



# Shorebird Science and Conservation Collective

Summary Report to Canadian Wildlife Service – October 2024

*rufa* Red Knot tracking data in Atlantic Canada to inform Offshore Wind Assessments

## Conservation Request

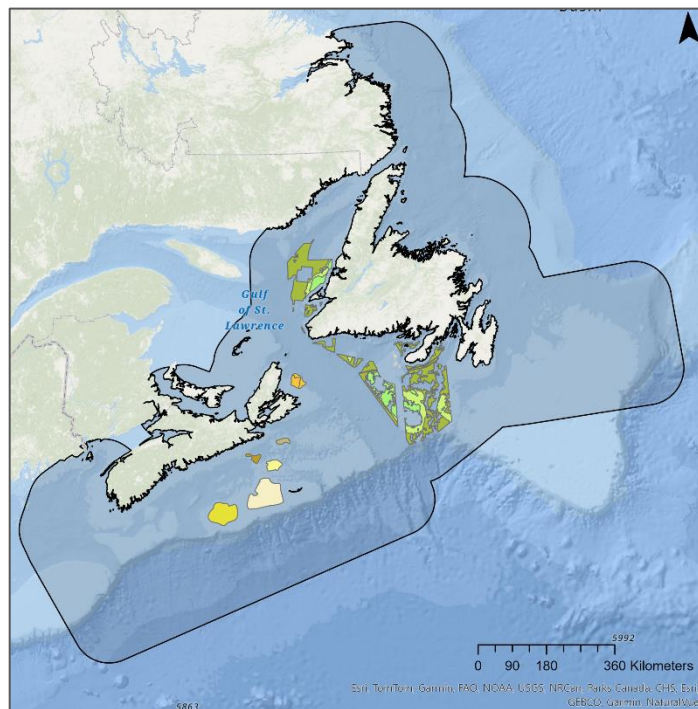
The Canadian Wildlife Service (CWS) requested *rufa* Red Knot (*Calidris canutus rufa*) tracking data from the Shorebird Science and Conservation Collective (hereafter, "Shorebird Collective") to support a risk mapping exercise related to offshore wind development in parts of Atlantic Canada. Specifically, CWS requested *rufa* Red Knot tracking data to determine their exposure risk in preliminary licensing areas for offshore wind near Nova Scotia and Newfoundland and Labrador (**Map 1**).

## About the Shorebird Science and Conservation Collective

The Shorebird Collective is a partnership of scientists and practitioners working to translate the collective findings of shorebird tracking and community science data into effective on-the-ground actions to advance shorebird conservation in the Western Hemisphere. Learn more at: <https://nationalzoo.si.edu/migratory-birds/shorebird-collective>.

## About the Canadian Wildlife Service

CWS is a branch of Environment and Climate Change Canada and serves as Canada's national wildlife agency. CWS is responsible for the conservation of migratory birds, species at risk, and biodiversity. Learn more at: <https://www.canada.ca/en/environment-climate-change.html>.



**Map 1.** CWS's Atlantic Canada area of interest for assessments of offshore wind development in the preliminary licensing areas off the coast of Nova Scotia and Newfoundland and Labrador.



## *rufa* Red Knot Background

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has assessed *rufa* Red Knots as three designatable units<sup>1</sup> based on wintering populations: Tierra del Fuego / Patagonia; Northeastern South America; and Southeastern USA / Gulf of Mexico / Caribbean<sup>2</sup>. The Tierra del Fuego / Patagonia wintering population is currently listed as **Endangered** on Schedule 1, the official list of wildlife species at risk under the Species at Risk Act<sup>3</sup>. The Northeastern South America and Southeastern USA / Gulf of Mexico / Caribbean wintering populations have been assessed as **Special Concern** and **Endangered** by COSEWIC<sup>3</sup>, respectively, and are under consideration for addition to Schedule 1.

