent of their range, but their acoustic behavior in the Mid-Atlantic, where we now know they are located year-round, has never been studied. This adds tremendous uncertainty into the density and abundance models that are generated from acoustic data.

Traditional survey methods for cetaceans include shipboard or aerial surveys. However, these surveys provide a snapshot of cetacean occurrence in any given area and these data are spatially and temporally restricted since it can only be obtained under appropriate survey conditions (e.g., good visibility). Therefore, although aerial and broadscale vessel-based survey data provide much-needed regional data, they are of limited use to infer specific behavioral patterns in fine spatial and temporal scales.

Establishing cue rates (how often a whale vocalizes) for NARW in diverse behavioral states and habitats also allows for PAM data collected previously through BOEM studies to be reanalyzed and be more useful. This information will provide much-needed species-specific behavioral data (for example, dive durations) to feed into population-level impact modeling analyses – an emphasized need identified by The National Academies of Sciences Committee (NASEM, 2016).

The data collected during this study will assist in improving the analytical robustness and biological meaningfulness of acoustic data collected during BOEM-funded studies as well as the credibility of passive acoustic monitoring, a critical mitigation prescribed by BOEM. It will also improve comparability of PAM data collected in different geographic regions. Additionally, implementing this study would provide BOEM with a means of validating BOEM's current PAM practices for endangered species impact mitigation.

Objectives:

- Observe and describe acoustic ecology of NARW across geographies and life histories where significant data gaps in call rates exist.

- Verify and/or establish cue rates combined with visual observation to inform accurate density modeling of data deficient marine mammal species applicable to renewable energy for impact analysis.

- Inform potential overlap of biologically important areas for NARW with BOEM's areas of interest.

Methods: This project will utilize validated and available techniques and technologies:

1. Mobile 3-D passive acoustic monitoring: vessel and/or automated underwater vehicle-based PAM will provide ground truthing and guidance for existing stationary PAM.

2. Biologging: electronic tags such as 3-D digital accelerometer/acoustic tags will be used to augment remote study to provide an understanding of habitat use and movement in relation to acoustic behavior.

3. Vessel based eDNA and biopsy sample collection will provide additional information on stock structure and distribution.

Specific Research Question(s):

1. What are the species/regions/life stages where acoustic behavioral information is needed to support detection and mitigation?

2. Are density models improved upon by reducing availability bias?

3. What is the overlap of understudied endangered and at-risk cetacean species with areas of interest to BOEM for offshore energy development?

4. What is the importance of these areas of overlap to the endangered NARW?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

[NASEM] National Academies of Sciences, Engineering, and Medicine. 2016. Approaches to understanding the cumulative effects of stressors on marine mammals. Washington (DC): The National Academies Press. https://doi.org/10.17226/23479.

Roberts JJ, Best BD, Mannocci L, Fujioka E, Halpin PN, Palka DL, Garrison LP, Mullin KD, Cole TVN, Khan CB, et al. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports. 6:22615.