

NWRT Project Number: NWRT-0009

TITLE: Caribou Survey of the Boothia Peninsula

PROJECT LEADER:

Lisa-Marie Leclerc
Kitikmeot Regional Biologist
PO Box 377
Kugluktuk, NU X0B 0E0
Phone: 867-982-7444
Email: LLeclerc@gov.nu.ca

SUMMARY:

The Boothia Peninsula is recognized as an important caribou habitat for calving. A collar study in the 90s identified two calving grounds, one between Wrottesley Inlet and Pasley Bay, and the other one further east. While there is potentially two type of caribou subspecies on the Boothia peninsula, same subspecies of caribou (different herds) could use the Boothia Peninsula at different time during their lifecycles. The limited amount of information (limited collaring and surveys) compounded with large temporal gaps make it difficult to have a good comprehension of this very dynamic system, especially since caribou populations have known to have undergone major change in abundance with potential shifts in range during the last decades. Caribou herd identification is based on the cow's fidelity to the same calving location. Calving ground extents will be determined using *IQ*, telemetry information from 49 collars, and surveyes using barren-ground caribou calving ground survey techniques to provide an abundance estimate of cow caribou on the Boothia Peninsula between June 11 to June 20. Cow, calf pairs were found to be calving in the high ground between Thom Bay and Lord Mayor Bay, no caribou were observed between Wrottesley Inlet and Pasley Bay. Genetics analysis (37 on the calving ground and 98 from harvesters) revealed that most but one, were all barren-ground caribou. We are hoping to fill gaps across a poorly understood caribou range to better understand calving ground extents to help inform land use activities and associated management actions.

PROJECT OBJECTIVES:

Following the recommendation of Gunn and Ashevak, (1990), the main goal of this study is to assess the number of caribou on Boothia Peninsula. This project will answer smaller objectives and expand our understanding of

caribou behaviour, and the importance of the Boothia Peninsula as a calving ground. The objectives can be described as follow:

- 1) Determine, using genetics collected during group composition studies, the different type of caribou present on the peninsula during calving (June), and harvesting (July to March).
- 2) Provide an updated estimate of caribou numbers on the Boothia Peninsula during calving and aim to provide a separate estimate of breeding cows.

Achievements:

We would have not completed the project without working in concert with the HTOs as well as the numerous members of each of the communities. Meetings were planned to ensure all participants had a shared vision of the project, as well as a clear understanding of the moving parts. The main activities were the completion of the aerial survey (abundance, and composition), as well as the collection of samples on the calving ground. This would not have been possible without the involvement of the HTOs be guiding the work and observers to taking part to the intensive survey work completed in mid-June.

We completed the community-based sampling program. Because we noticed a slow down in the return of the sample kits during the winter, we decided to provide more time to the harvesters for bringing back the samples until mid-March. As such, we were able to successfully run the community-based program in two communities, Taloyoak and Kugaaruk, where 98 sample kits were returned. The genetics results were available in July 2023.

In addition, the location of calving ground was delimited during the survey work (presence/absence) but will be further studied based on the available telemetry data, which is essential for land use planning as well as mitigating human activities in sensitive wildlife habitat. Nonetheless, we will be able to derive an abundance estimate as well as provide demographic indicators, production (calves:100 cow).

MATERIALS AND METHODS:

This project used existing IQ knowledge from the communities of Taloyoak, Gjoa Haven and Kugaaruk to inform on the calving locations and important features to help distinguish different caribou herds on the Boothia Peninsula. Although the community of Taloyoak gathered observations during calving, involvement of Gjoa Haven and Kugaaruk were beneficial with the gathering of additional observations on these caribou herds outside the calving season to broader our understanding of these caribou herds movements within their

range. To avoid duplication of efforts, a questionnaire was developed with the assistance of the KRWB.

From June 11 to 19, 2022, we conducted a reconnaissance survey over the entire Boothia Peninsula using a random systematic transect lines survey, 10 km apart, coupled with a double-observer platform where observers called information within 400 m strip. On completion, the observed caribou distribution was used to stratify the area in three strata based on caribou density to fly the visual survey following the method for barren-ground caribou calving ground survey. Aircraft flew at 160 km/hr and at an altitude of about 122 meters. Additionally, observations of predators and muskox were recorded. A total of four observers were hired to participate on this survey and were trained on how to scan the landscape and call for observations (in or off transect, accurate group count).

We initiated the helicopter-based composition survey and fecal samples collection. The composition survey crew classified large groups of caribou on the ground (>50) and small groups from the air. Groups of caribou were classified to determine the proportions of breeding, non-breeding cows, as well as bulls, yearlings, and newborn calves. We conducted identification and classifications on the ground, pregnancy rates were ascertained by udder counts by the close inspection of cows through binoculars for the present of absence of a distended udder. Cows with low-in-the-belly profiles were recognised as still pregnant.

While on the ground, fecal samples were collected with the help of an HTO member (1 person hired). From the fresh feces collected, genetics swabs were performed with a toothpick in the field to assure that samples would not be compromised, they were stored dry until back in Kugluktuk, and then sent for genetics analysis. The genetics analysis allowed the caribou to be identified per herd (for example: Peary or Barren-ground caribou). Finally, sample kits were made available to harvester to collect feces. A total of 25 harvesters were compensated for collecting the samples (\$100/kit; GN ENV \$60/kit and WWF \$40/kit). This was indented to broader our understanding of the caribou herds' range outside calving season.

Telemetry data for collared caribou found on the Boothia peninsula was analysed to calculate the extent of the calving ground and assess cow fidelity as such. Barren-ground caribou were characterized by their well-known migration, where gregarious female caribou have shown a philopatric tendency to return to the same site (spatial fidelity) to give birth year after year (Gun et al., 2010). Based on this behaviour, Nagy et al., (2011), satellite-tracking of collared female caribou was used to identify robust subpopulation structures based on female affiliation to a distinct calving location.

Training:

During this project participants gained skills and knowledge in:

- Classification of caribou: breeding, non-breeding cows, as well as bulls, yearlings, and newborn calves
- Fecal sample collection and perform genetics swab in the field
- Learning and sharing knowledge on wildlife with community members
- Use of GPS
- Extensive background experience for future wildlife surveys
- Experience with standard job expectations (e.g. showing up, being on time, and being prepared)

Employment summary:

Participant	Role	Employment (person days)	Compensation per day
Summer Student (ENV)	Logistic/Observer	1 for 30 days	\$200
Community Members	Observers	3 for 4 days	\$350
Community Members	Observers, sample collection	3 for 2 days	\$350
Hunters	Year-round fecal sample collection	25 for 1 day	\$100 per samples

RESULTS:

For the reconnaissance survey, we flew 28 transect lines that averaged 116 km for a total of 3,250 km on transect (excluding ferry). The reconnaissance survey started on June 12. Low ceiling and fog prohibited us to fly the six northernmost transects, and the completion of these lines was postponed until June 15, which marked the end of the reconnaissance survey. Only a small section wasn't flown due to fog (Figure1). We believe this small missed area has not impacted on identifying caribou aggregation within the study area (Boothia Peninsula).

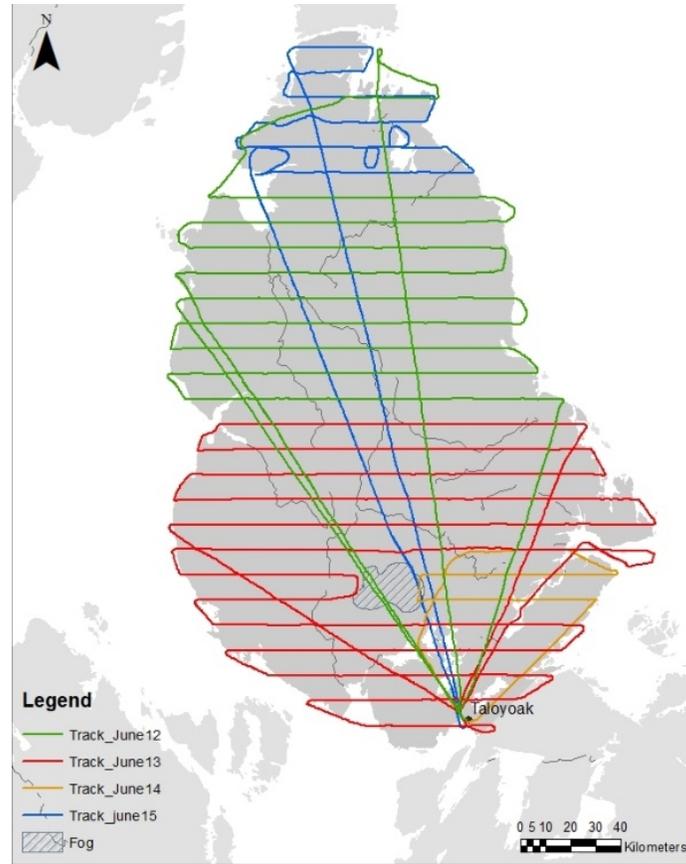


Figure1: Tracks flown during the reconnaissance survey taken place from June 12 to June 15, 2022. The strike area depicts the location of the fog encountered.