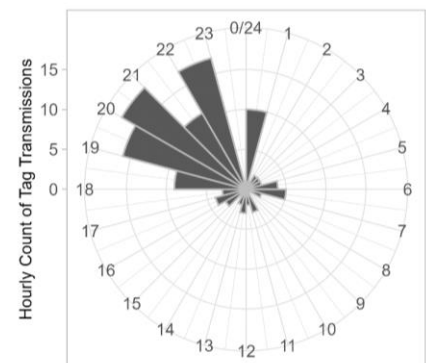


## Tracking Data Summary

The Shorebird Collective examined satellite tracking data (GPS and Argos technologies) contributed from **79** *rufa* Red Knots<sup>4</sup> to determine if they moved through CWS's area of interest (AOI) in the preliminary licensing areas for offshore wind near Nova Scotia and Newfoundland and Labrador (**Map 1**). *rufa* Red Knots primarily were tagged during northbound migration through two regions (New Jersey and near the South Carolina/Georgia border), though some were tagged in the Canadian Arctic and South America. Prior to mapping, the Shorebird Collective processed data to remove false detections and used mathematical models to estimate the geographic locations of tracked individuals given the spatial error of tracking technologies<sup>5</sup> (example code is available at: <https://github.com/autumnlynn/ShorebirdCollective/>).

Of the 79 tracked birds, **eight** *rufa* Red Knots had tag transmissions (i.e., tracked locations) in CWS's Atlantic Canada AOI (**Map 2**). All eight of these individuals were originally tagged in New Jersey, USA and contributed by Stephanie Feigin and Larry Niles (Wildlife Restoration Partnerships). Of those individuals, **one** Red Knot (MOOR\_238544\_2023) was tracked through both the Nova Scotia Sydney Bight licensing area on the evening of Aug 24, 2023 during its first offshore migration attempt, and later through the Newfoundland/Labrador licensing area on the evening of September 15, 2023 (a signal was transmitted from the tag at 22:44:25 UTC [18:44:25 AST]) during its second offshore migration attempt (**Map 3**). Note: We considered a bird to have crossed a licensing area if the trajectory between two consecutive tracking points intersected the boundary of the licensing area.

The 8 *rufa* Red Knots were tracked through the Atlantic Canada AOI during southbound (fall) migration only during the months of **August and September** in 2022 and 2023 with most individuals tracked during the **second and third weeks of August**. Additionally, tag transmissions over the water tended to **occur at night between the hours of 18:00 and 01:00 AST** (**Figure 1**). This finding of nighttime transmissions agrees with patterns observed for seven other species tracked in the AOI, as previously reported to CWS, suggesting that "smart curtailment" strategies at night during peak periods could be an affective mitigation strategy to reduce collision risks for shorebirds.



**Figure 1.** Hourly counts of tag transmissions from the eight Red Knots tracked in the Atlantic Canada AOI.

<sup>1</sup> A designatable unit is a "Species, Subspecies, variety, or geographically or genetically distinct population that may be assessed by COSEWIC, where such units are both discrete and evolutionarily significant". See [link](#) for more information.

<sup>2</sup> COSEWIC. 2023. Canadian Wildlife Species at Risk. Committee on the Status of Endangered Wildlife in Canada. [Link](#).

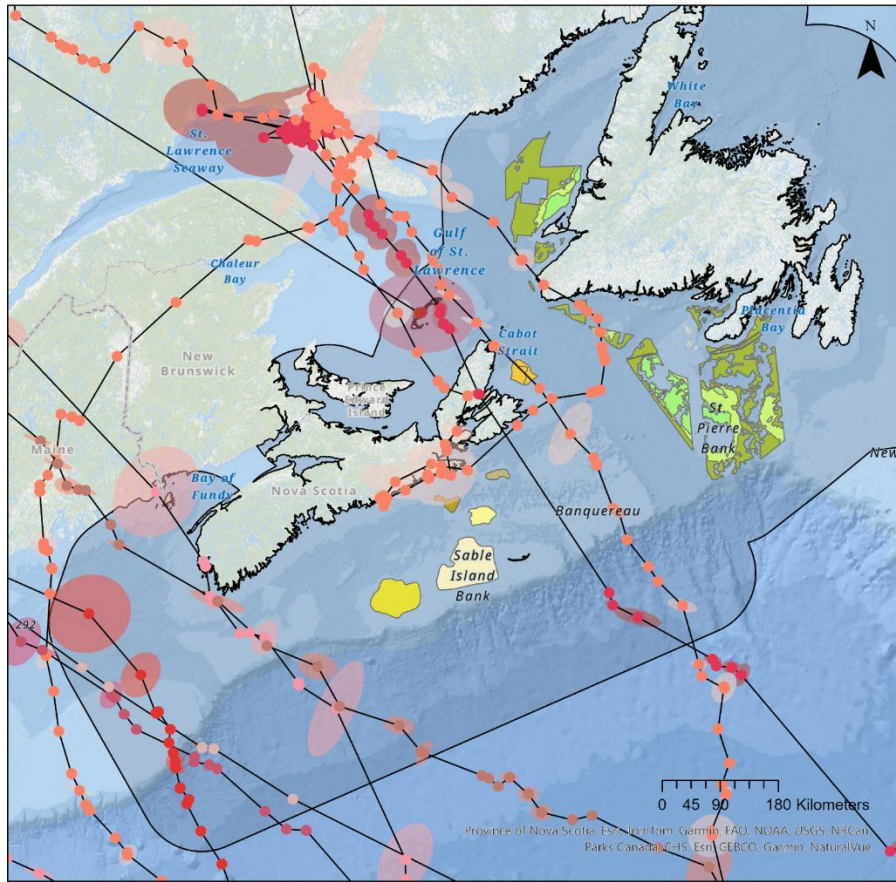
<sup>3</sup> ECCC. 2022. Species at risk public registry. Environment and Climate Change Canada. [Link](#).

<sup>4</sup> These data come from 7 organizations, collected from 2015 to 2024 (Shorebird Collective Data Version 2024-09-24). See Data Contributors section for more information.

<sup>5</sup> Harrison, A.-L. Stenzel, C., Anderson, A., Howell, J., Lanctot, R. B. [and 67 others]. In revision at Conservation Biology. The collective application of tracking data to shorebird conservation. [Pre-print Link](#).

