

NWRT Final Project Report
NWRT Project Number: 5-19-02
Project Title

Regional and range-wide causes of decline for shorebirds of the Kivalliq

Project Leader

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Summary: Nunavummiut throughout the Kivalliq have long expressed concerns about shorebird declines. Through a NWSF collaboration between residents of Coral Harbour and scientists at ECCC, we recently summarized IQ about these declines. These discussions renewed concerns about shorebirds, and local wildlife managers have provided suggestions for research topics that they feel are a priority. In 2018, we refined this list of research topics in consultation with the Aiviit HTO and the Irniurviit ACMC, and in 2019, initiated a 3-yr research program to study these issues of shared priority. In addition, we continue to work with the community to deliver an exciting training program launched in 2018: the Inuit Field Training Program. This program, co-led by Dr.'s Smith and Gilchrist at ECCC and a local committee composed of HTO and ACMC members, brings keen and capable youth to our field camp to participate in the research, learn about employment opportunities in science fields, and receive mentorship from Inuit and scientific leaders. Finally, we also carried out a project in 2019 to pilot-test community-based monitoring of goose abundance; overabundance of geese is a potentially important cause of regional shorebird declines in the Kivalliq.

Through these efforts, we are succeeding in advancing knowledge of shorebird declines, addressing questions of interest to Kivallirmiut, and building capacity so that Nunavummiut are better positioned to participate in and lead biology research in the years to come.

The scientific outputs of our project are also described in detail in an accompanying field report.

Project Objectives: Shorebirds are declining to such an extent that many could become Species at Risk. People in Coral Harbour recently reiterated concerns about these large declines and requested that further scientific studies be undertaken, to complement our recent IQ research. We refined these priority research questions with NWRT funding in 2018. Project 5-19-02 was proposed to carry out research to address the following objectives:

1. Track shorebirds (especially Ruddy Turnstones and Red Phalaropes which have not been previously tracked due to technological limitations) with modern tracking devices to understand their movements throughout the year and how these movements expose them to threats
2. Explore “carry-over” effects, for example, how feeding conditions at stopover sites influence the physiological status of birds upon arrival to Nunavut, and how this influences subsequent survival and reproduction
3. Track and study Arctic Terns (a coastal seabird that shares habitat with shorebirds) to understand their migrations, the threats that they face, and why they are declining
4. Carry out reconnaissance to determine the feasibility of shorebird surveys in Ikkattuaq Migratory Bird Sanctuary in 2020
5. Engage and train local youth, to increase their involvement in our research and to develop their employment prospects for the future

Materials and Methods:

In April 2019, we had planned for in person consultations in Coral Harbour with the Aiviit HTO and the Irniurviit ACMC. We attempted to reach Coral Harbour for 6 days, but poor weather prevented us from traveling beyond Rankin Inlet and Paul Smith and Bonnie Taparti could not attend the meetings in person. We contributed to the meetings via phone, and despite our disappointment about not reaching the community, were nevertheless able to achieve our objectives of planning the 2019 field season. Through consultation with the community and organizations in Coral Harbour, we co-developed a list of research objectives that centers around studies of breeding and migration ecology of shorebirds, especially Red Phalaropes (*Saurraq*) and Ruddy Turnstones (*Tuvvititiiq*), as well as Arctic Terns (*Imiqqutailak*). Specifically, people and organizations in Coral Harbour are interested in better understanding the routes taken by these birds during migration, how these distributions outside of Nunavut expose species to threats, and how changing environmental conditions within and outside Nunavut are contributing to shorebird declines.

Methods for our studies were varied, and are described in more detail in an accompanying report. Briefly, we used a combination of field studies at our Qaqsauqtuuq (East Bay) site, where we captured birds to deploy and retrieve tracking tags, and also accessed data sets from other sites through collaboration with other government and academic researchers. Through these efforts, we have amassed the largest ever collection of geolocator tracking data for shorebirds, with 371 individuals of 7 species. This dataset includes the Ruddy Turnstone and Red Phalarope, priority species of our collaborators (Objective 1), as well as other species of declining shorebirds. We have also successfully tracked Arctic Terns from Qaqsauqtuuq and other locations across the North (Objective 3).

These tracking data were complemented by physiological studies to link conditions encountered on the wintering grounds and during migration to reproductive success (Objective 2). Specifically, we used levels of corticosterone in feathers to measure the levels of “stress” that birds were experiencing during the winter, when the feathers were grown, and are linking this to their reproductive performance during the summer. This allows us to determine whether conditions outside the Arctic “carry over” to influence birds’ breeding success while in Nunavut.

Engaging and employing Inuit in our research is a priority (Objective 5). During the 2019 field season, we employed 6 Nunavut beneficiaries in our field work as research assistants, as well as short-term contributions from additional people as guides early in the season. We also delivered a second edition of the Inuit Field Training Program, in late July 2019, at the East Bay Mainland camp. This exciting training effort brought 8 young Inuit to our camp, mentored by a balanced team of Inuit and southern scientist leaders, to learn about techniques and employment opportunities in environmental science. Logistics and administration of the training program are led by a steering committee based in Coral Harbour, and also by a full-time Nunavut beneficiary working in our office in Ottawa and traveling to the field site to help deliver the program. Additional details of this program are included as an attachment.

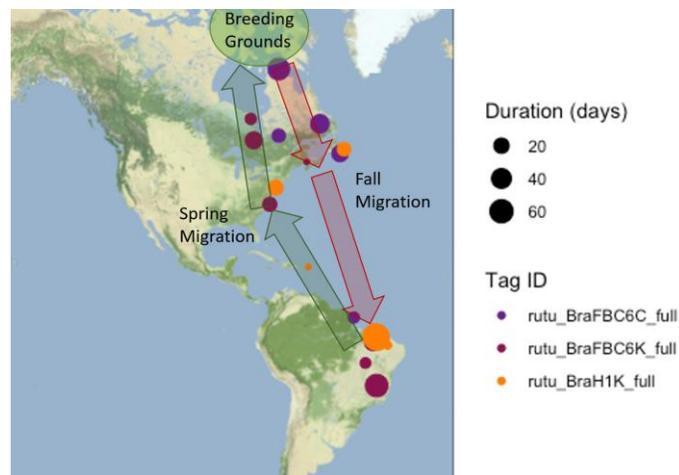
Results:

The purpose of this study is to investigate research questions relating to the declines of shorebirds that interest the community of Coral Harbour, as identified in a preliminary study that was funded by the NWRT (Project 5-18-01). We began addressing these objectives with fieldwork conducted in 2019, with the intention of carrying out a 3-year research program. We received an offer of NWRT funding for 2020 to continue our fieldwork, community meetings, and research activities. However, because we cancelled all 2020 fieldwork and community visits due to the COVID-19 pandemic, we decided to decline the funding. We felt that it was not appropriate to accept NWRT funding when we would not have the opportunity to spend the funds in Nunavut. Nevertheless, we continue to make progress on our objectives through

analyses of data collected in 2019, and other datasets received from collaborators. We intend to reapply for NWRT support in January 2021, and are planning to carry out field work in summer 2021 if conditions allow.

In line with our shorebird tracking objectives, we deployed solar-powered satellite tags on 4 Red Phalaropes in 2019 at Qaqsauqtuuq, which allow fine-scale tracking of their movements beyond the breeding grounds (Objective 1). Improvements in tracking technology have resulted in smaller tag sizes, which permitted us to explore this option. However, attachment methods for these tags need refinement. At Qaqsauqtuuq, following advice from our Inuit collaborators, we attempted the use of a minimally invasive “glue mount”, where tags are glued to the feathers and fall off when the bird moults. This mounting option proved to be insufficiently durable for these ocean-going shorebirds, and the tags were lost earlier than we had hoped. However, we also worked with collaborators to deploy these tags at other sites within and outside Nunavut. These collaborators used the more invasive but longer lasting “harness mounts”, and our multi-site dataset provides new insights into the migratory behaviour of phalaropes.

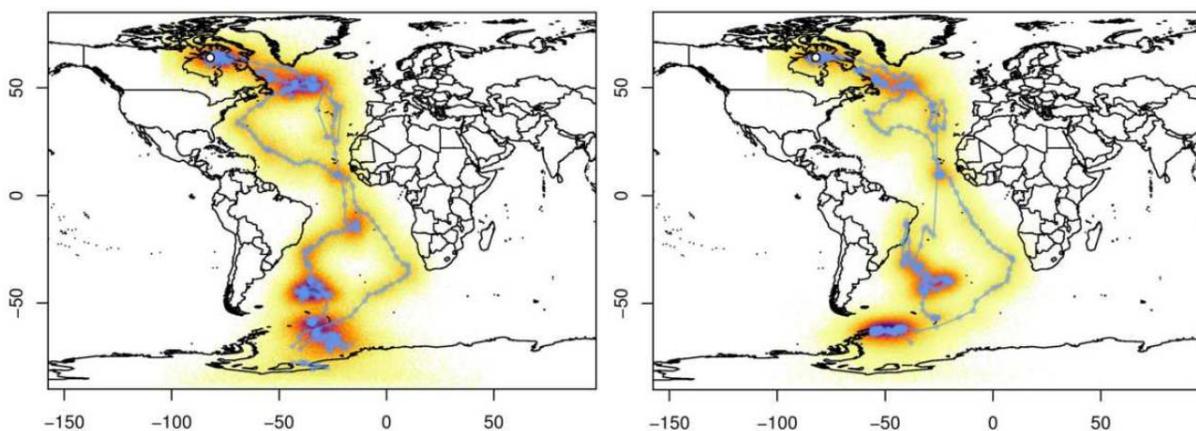
Ruddy Turnstones were another species of special interest to our collaborators in Coral Harbour; we tracked this species with geolocators deployed at East Bay, and also accessed tracking data from migration sites throughout the species’ range to describe movements throughout the year (Objective 1). These tracking data from 30 individuals are currently being analysed (example below).



The general movements of 3 Ruddy Turnstones throughout the year, as revealed by light-level geolocators.

In addition, we sampled feathers from Red Phalaropes, Ruddy Turnstones, and other shorebirds at Qaqsauqtuuq to test for levels of stress hormones that can allow us to determine whether carry-over effects are present in the breeding success of shorebirds at the individual level (Objective 2). Results showed that, at East Bay, White-rumped Sandpipers had the lowest levels of stress hormones present in their feathers, and that earlier nesting individuals tended to have higher levels of winter stress. Within species, individuals with lower levels of winter stress were more successful in completing their incubation. We continue to refine these physiological assessments of “carry-over” effects, linking tropical winter conditions to birds’ performance in Nunavut.

We recaptured 6 Arctic Terns that had been outfitted with geolocators and resighted several others that we hope to be able to recapture in future years. Data collected from geolocators deployed and recaptured at Qaqsauqtuuq has contributed to a greater understanding of Arctic Tern migration patterns (Objective 3), including the use of a North Atlantic stopover site during the fall migration, and a spring migration pathway that follows the Atlantic coast of Africa northward before crossing the Atlantic towards the east coast of the United States and Canada to continue migrating back to nesting grounds on Southampton Island.



The movements throughout the year of two Arctic Terns breeding at Qaqsauqtuuq. Note the area of heavy use, in orange, in the North Atlantic.

Following discussions with the community in 2019, we deferred the trip to Ikkattuaq Migratory Bird Sanctuary (Objective 4) until summer 2020. We had acquired funds and made plans to carry out this work, but these plans were cancelled due to the pandemic. We plan to carry out these surveys as soon as possible, in 2021 or 2022. We intend to hire recent graduates of the Inuit Field Training Program to complete these surveys with us, to engage local youth in the monitoring of this co-managed Migratory Bird Sanctuary.

In July 2019, we delivered a second Inuit Field Training Program using the research facilities at Qaqsauqtuuq to train and engage local youth from Coral Harbour (Objective 5). The local steering group from Coral Harbour selected eight participants who traveled to East Bay for 10 days to learn about environmental monitoring techniques, skills required for living and working safely in remote research camps, educational and employment opportunities available to them in environmental fields, and Inuit traditional knowledge taught by a local elder. This program has been a success, and we plan to expand the program to include another field site at Prince Charles Island in the Foxe Basin as soon as possible, pending funding from ECCC and other government agencies.

Finally, we also carried out a project in 2019 to pilot-test community-based monitoring of goose abundance; overabundance of geese is a potentially important cause of regional shorebird declines in the Kivalliq. This project demonstrated that it is possible for community members to efficiently monitor the breeding densities of geese, monitoring that is currently done at significant expense through aerial surveys with southern staff. While this work was supported by other sources of funding, I mention it here because building capacity for community-based monitoring is a priority of my program, and of the NWMB.

Additional details of the 2019 fieldwork, and of the Inuit Field Training Program, are described in the attached reports.

Discussion/Management Implications:

Communities in Nunavut are concerned about the state of shorebird populations, and scientific evidence also shows strong shorebird population declines. Our shorebird research activities are designed with direct input from community organizations (Aiviit HTO and Irniurviit ACMC), and include participation by local people, so that we can ensure that we are addressing local concerns and priorities about shorebirds. These NWRT-funded projects are an excellent complement to the broader suite of monitoring projects that we carry out, funded by Environment and Climate Change Canada. The preexisting infrastructure and our ongoing research and monitoring projects means that, with the additional funding from NWRT, we can efficiently leverage the resources already in place to focus on additional topics of particular interest to Nunavummiut. We are also able connect these local research projects to a broader network of researchers working at other sites across the Arctic. Therefore, research topics that are a community priority can be addressed at a larger spatial scale, allowing insights from across the Canadian Arctic.

2019 was the first full year of this 3-year research project, and consequently, we have just begun to address the objectives. Nevertheless, we are well on track to addressing them in greater depth in the coming years. Our shorebird tracking studies are already yielding insights into migration routes and wintering areas that were previously not described for these species. Our work on Arctic Terns has allowed us to better understand their incredible migration and identify an important pelagic “stopover site” in the North Atlantic. Our studies of feather corticosterone in shorebirds are applying this innovative new technique to measure stress in the previous winter with a feather collected during the summer.

At a national scale, some of the results of these studies could contribute to status reports for shorebirds being considered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). We are currently leading a project to summarize the status of 14 species of Arctic-breeding shorebirds, for review by COSEWIC. Information from the shorebird breeding grounds in Inuit Nunangat is essential for the development of these status reports, and results from Qaqsauqtuuq are the most rigorous source of shorebird breeding data available in Canada. The tracking dataset that we have amassed, too, is the largest ever assembled and will provide new insights into the movements of these wide-ranging shorebird species.

The research topics identified in this project relate directly to the NWMB mandate of ensuring the conservation and management of wildlife in Nunavut for the long-term benefit of Nunavut residents. By working directly with community members and HTOs, we strive to provide relevant research results that can inform the management and conservation of terrestrial ecosystems such that they can be enjoyed by current and future generations.

Report by Inuit Participants:

My name is Bonnie Taparti and I help co-lead the Inuit Field Training program. It was my first time in East Bay in 2019 with participants from Coral harbour that were selected by the local steering committee. During the Program, one of the things the participants were taught was how to collect shorebird data and I thought the methods used were very respectful of the wildlife in and around the research station. The program also effectively incorporates Inuit Qaujimajatuqangit with our Inuk senior leader teaching the participants land skills and Inuit perspectives. The program was a success and I hope to see it continue and expand in the near future. *[bonnie.taparti@canada.ca]*

Lenny Emiktaut [Lenny.emiktaut@canada.ca] worked with us in 2019 and now works full time for ECCC in Iqaluit. He agreed to write a paragraph, but we were not able to secure it in time to include with the report.

Reporting to communities/resource users:

As of the 2019 field season, the project was proceeding as planned. The first season of fieldwork was successful and field reports were shared with the community. We made plans to visit Coral Harbour in March 2020 to review the results to date and discuss any necessary changes to project objectives. We had arranged our meetings and accommodations and purchased our air tickets, but we were once again unable to reach the community because the pandemic lockdown began just days before our planned meeting dates. We have continued to stay in touch with the ACMC and HTO by phone and electronically, and look forward to getting together physically once the pandemic abates.

Output or step	Start date	End date	Status
Initial meetings with HTO/ACMC	15/04/2018	01/09/2018	Completed through in-person meetings in April 2018, and subsequent communications by phone/email.
Project design and consultation	01/09/2018	31/03/2019	Complete
Year 1 of field work	01/05/2019	31/08/2019	Complete
Results sharing/consultation	01/09/2019	31/03/2020	Modified due to COVID – Reports of 2019 research progress were written, translated and distributed to HTO and ACMC by email. We made arrangements for an in-person meeting in March 2020 to discuss the results, but this was cancelled at the last minute due to COVID-related travel restrictions.
Year 2 of field work	01/05/2020	31/08/2020	All 2020 fieldwork was cancelled.
Results sharing/consultation	01/09/2020	31/03/2021	We would like to visit Coral Harbour to discuss the project this winter (and have set aside funds

			to do so), but at present, it seems unlikely that this will be possible.
Year *2 of field work	01/05/2021	31/08/2021	We have made plans (finances and permits) for fieldwork in 2021. If it is not possible for our southern staff to participate in the fieldwork, we will still try to implement some project components using an all Inuit team. However, it is not yet clear if even this will be possible, due to covid-related safety considerations. Our first priority is the safety of our Nunavummiut collaborators and our southern staff.
Results sharing/consultation	01/09/2021	31/03/2022	On schedule to begin as planned
Year *3 of field work	01/05/2023	31/08/2023	We propose a 3 rd year of fieldwork in 2023, owing to the cancellation of 2020 fieldwork.