Information obtained from the caribou distribution identified during the reconnaissance survey was used to create three strata for the visual survey: 1) a low density strata in the North (red), 2) a medium density strata in the middle (blue), and 3) a high density strata in the south of the Boothia Peninsula in green (Figure2A and Table1)). We ensured a minimum of 10 transect lines per stratum with a distance between transect lines of between 3.3 and 4 km. The visual survey was flown from June 14 to June 16, and we observed a total of 66 caribou (red dot) in 30 groups (Figure2B). For the visual abundance survey there were six groups observed within low density strata (red); 11 groups in the medium density strata (blue), and 13 groups in the high-density strata (green). We did observe cows with new born calf reinforcing that caribou are calving on the Boothia Peninsula at these locations. However, we will be awaiting the genetics analysis to help understanding the subpopulation structures in these three strata.

Table1: Summary of Boothia Caribou visual survey design, number of transects allocated in each stratum, and respective planned survey effort.

Stratum	Name	Area (km ²)	Samplers	Distance Between Transect (km)	Transect Length (km)
1	North	5,601	31	4	1,396
2	Middle	2,236	12	3.3	666
3	South	1,528	16	4	381
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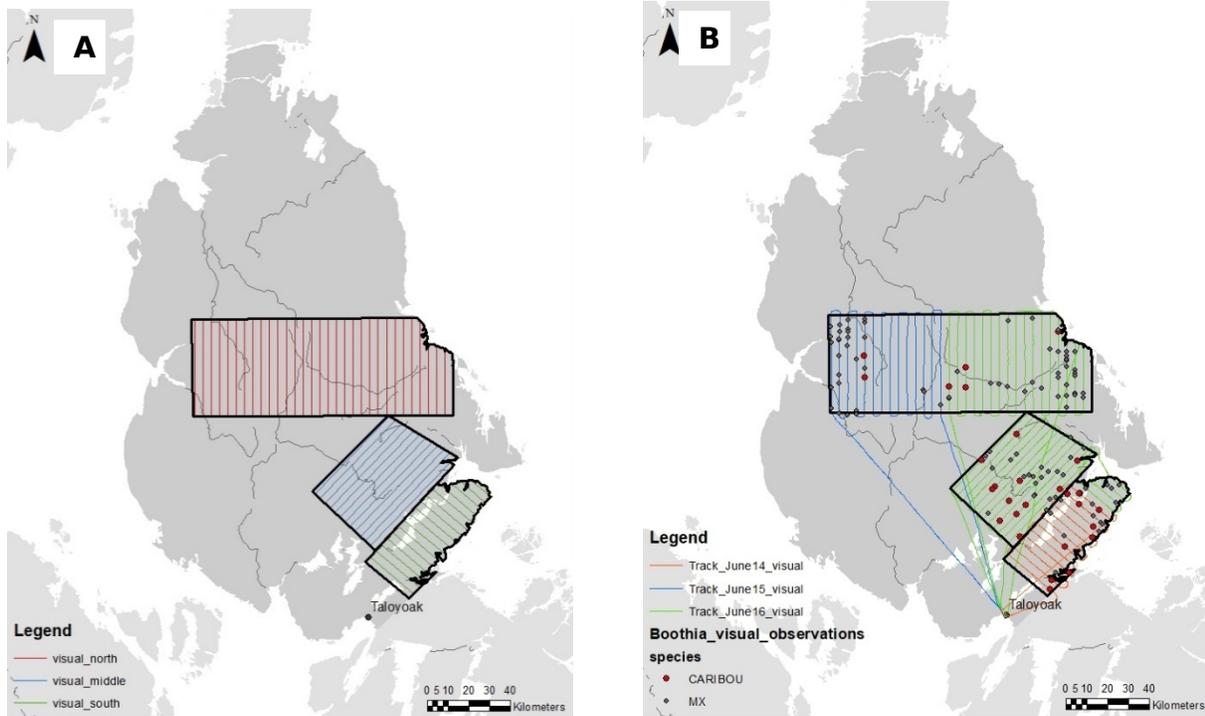


Figure 2: A) Visual strata north (red), middle (blue) and south (green) and B) the track lines flown from June 14 to 16, 2022 and the muskox (black dot) and caribou (red dot) observed during this time.

The helicopter-based composition survey and fecal samples collection was completed on June 17 and 18, 2022 (Figure3). The composition survey crew classified all groups from the air. Groups of caribou were classified to determine the proportions of breeding, non-breeding cows, as well as bulls, yearlings, and newborn calves. An expert from the community also helped with the spotting and classifying of the caribou. During the composition survey 38 groups of caribou were classified with a total of 33 female non-breeders, 38 female breeders, 71 females, and 82 adult caribou and yearling caribou

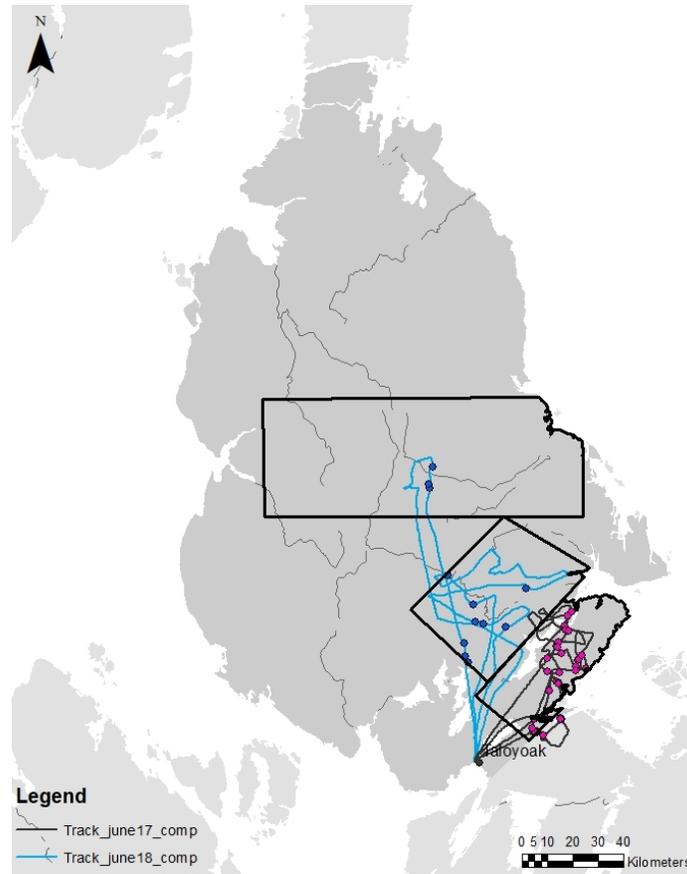


Figure3: Composition survey flown with a rotary-wing on June 17 (black) and 18 (blue), 2022. Location of sample collection are represented in pink for June 17 in the high density stratum and in blue for the medium and low density stratum on June 18.

After classification, we landed away from the caribou to try to find fresh feces. We successfully found feces in 37 locations, collected samples, and performed genetics swab with a toothpick in the field (Figure 3). In addition, 150 sample kits (100 in Taloyoak, 25 in Gjoa Haven and 25 in Kugaaruk) were provided to harvesters, with a return of 98 filled kits. These 137 fecal samples were sent for genetics analysis. This will be used to broaden our understanding of the caribou herds' range outside calving season and possibly help with the identification of caribou subspecies using the Boothia Peninsula. Genetics analysis revealed that most but one, were all barren-ground caribou.

At this point, all the data has been gathered and intensive analysis is underway to not only identify and generate an abundance estimate, but to take a deeper look into the behavioural differences if any, of this group of barren-ground caribou calving on the Boothia peninsula.

DISCUSSION/MANAGEMENT IMPLICATIONS

The present survey work was performed complementary to the northeast mainland (NEM) caribou herd 2021 June calving ground survey. In 2021, the survey area extended to the south-east part of the Boothia Peninsula, as collar information showed caribou using this area during calving. However, the Spence Bay Hunters and Trappers Association was concerned that caribou to the north were missed. Thus, the results presented here show that no caribou were found in the north part of the Boothia Peninsula and based on their location in the high hill were all accounted for in the survey effort of 2021. Therefore, the management recommendations from the NEM survey hold for now for the caribou found on the Boothia peninsula until we can determine if we can behaviorally distinguish them in a separate herd or not.

This project shed light on the type of caribou subspecies that calve on the Boothia Peninsula, majority barren-ground caribou, and help understanding where and when harvests take place. By looking at the telemetry data, we have a better understanding as to which hunters are relying more on.

Caribou ecology on the Boothia Peninsula is very limited. This study offered a means of using IQ and Western Knowledge together to fill important knowledge gaps regarding caribou range on Boothia Peninsula. The location of calving grounds, combined with genetic testing of fecal samples and telemetry data, helped us understand if there is more than one herd of barren-ground caribou using the Boothia Peninsula for calving. This information was essential for management of caribou per herd under the Nunavut Land Claim Agreement and assures that human activities on this particular wildlife habitats is properly mitigated during ongoing land use processes.

REPORTING TO COMMUNITIES/RESOURCE USERS:

The KRWB and HTOs were supposed to be involved in the data analysis of this program. However, it would not be possible to do so due to shortage in human-capacity. We originally planned to have the final report ready in spring 2022. Since we extended the the period for the collection of sample kits from November to March, this will postpone the reporting to the community to spring 2024, a year later than originally planned. The next face to face meeting will need to be scheduled to present the final analysis of this work.

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