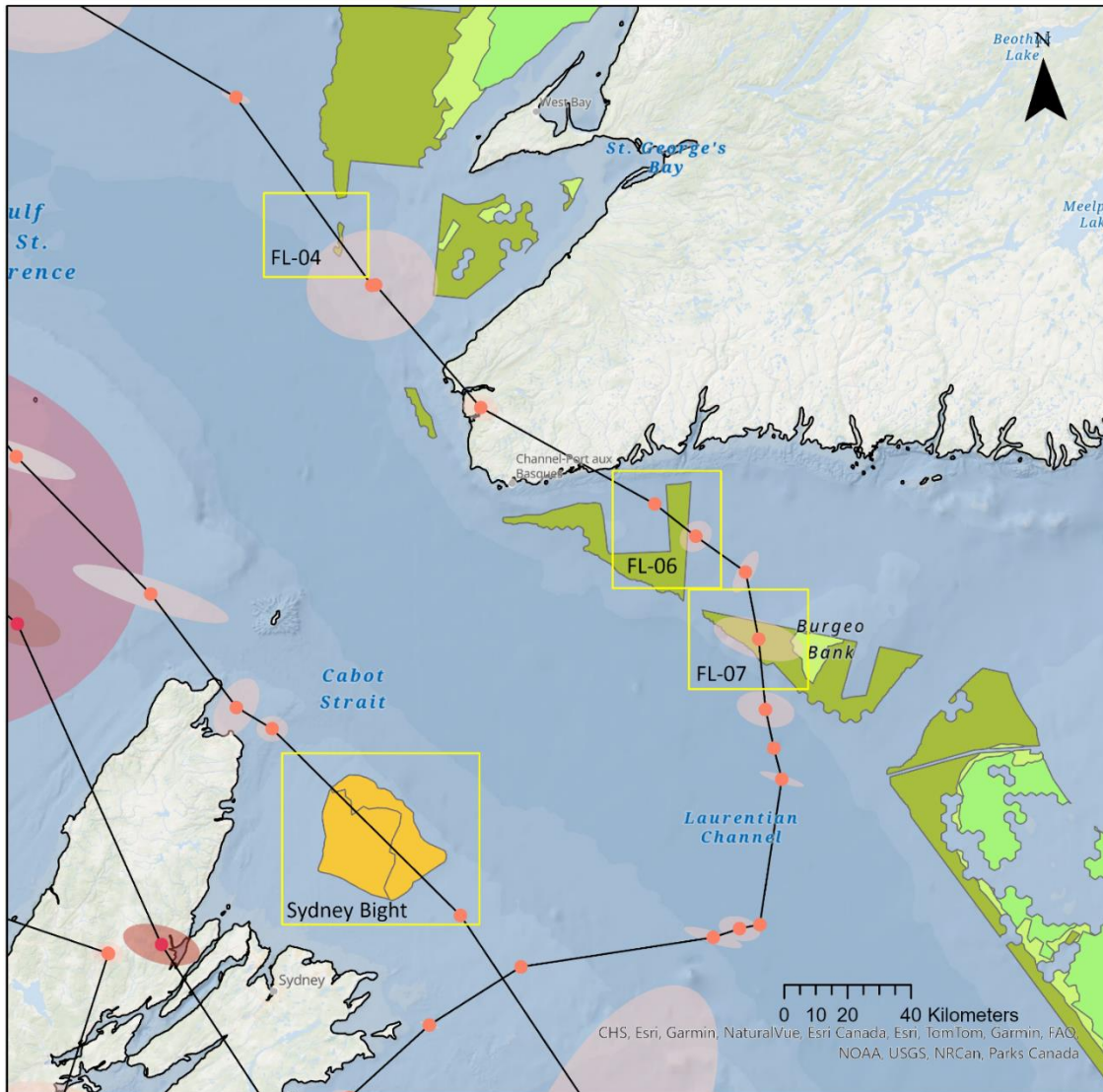
Most individuals tracked through the AOI were tagged during northbound (spring) migration at Delaware Bay, New Jersey, USA (Feigin and Niles contributed data) and were not tracked for a full annual cycle. Therefore, based on tracking data alone, it is unclear which wintering populations may be exposed to offshore wind in Atlantic Canada. However, six of the eight individuals were tracked to Northeastern South America the following fall before their tags stopped transmitting, one of which (Individual ID: MOOR\_232982\_2023) continued south to Argentina, likely belonging to the wintering population currently listed as Endangered on Schedule 1. Another individual (PEIXE\_241166\_2023) was tagged in southern Brazil during April and could also be part of this endangered wintering population.

Interestingly, none of the 13 individuals tagged in Georgia and South Carolina during spring 2024 (Sanders et al. contributed data) passed through the AOI. Those that have been tracked southbound are currently in the Southeastern USA / Gulf of Mexico / Caribbean or Northeastern South America regions. Additional work is needed to identify connectivity between wintering populations and the AOI. Lastly, to our knowledge, additional tracking data from *rufa* Red Knots are owned by a biologist with the Canadian Wildlife Service but have not yet been contributed to the Shorebird Collective. These data could provide additional insights on Red Knot exposure to offshore wind licensing areas in Atlantic Canada.



**Map 2.** Tracking data from 8 *rufa* Red Knot contributed to the Shorebird Collective crossing CWS's Area of Interest (AOI) in Atlantic Canada and in relation to proposed offshore wind energy licensing areas. All birds crossed the AOI during southbound (fall) migration.

<p><b>Individual Bird Tracked Location</b></p> <ul style="list-style-type: none"> <li>● FORT_230317_2022</li> <li>● KIMB_232984_2022</li> <li>● MOOR_232981_2022</li> <li>● MOOR_232982_2023</li> <li>● MOOR_238544_2023</li> <li>● MOOR_238546_2023</li> <li>● MOOR_240168_2023</li> <li>● PEIXE_241167_2023</li> </ul>	<p><b>Estimated Tracklines</b></p> <ul style="list-style-type: none"> <li>— Estimated Spatial Error of the Location</li> <li>— Atlantic Canada Area of Interest</li> </ul> <p><b>Newfoundland and Labrador Potential Licensing Areas</b></p> <ul style="list-style-type: none"> <li>■ Depth up to 60m</li> <li>■ Depth between 60-80m</li> <li>■ Depth between 80-300m</li> </ul>	<p><b>Nova Scotia Potential Licensing Areas</b></p> <ul style="list-style-type: none"> <li>■ Canso Bank</li> <li>■ Emerald Bank</li> <li>■ French Bank</li> <li>■ Middle Bank</li> <li>■ Sable Island Bank</li> <li>■ Sydney Bight</li> </ul>	<p>Data compiled and standardized by the Shorebird Science and Conservation Collective (Version 2024-09-24), Migratory Bird Center, Smithsonian's National Zoo and Conservation Biology Institute. Data contributed to the Shorebird Science and Conservation Collective by: Stephanie Feigin, Wildlife Restoration Partnerships. Data co-owned by: Larry Niles (Wildlife Restoration Partnerships).</p>
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Individual Bird Tracked Location  
 ● MOOR\_232981\_2022  
 ● MOOR\_238544\_2023  
 — Estimated Tracklines  
 ○ Estimated Spatial Error of the Location

Newfoundland and Labrador Potential Licensing Areas  
 ■ Depth up to 60m  
 ■ Depth between 60-80m  
 ■ Depth between 80-300m

Nova Scotia Potential Licensing Areas  
 ■ Sydney Bight  
 ■ Red Knot Track Intersects Licensing Area

Data compiled and standardized by the Shorebird Science and Conservation Collective (Version 2024-09-24), Migratory Bird Center, Smithsonian's National Zoo and Conservation Biology Institute. Data contributed to the Shorebird Science and Conservation Collective by: Stephanie Feigin, Wildlife Restoration Partnerships. Data co-owned by: Larry Niles (Wildlife Restoration Partnerships).

**Map 3.** Tracking data from *rufa* Red Knots through the Sydney Bight preliminary licensing area near Nova Scotia and several preliminary licensing areas off the southwestern coast of Newfoundland (IDs FL-04, FL-06, and FL-07). The same individual, MOOR\_238544\_2023, crossed through both the Nova Scotia and Newfoundland licensing areas during two different offshore migration attempts in the fall of 2023.

# Data Contributors

Tracking data for this analysis were contributed to the Shorebird Collective by the following people and organizations. A full list of data contributors to the Shorebird Collective can be found at: <https://nationalzoo.si.edu/migratory-birds/shorebird-collective>.

***rufa* Red Knot tracking data provided in the maps and timing descriptions contributed by:** Stephanie Feigin (Wildlife Restoration Partnerships) and co-owned by Larry Niles (Wildlife Restoration Partnerships)

**Additional contributors of *rufa* Red Knot data:**

Jennie Rausch (Canadian Wildlife Service, Environment and Climate Change Canada)

Rebecca Linhart (University of Rhode Island)

Amy Scarpignato (Smithsonian Migratory Bird Center)

Felicia Sanders (South Carolina Department of Natural Resources)

Data co-owners include Pam Loring and Melissa Chaplin (U.S. Fish and Wildlife Service), Peter Paton and Scott McWilliams (University of Rhode Island), Julie Paquet (Canadian Wildlife Service, Environment and Climate Change Canada), Diana Hamilton (Mount Allison University), Jason Mobley (Aquasis Migratory Shorebird Conservation Project), Janet Thibault, Mary-Catherine Martin, and Cami Duquet (South Carolina Department of Natural Resources), Fletcher Smith and Tim Keyes (Georgia Department of Natural Resources), Abby Sterling and Allie Hayser (Manomet), Adam Smith (American Bird Conservancy)