Environmental Studies Program: Ongoing Study

Title	Tracking Movements of Terns that Use New England Staging Sites (AT 22-04)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	David Bigger (david.bigger@boem.gov)
Procurement Type(s)	Inter-agency Agreement
Conducting Organization(s)	U.S. Fish and Wildlife Service
Total BOEM Cost	$225,558
Performance Period	FY 2023–2026
Final Report Due	January 14, 2026
Date Revised	December 21, 2023
PICOC Summary	
Problem	The extent of offshore movements of post-breeding terns are being developed. There are significant gaps, particularly whether migrating terns pass through areas leased for wind energy development and what proportion of the population maybe exposed to development.
Intervention	Deploy new tracking technology to more precisely describe post-breeding offshore movements of terns.
Comparison	Compare predicted movements derived from older technology to movements described with newer technology.
Outcome	Detailed maps describing offshore movements of individual terns
Context	Northeast Atlantic

BOEM Information Need(s): The data collected from this effort will be used to inform NEPA analysis, region specific environmental assessments, review of applications for permits, and ESA consultations.

Background: The Common Tern (*Sterna hirundo*) is a high-priority species for monitoring at offshore Wind Energy Areas (WEAs) in the U.S. Atlantic Outer Continental Shelf (OCS) due to its offshore habitat use and life history similarities with the Federally-endangered Roseate Tern (*Sterna dougallii dougallii*). Previous studies on the movements of Common and Roseate terns in the U.S. Atlantic OCS have primarily used digitally coded radio transmitters and land-based automated telemetry stations in coordination with the Motus Wildlife Tracking System (Loring et al. 2017, 2019). While these studies provided new information on regional movements of terns, information on offshore movements was limited by detection range of land-based telemetry stations (generally < 15 km). Recent advances in tracking technologies are increasing opportunities to track terns in offshore environments. This study will use GPS-RF technology to collect new information on offshore movements of Common Terns relative to offshore wind energy areas in Southern New England. Using GPS-RF will provide information on breeding and staging movements of terns and potentially full annual cycle migratory information depending on longevity of tag electronics and the tag attachment method, and recapture success the following season.

Objectives: 1) Map movement patterns and flight altitudes of Common Terns during the post-breeding period and fall migration. 2) Summarize meteorological conditions (wind speed, wind direction, visibility, and precipitation) and timing (time of day, day of year) of offshore flights in the Atlantic OCS. 3) Document Common Terns and Roseate Tern use of staging sites in proximity (<30 km) to WEAs offshore of southern New England.

Methods: Field work will focus on nesting and staging sites of Common Terns in southeastern MA that are in proximity to WEAs in southern New England: Monomoy National Wildlife Refuge, Ram Island and Bird Island, Muskeget Island, and Norton Point. Trapping terns on nest sites is a well-established capture method with a high likelihood of success, particularly at established colonies such as Monomoy NWR, Bird Island, and Ram Island. The likelihood of success associated with trapping at less-stable colonies, such as Norton Point and Muskeget, will depend on the numbers, timing, and persistence of nesting activity during the target trapping window. Walk-in treadle traps will be used to capture adult Common Terns at their nests during the mid to late incubation stage. All trapping activities will be conducted under direction of colony managers at each nesting site.

Sixty adult Common Terns will be selected for tagging with Pathtrack nanoFix GEO+RF Mini Tags (https://www.pathtrack.co.uk/product/nanofix-georf-mini/). These tags weigh ≤3.2 g and measure ~34 mm x 14 mm x 9 mm with a 50-mm whip antenna extending posteriorly. All tags will be attached using a leg-loop harness design appropriate for long-term (12 month) attachment duration. During operation on solar capacity, the tags attempt up to 40 location fixes per day on a customized schedule. If the battery voltage becomes too low, the tags will switch to a low power mode to recharge. The tags will resume operation if the battery is recharged via solar to a sufficient level.

All movement data will be analyzed using R and mapped using ArcGIS. The analysis will include summaries of movement patterns, meteorological conditions (wind speed, wind direction, visibility, and precipitation) and timing (time of day, day of year) of offshore flights in the Atlantic OCS. Flight height data from GPS tags will be summarized and a flight height distribution will be generated from all location data collected over federal waters. All location data, altitude data and metadata will be provided as supplemental information and archived in Movebank for future use. In addition, GPS data will be coordinated with a current BOEM-funded effort to develop a stochastic collision risk model in partnership with the USFWS and University of Rhode Island. Lastly, the methodologies developed in this study will be used to develop a future tracking study on the endangered Roseate Tern.

Field crews will also conduct surveys on Norton Point, Muskeget Island, and Monomoy NWR to locate staging flocks of Common and Roseate Terns. Surveys will take place three times per week in July, August, and September at Norton Point, once per week on Muskeget, and twice a week at Monomoy NWR to determine the presence of Sterna species. Data collected by field surveys will be used to document the timing, abundance, and distribution of Common and Roseate terns staging on Muskeget Island, Norton Point, and Monomoy NWR between Jul 15 and Sept 15. This will include staging flock size and composition on both trapping and non-trapping monitoring visits. Acoustic data will be summarized to document the presence or absence of Common and Roseate terns each night during the staging period at Norton Point and Muskeget.

Specific Research Question(s): How do predicted tern movements derived from older technology to movements compare to movement described with newer technology?

Current Status: Post-award meeting conducted on December 15, 2023. Summary of post-award submitted on December 20, 2023.

Publications Completed: None

Presentations: None

Affiliated WWW Sites: None

References:

Loring, P.H., R.A. Ronconi, L.J. Welch, P.D. Taylor and M.L. Mallory. 2017. Postbreeding dispersal and staging of Common and Arctic Terns throughout the western North Atlantic. Avian Conservation and Ecology 12(2):20.

Loring P.H., P. W. C. Paton, J. D. McLaren, H Bai, R. Janaswamy, H. F. Goyert and P. R. Sievert. 2019. Tracking offshore occurrence of Common Terns, endangered Roseate Terns, and threatened Piping Plovers with VHF Arrays. US Department of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia.