

Application: Estimating the abundance of the Foxe Basin polar bear subpopulation

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Nunavut Wildlife Research Trust (2024-2025)

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NWRT Final Report - June 2025

NWRT Project Number: NWRT-2023-0000000005

Project Title: Re-estimating the abundance of the Foxe Basin (FB) polar bear subpopulation via aerial survey & biopsy collection

Project Leader:

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Summary

The Foxe Basin polar bear subpopulation (FB) is one of Nunavut's largest polar bear subpopulations – it spans a geographical area of about 1.1 million km². It is a seasonally ice-free subpopulation with bears aggregating on the coast during the summer months. There is no recent data for Foxe Basin, and there is therefore a need to reassess the subpopulation. The most recent population estimate is of 2,585 polar bears, derived from surveys conducted in 2009 and 2010.

Environmental changes and resulting changes in population abundance or distribution in surrounding areas (Western Hudson Bay and Southern Hudson Bay) creates further need for an updated population abundance estimate of the Foxe Basin subpopulation. To effectively understand the dynamics within the Hudson Bay complex between subpopulations, we aimed to investigate movements between surrounding subpopulation boundaries. Insight into inter-subpopulation movements will help inform the management of bears within the Foxe Basin subpopulation, as well as in neighbouring subpopulations.

We conducted a new abundance and movement study for Foxe Basin in August-September 2024. This fulfills mandated wildlife monitoring objectives and in future will provide management advice to the Nunavut Wildlife Management Board and provide much needed abundance information to a data deficit subpopulation.

We consulted with Aqigiq HTO, Aiviit HTO, Baker Lake HTO, Arviq HTO, Aiviq HTO, Mayukalik HTA, Igloodik HTO, and Hall Beach HTA in February 2024. We consulted on the methods and survey plan, then incorporated feedback from the communities that harvest from Foxe Basin into our survey design. The methods included using distance sampling via aerial survey to estimate the Foxe Basin polar bear subpopulation abundance and using biopsy darting to investigate movements at subpopulation boundaries. We received support letters from Aiviit HTO, Baker Lake HTO, Arviq HTO, Aiviq HTO, Mayukalik HTA, Igloodik HTO, and Hall Beach HTA for this research.

Originally, we had planned to conduct the survey using two helicopter crews over the month of August, to avoid unpredictable fall weather in September. Unfortunately, three weeks from the

beginning start date of the survey, the helicopter company informed us that only one helicopter was available. We attempted to acquire a second aircraft, but none were available, likely due to forest fire operations. As a result, our field work took twice as long and spanned into September, where we ran into bad weather. This prevented us from covering all South Hampton Island, although we covered as much as we could given weather windows. When the weather allowed, we worked hard to make the most of our survey days and get the best data we could, while keeping safety in mind. We were disappointed that we couldn't relocate to Coral Harbour, include members from the HTO in the field work, and fly inland as we had previously planned.

We plan to return August 2025 to survey the remainder of Southampton Island.

Project Objectives

The objectives of the FB study are to:

- 1) Work with community HTOs within FB to design and implement a comprehensive survey that prioritizes human safety while achieving research goals. Given the large amount of data collected over the last decade through genetic mark-recapture in surrounding subpopulations, these goals can be best achieved in FB using aerial survey in combination with selective biopsy darting (genetic mark-recapture), to reliably estimate the abundance of polar bears in FB during the summer/fall on-land season (i.e., August) 2024. Selective biopsy darting will allow us to detect movement between neighbouring subpopulations.
 - a. Update: This was completed, with the exception of observer participation in Coral Harbour. We are looking into the possibility of surveying Southampton Island fully in August 2025, including participation of Aiviit HTO.
- 2) Estimate the current population size and composition of the FB polar bear subpopulation.
 - a. Update: this is ongoing.
- 3) Evaluate on-land polar bear distribution.
 - a. Update: this is ongoing.
- 4) Evaluate movement between neighbouring subpopulations.
 - a. Update: We collected 106 biopsy samples and will be submitting them for DNA analysis. We will also submit samples from harvested bears in FB and surrounding subpopulations to find any matches.
- 5) Enhance public participation, provide HTO-designated personnel with training in survey methods and provide employment through the involvement of members directly into the field work. Training will include in-person training of field gear and in-field training of survey techniques and biopsy darting.
 - a. Update: During the 2024 season, a total of 6 observers from Kimmirut, Kinngait, Igloodik, Sanirajak, and Naujaat participated in the project.
- 6) Involve affected co-management partners in the planning and research of the FB subpopulation through the use of local knowledge in the planning of the survey, and use of Inuit Qaujimaqatugait throughout the project by guiding the location and collection of biopsy samples from the field.
 - a. Update: We consulted with the 8 affected communities in February 2024 and incorporated Inuit Qaujimaqatugait into the survey design. Throughout the survey, observers shared Inuit Qaujimaqatugait with us, helping us understand

the land and bear behaviour better. Additionally, we would consult with observers on any decisions that needed to be made in the field regarding bear safety.

Materials and Methods

We used methodologies similar to those employed in 2010. The primary approach involved distance sampling via aerial surveys, a non-invasive method that aligns with Inuit values by avoiding the handling of polar bears. We ended up only having one survey teams, including the pilot, 2 GN biologists, and one HTO observer. The survey traversed digitally defined transect lines to record polar bear observations and their distances from the line, which will enable the calculation of a detection function to estimate population abundance. In addition, biopsy darting via helicopters will collect genetic material from specific subpopulations, providing insights into movement between subpopulations.

We conducted the fieldwork in August-September 2024 and employed habitat-based strata to maximize efficiency, similar to the 2010 survey, while incorporating feedback from community consultations in 2024. The strata considered proximity to the coastline, with transects spaced according to predicted bear densities. The helicopter flew at low altitudes and moderate speeds to ensure accurate observations, with environmental and observational variables recorded for each sighting. Data analysis will use R and the Distance program, incorporating mark-recapture distance sampling and detection covariates to improve accuracy. By combining genetic sampling with distance sampling, the study will provide robust estimates of polar bear abundance, demographic parameters, and body condition, while adhering to principles of safety and respect for Inuit cultural values.

During the survey, a total of 6 observers from Kimmirut, Kinngait, Igloolik, Sanirajak, and Naujaat were trained and employed in the project.

Research Project Schedule

Output or Setup:	Start Date (dd/mm/yyyy):	End Date (dd/mm/yyyy):	Complete?
Logistical preparations (e.g. fuel ordering, barging, and caching, cabin prep, field equipment)	Fall 2023	Summer 2024	Complete
Order fuel	Spring 2023	Spring 2024	Complete
Fuel caching and clean up	Winter 2024	Fall 2024	Clean up still needed – on schedule
Aerial survey	Summer 2024	Fall 2024	Complete
Harvest sampling	1990s	Spring 2025	Harvest sampling will be complete in August 2025 – on schedule

Analysis of tissue samples	Summer 2025	Winter 2026	Analysis of all samples will be complete by Winter 2026 – on schedule
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Preliminary Results/Discussion

Our entire fieldwork program took place from August 7-September 29. We flew a total of 39,821 km surveying and opportunistically biopsy darting polar bears over the Foxe Basin area. We collected over 500 data points and collected 106 biopsy samples. Our main challenge we faced was having only one aircraft and weather. We had a total of 21 weather days, which delayed the progress of our survey. It also resulted in us prioritizing surveying some areas over others, where there were higher densities of bears found in the past. We are still undergoing the process of entering the data, which will be followed by analyses and results.

We will be returning August 2025 to survey Southampton Island. This will delay the analysis and results of the survey.

Discussion/Management Implications

The results of the Foxe Basin polar bear abundance assessment will be used to inform adaptive management of the subpopulation.

Polar bears in Nunavut are managed through a quota-based, adaptive harvest system that incorporates cultural and ecological considerations. This approach requires regular population reassessments to inform management. The reassessment of Foxe Basin was initiated to update critical population data necessary to ensure effective wildlife management.

Once available, updated population information will be submitted to the NWMB for decision-making on the management of the subpopulation.

Report by Inuit participants

An interim report was provided to the affected communities of the Foxe Basin polar bear subpopulation. The Aiviit and Naujaat Hunter and Trapper Organizations indicated concerns regarding the coverage of the work that was completed in 2024. Inclement weather prevented the survey completion as proposed, and therefore a 2025 field season was initiated to augment the coverage of the 2024 survey.

Reporting to communities/resource users

Community/HTO	Before Research (date/type):	During Research (date/type):	After Research (date/type):
Baker Lake	Winter/spring 2024; in-person consultation of	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations

	survey and methods		
Chesterfield Inlet	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Coral Harbour	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; follow up regarding letters of concern and plans for summer 2025 project; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Naujaat	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; follow up regarding letters of concern and plans for summer 2025 project; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Kinngait	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Kimmirut	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Igloolik	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
Sanirajak	Winter/spring 2024; in-person consultation of survey and methods	spring 2025 interim report emailed; fall 2025/study analysis update emailed	Fall 2026/in-community consultations
KWB	Winter/spring 2024; in-person consultation of survey and methods	Fall 2023/in-person AGM; Fall 2024/in-person AGM; Fall 2025/in-person AGM	Fall 2026/Attend in-community consultations with the GN

QWB	Winter/spring 2024; in-person consultation of survey and methods	Fall 2023/in-person AGM; Fall 2024/in-person AGM; Fall 2025/in-person AGM	Fall 2026/Attend in-community consultations with the GN
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