

STUDY TITLE: Characterization and Potential Impacts of Noise Producing Construction and Operation Activities on the Outer Continental Shelf

REPORT TITLE: Baseline Bioacoustic Characterization for Offshore Renewable Energy Development in the North Carolina and Georgia Wind Planning Areas

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APPLICABLE PLANNING AREA: South Atlantic Planning Area and Mid-Atlantic Planning Area

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KEY WORDS: acoustics; ambient noise; biology; black drum; community; coral; environment; fish; Georgia; Georgia Bight; habitat; indicator; maps; marine mammals; modeling; North Carolina; occurrence; Onslow Bay; oyster toadfish; passive acoustic monitoring; right whale; sediment; sound propagation; survey; turtles

BACKGROUND: This study was conducted for BOEM as a baseline biological study of focal marine vertebrate species at two wind planning areas in the U.S. Southeast Atlantic coast section of the Outer Continental Shelf (OCS). The wind planning areas are part of the Beaufort (block NI18-04; North Carolina) and Brunswick (block NH 17-02; Georgia) lease blocks, within Onslow Bay and the Georgia Bight, respectively. These sites are coastal, shallow water habitats that are home to a range of fish species, marine mammals, turtles, and sub-tropical coral reefs that have varying degrees of protected status or fisheries importance. We performed a baseline survey for future research in the environmental impacts of offshore wind energy development.

OBJECTIVES: (1) Evaluate the seasonal occurrence of North Atlantic right whales (*Eubalaena glacialis*), fin whales (*Balaenoptera physalus*), and humpback whales (*Megaptera novaeangliae*) as representative, protected marine mammal species, and baleen whales, to understand the environmental risks associated with their presence (BRP). (2) Evaluate the occurrence and spawning behavior of black drum (*Pogonias cromis*) and oyster toadfish (*Opsanus tau*) as representative fish species to understand

the fish populations and evaluate the utility of these two species as ecological indicators of the ecosystems (BRP). (3) Characterize the ambient noise environment around the wind planning areas (BRP) and model the propagation of wind farm construction activities (MAI). (4) Characterize the physical structure of the benthic habitats and associated flora and fauna (ESS).

DESCRIPTION: To address the occurrence of marine mammals and fishes and the ambient noise conditions, acoustic data were collected using 3 marine autonomous recording units (MARUs) at each of the North Carolina and Georgia sites. Acoustic data were recorded at 2 kHz in two consecutive deployments of the MARUs at each site, June 2012 – April 2013.

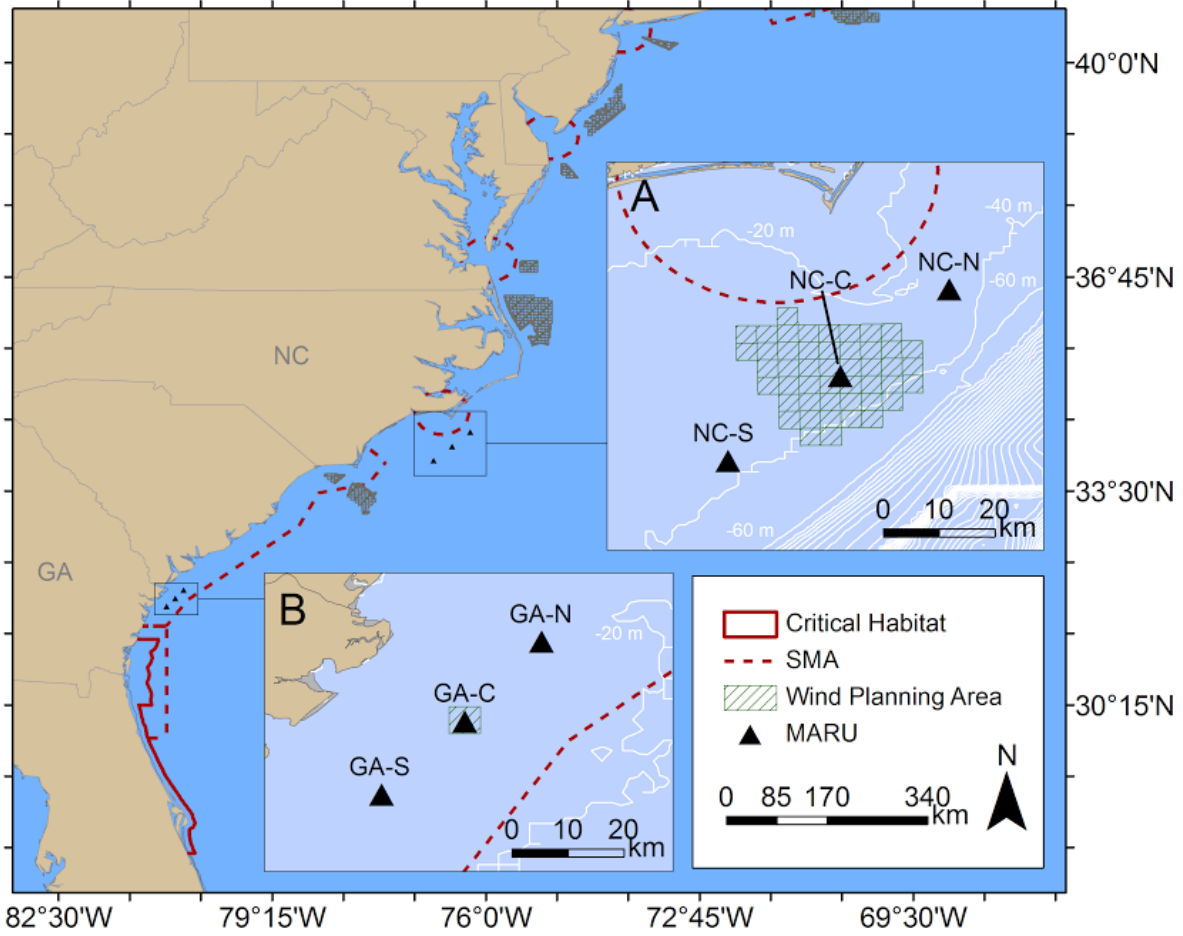
We characterized the occurrence of North Atlantic right whales (*Eubalaena glacialis*), fin whales (*Balaenoptera physalus*), and humpback whales (*Megaptera novaeangliae*), black drum (*Pogonias cromis*) and oyster toadfish (*Opsanus tau*) by identifying the species-specific vocalizations. To evaluate the ambient noise conditions of the sites, acoustic data from each MARU were processed and presented in long duration spectrograms and power spectra.

SIGNIFICANT CONCLUSIONS: These two wind planning areas show a significant amount of bioacoustic activity. Right whales, black drum, and toadfish were detected nearly across the entire study period at the Georgia site, but on only a few days in North Carolina. Fin whales and humpback whales were detected only on a low number of days at both locations.

STUDY RESULTS: Right whales were detected throughout the study, with peak presence in November–April, when whales have previously been described as migrating through the mid-Atlantic (Winn et al. 1986). These data suggest that right whales may occur in this region more often than previously documented. In Georgia and North Carolina, we did not detect a significant presence of fin whales or humpback whales. Fin whales were detected on only six days in the North Carolina site, in November 2012 and March 2013, consistent with previous records of fin whale occurrence in this region. Humpback whales were observed in low numbers.

Chorusing of black drum and oyster toadfish was detected in late June 2012 and late March and April 2013 at the Georgia site, and was visible in multi-day long spectrograms. Black drum chorusing was also detected at NC-North in March-April, but no toadfish chorusing was detected in North Carolina.

STUDY PRODUCT: Rice, A. N., J. L. Morano, K. B. Hodge, D. P. Salisbury, C. A. Muirhead, C. W. Clark. 2015. Baseline bioacoustic characterization for offshore renewable energy development in the North Carolina and Georgia Wind Planning Areas. US Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2014-026. 197 pp.



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