

Environmental Studies Program: Ongoing Study

Field	Study Information
Title	Investigating Persistent Super Aggregations of Right Whales and Their Prey in Lease Areas in the North Atlantic (AT-22-13)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	Timothy White (timothy.white@boem.gov)
Procurement Type(s)	Inter-agency Agreement
Conducting Organization(s)	National Marine Fisheries Service
Total BOEM Cost	\$775,000
Performance Period	FY 2022–2024
Final Report Due	December, 2024
Date Revised	January 4, 2023
Problem	In the recent years, up to 50% of the highly endangered North Atlantic right whale population has been sighted in the southern New England region in or near BOEM wind energy lease areas OCS-A 0521 and OCS-A 0522. Prey resources are currently undocumented in these areas in winter and thought to be different than prey that Right whales typically feed on in spring and summer.
Intervention	Conduct multidisciplinary research to gain insight into the prey resources that compress right whales into super aggregations in wind energy lease areas
Comparison	Target super aggregations in lease areas and compare to other right whale feeding areas outside lease areas.
Outcome	Identification of key prey resources currently undocumented in right whale hotspots that intersect wind energy lease areas. Prey composition, prey density, and prey energetic value will inform right whale energetics models to determine the importance of these critical feeding areas.
Context	Atlantic/Massachusetts lease areas

BOEM Information Need(s): This research may challenge the current perception of right whale prey resources and could help evaluate whether this foraging region is likely to persist under changing ecosystem conditions by better understanding the mechanisms and prey resources that drive foraging by right whale super aggregations in lease areas (Leiter et al. 2017; White and Veit 2020). The Nantucket Shoals system and others like it will likely increase in importance due to ecosystem resilience as the larger oceanographic regime changes (Record et al. 2019). NEPA/ESA/MMPA assessments will more routinely need to account for the attraction of immense persistent aggregations of listed species to resilient areas due to the concentrated food resources they provide and competing interests for the space with industry.

Background: In the ongoing BOEM study with the Massachusetts Clean Energy Center (AT-17-x10), the New England Aquarium and Woods Hole Oceanographic Institution investigated potential prey of right whales in the northern Massachusetts Wind Energy Areas; however, their sampling locations were distant from the super aggregations of right whales that persist in lease areas. It is worth noting that at the right whale consortium, Mark Baumgartner commented that he did not know what the whales were feeding on in this area that we propose to target.

Objectives: Our primary objective is to examine the prey resources and persistent aggregations of right whales in winter, during a time when their usual prey (*Calanus finmarchicus*) is in diapause at much deeper depths. Nearly 50% of the right whale population feeds along the southwest quadrant of Nantucket Shoals and intersects Wind Energy Areas. Documentation of this unidentified prey patch and its primary zooplankton densities will help inform and update right whale energetics models.

Methods: Shipboard sampling of plankton and oceanography (e.g., currents, temperature, depth) will be conducted using a combination of nets, active acoustics, and underwater video. Sampling will be paired with NOAA aerial survey effort, AMAPPS aerial imagery surveys, satellite imagery of whales, and right whale individual identification to help build a comprehensive portrait of right whale demographics as it pertains to habitat use. Recent deployments of moored acoustic sensors and autonomous acoustic gliders currently patrolling the wind management area will aid our field efforts and sampling could also be expanded to incorporate eDNA water collection. This study will contribute to and benefit from BOEM projects by providing and receiving whale sighting information to the research projects on Automated Detection and Classification of Wildlife Targets in Digital Aerial Imagery (NT-19-04) and AMAPPS III B and C—Photogrammetric Aerial Surveys to Improve Detection and Classification of Seabirds, Cetaceans, Sea Turtles (AT-20-02).

Specific Research Question(s):

1. Which prey species are right whale aggregations targeting in lease areas?
2. Are these feeding areas becoming more important to right whales as the larger oceanographic regime changes?
3. How does species composition and energetic value of targeted prey swarms in these areas translate to right whale condition and survival?

Current Status: Initial shipboard prey-field sampling and active acoustics will be underway in winter and spring 2023. Targeted aerial imagery surveys will overlap boat sampling locations on Nantucket Shoals.

Publications Completed: None

Affiliated WWW Sites: None

References:

Leiter SM, Stone KM, Thompson JL, Accardo CM, Wikgren BC, Zani MA, Cole TVN, Kenney RD, Mayo CA, Kraus SD. 2017. North Atlantic right whale *Eubalaena glacialis* occurrence in offshore wind energy areas near Massachusetts and Rhode Island, USA. *Endangered Species Research*. 34:45–59.

Record NR, Runge JA, Pendleton DE, Balch WM, Davies KT, Pershing AJ, Johnson CL, Stamieszkin K, Ji R, Feng Z, Kraus SD. 2019. Rapid climate-driven circulation changes threaten conservation of endangered North Atlantic right whales. *Oceanography*. 32(2):162–169.

White TP, Veit RR. 2020. Spatial ecology of Long-tailed Ducks and White-winged Scoters wintering on Nantucket Shoals. *Ecosphere*. 11(1):e03002. 10.1002/ecs2.3002.