Environmental Studies Program: Ongoing Study

Title	Mapping Abundance, Distribution, and Foraging Ecology of Gray Seals in the North Atlantic (AT-22-06)
Administered by	Office of Renewable Energy Programs
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Procurement Type(s)	Interagency Agreement
Conducting Organization(s)	NOAA/NMFS/NEFSC
Total BOEM Cost	$ 1,495,712
Performance Period	FY 2023–2027
Final Report Due	September 30, 2027
Date Revised	August 8, 2023
PICOC Summary	
Problem	A lack of information regarding the distribution and abundance of gray seals (*Halichoerus grypus atlantica)*.
Intervention	Developing baseline information about gray seals and their use of the marine environment.
Comparison	Compare the baseline condition of gray seals before and after wind development.
Outcome	An understanding of the level of impact from offshore wind on gray seals.
Context	Areas along the Atlantic where gray seals occur near current and proposed wind energy areas.

BOEM Information Need(s): Information regarding the distribution and foraging ecology of the rapidly increasing gray seal population in northeast U.S. waters will provide insight into the role of this species in the marine ecosystem, and allow BOEM to more effectively evaluate the potential for impacts to gray seals from offshore wind farms. It is important for BOEM to understand the distribution, abundance, and movements of gray seals on the Outer Continental Shelf (OCS) in order to assess any impacts from offshore wind development. Additionally, the study would meet the ESP goal of implementing more citizen science projects by supporting fishers to collect information from the bycatch of seals.

Background: The number of gray seals (*Halichoerus grypus atlantica*) in the Northeast has risen dramatically in the last 2 decades, with few being observed in the early 1990s to at least 25,000 on a single Massachusetts beach in 2016. They range from New Jersey north to Labrador. Gray seals use beaches and waters in the northeast to breed, pup, and forage in areas that overlap with BOEM WEAs based on a small satellite tagging study (Puryear et al. 2016) as well as NMFS bycatch estimates from commercial fisheries. Since 2001, NMFS has conducted aerial surveys to monitor gray seal pup production on Muskeget Island and adjacent sites in Nantucket Sound, and Green and Seal Islands off the coast of Maine (Wood et al. 2007). Previous surveys to monitor marine mammal distributions in WEAs off Massachusetts and Rhode Island did not survey seals (Krause et al. 2016, current AMAPPS efforts). The installation of foundations for offshore energy structures can create foraging habitat for seals (Russell et al. 2014). Increases in the habitat use, distribution, or abundance of animals around

foundations can increase the potential for human interactions with gray seals from offshore wind activities (e.g., construction) and fisheries (e.g., entanglement) in wind energy areas (WEAs). To better understand the population, ecological, and anthropogenic effects of the rapidly increasing population of gray seals, there is a pressing need to obtain basic demographic and ecological information of this increasing seal population in northeast Outer Continental Shelf (OCS) waters prior to further development of offshore wind facilities.

Objectives: The objective of this study are to:

- Collect baseline information on the distribution, abundance, and movements of gray seals.
- Support citizen science reporting of human interactions with seals in northeast OCS waters.

These seasonal and behavioral patterns form the basis for the implementation of strategies to monitor or reduce adverse interactions between seals and activities occurring within wind energy areas. Funding this project during the current time frame would provide some pre-construction baseline information, and additional comparative information during construction.

Methods: Survey and tracking data can provide much needed distribution and abundance data on gray seals. Additionally, seal movements from satellite-tagged animals, combined with commercial fishing effort data can be used to predict times and areas of co-occurrence inside of the WEA's. Information collected will determine if the distribution of gray seals in WEAs changes throughout the year depending on the forage base, presence of predators, and other factors, or if it changes during construction. The study will provide information on changes in density over time, given the population appears to be growing rapidly with an uncertain trajectory. A multi-year study is proposed including satellite tagging of individual seals to understand their seasonal distributions and movements on the OCS, aerial surveys of haul out areas combined with radio tagging efforts to correct for the portion of the population at sea during surveys would be used to estimate total abundance in the region. Additionally, an opportunity for citizen science is available to support commercial fishermen who have expressed interest in working with the scientific and regulatory communities to retrieve carcasses of animals in nets to improve diet information and to help inform solutions to reduce interactions between seals and fisheries. An additional fifth year would be dedicated to data synthesis and final reporting with minimal field operations.

The project would be completed over a 4-year period plus an additional year for data analysis and reporting of results. Three years would be devoted to satellite tagging and tracking of individual seals to understand their seasonal distributions in the pelagic environment. One year would be dedicated to aerial surveys of haul-out areas and radio tagging to correct for portion of the population hauled out during the aerial surveys. Haul-out areas will be identified and abundance estimates derived through the aerial survey and radio tagging efforts High resolution photography may be used during surveys. A fifth year would be dedicated to synthesis, analysis, and final reporting. In addition to the above work, a citizen science component from fishers would be integrated into the study to support the collection and transport of seals entangled in fishing nets. This dimension of the project will add baseline information on seal bycatch, the diet, and food web interactions in WEA regions. Samples will be transported, stored, information collected on seals, and a diet analysis completed from stomach contents. Data synthesis, analysis, and preparation of a final report would occur in the fifth year of the study.

Specific Research Question(s): What are the important ecological areas for gray seals?

Current Status: The study was awarded in August 2022. Field work is underway.

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

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