NWMB Project Number 2-10-09

Distribution and Abundance of Barren-ground Caribou on Baffin Island, Nunavut

Interim Report
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SUMMARY

The Government of Nunavut recognizes 3 populations of Barren-ground caribou on Baffin Island. The status of these populations is unknown. No reliable current or historic estimates of population size exist for these caribou. Caribou are culturally significant to Inuit and provide an important source of food. Subsistence harvesting is important and more than half of Nunavut's growing human population occurs on Baffin Island. Additionally, development and exploration activities are increasing and there is the potential for impacts on caribou and their habitat.

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INTRODUCTION

Caribou are circumpolar in their distribution and occur in northern parts of Eurasia and North America. In Canada, caribou are represented by 4 subspecies; Peary, Woodland, Grant's and Barrenground. The latter is the most abundant in Nunavut. Barrenground caribou generally occupy the tundra from the Yukon to Baffin Island. On the mainland, large migratory herds demonstrate seasonal migrations from the tundra to the taiga while Barrenground caribou on Baffin Island generally occur in smaller herds and are confined to the tundra. It is possible that both migratory and sedentary caribou occur on the island.

The Department of Environment, Government of Nunavut recognizes 3 caribou populations across Baffin Island (Department of Environment, 2005). Little has been documented about the past and current abundance of these caribou. Early surveys (1940-1970) were unable to provide reliable population estimates due to limited coverage and poor survey methods, which were compounded by small widely dispersed herds, bad weather and rugged terrain (Hall 1980). Later surveys generally focused on discrete portions of caribou range and were almost exclusively limited to South Baffin. A robust population estimate has never been produced for all Baffin caribou or for the populations that have been proposed. Nonetheless, Williams and Heard (1986) reported that >100,000 caribou inhabited Baffin Island in 1985. The status was updated in 1991 when it was suggested that populations were stable with 60,000 -180,000 in South Baffin, >10,000 in Northeast Baffin, and between 50,000-150,000 in North Baffin (Ferguson and Gauthier, 1992). Since the mid-1990s, local communities and hunters have reported low caribou numbers across northern Baffin Island and more recently, for caribou across the entire island.

In North Baffin, caribou reconnaissance surveys in 2008 and 2009, failed to locate large numbers of animals (Jenkins 2008, Jenkins 2010). In 2008, 9 small groups of caribou, totaling 47 animals were located in an area of 40,643 km^2. In

2009, the study area was expanded and 24 groups (123 individuals) were located in an area almost double in size (Jenkins 2010). These results in combination with local knowledge, suggest that a significant decline in North Baffin caribou may have occurred but the data can not be extrapolated across the entire population range.

Concurrently, exploration and development has been increasing on Baffin Island with potential impacts on caribou and their habitat. Climate change poses an additional risk with associated impacts to both the biotic and abiotic environment (Barber *et al.* 2008, Vors and Boyce, 2009). Sound baseline data on both the abundance and distribution of caribou is necessary to direct management and conservation initiatives and monitor change.

To address knowledge gaps and concerns regarding the distribution and abundance of barrenground caribou on Baffin Island, a full island survey has been proposed. This research will provide baseline information on the populations of caribou on Baffin Island thereby enabling the Government to monitor population trends in the future. The results will be used to inform management decisions and future research needs geared to assessing and mitigating the potential impacts of land use activities and climate change. To capture knowledge on past distribution and abundance of caribou, local knowledge will be collected from elders and hunters.

PROJECT OBJECTIVE

The principle goal of this investigation is to determine the abundance and distribution of caribou on Baffin Island. This research is guided by 4 objectives:

1) Collect local knowledge on the past distribution and abundance of Baffin Island caribou.
2) Investigate and record the current spatial distribution and abundance of caribou across Baffin Island.
3) Estimate population density and abundance.

4) Collect and analyze fecal samples to evaluate genetic diversity and population structure.

MATERIALS AND METHODS

Study Area - Baffin Island forms the eastern margin of the Canadian Arctic Archipelago and is the largest Island in Canada (ca. 507,451 km^2). The entire island and small proximal islands constitute the study area (Figure 1). There are 8 communities within the study area, including Pond inlet, Arctic Bay, Clyde River, Qikiqtarjuaq, Pangnirtung, Iqaluit, Kimmirut, and Cape Dorset and 2 National Parks.

Methods – We plan to consult with HTOs and hunters in local communities to collect Inuit knowledge on Baffin Island caribou and finalize details on the aerial survey designs following standard aerial survey techniques and distance sampling methods. Inuit knowledge and existing scientific information will help to inform study boundaries for a one or two year survey program (see Figure 1A, Appendix 1). A systematic transect design with a random starting location will be used. Transects will be positioned 10 km apart and run perpendicular to the longest axis of the island. Transects will cover the entire land base with the exception of extensive ice fields or glaciers and will be stratified based on population boundaries. Transects will be flown using at least 2 Bell 206L helicopters and 4 dedicated observers in each unit (includes pilot). Aircraft will fly approximately 120 meters above ground level to detect animals. To maximize accurate detection, air speed will range from 90 to 130 km/h depending on patchiness of snow cover, topography and evidence of wildlife. Upon detection, all individuals and groups will be approached to record location, and identify sex, age and group size. When available, scat samples will be collected at fresh feeding sites. The perpendicular distance of each caribou observation from the transect will be determined using GIS. Program Distance 5.0 (Thomas et al. 2005) will be used to model the detection function and estimate the density of caribou. The detection function models (key function/series expansion)

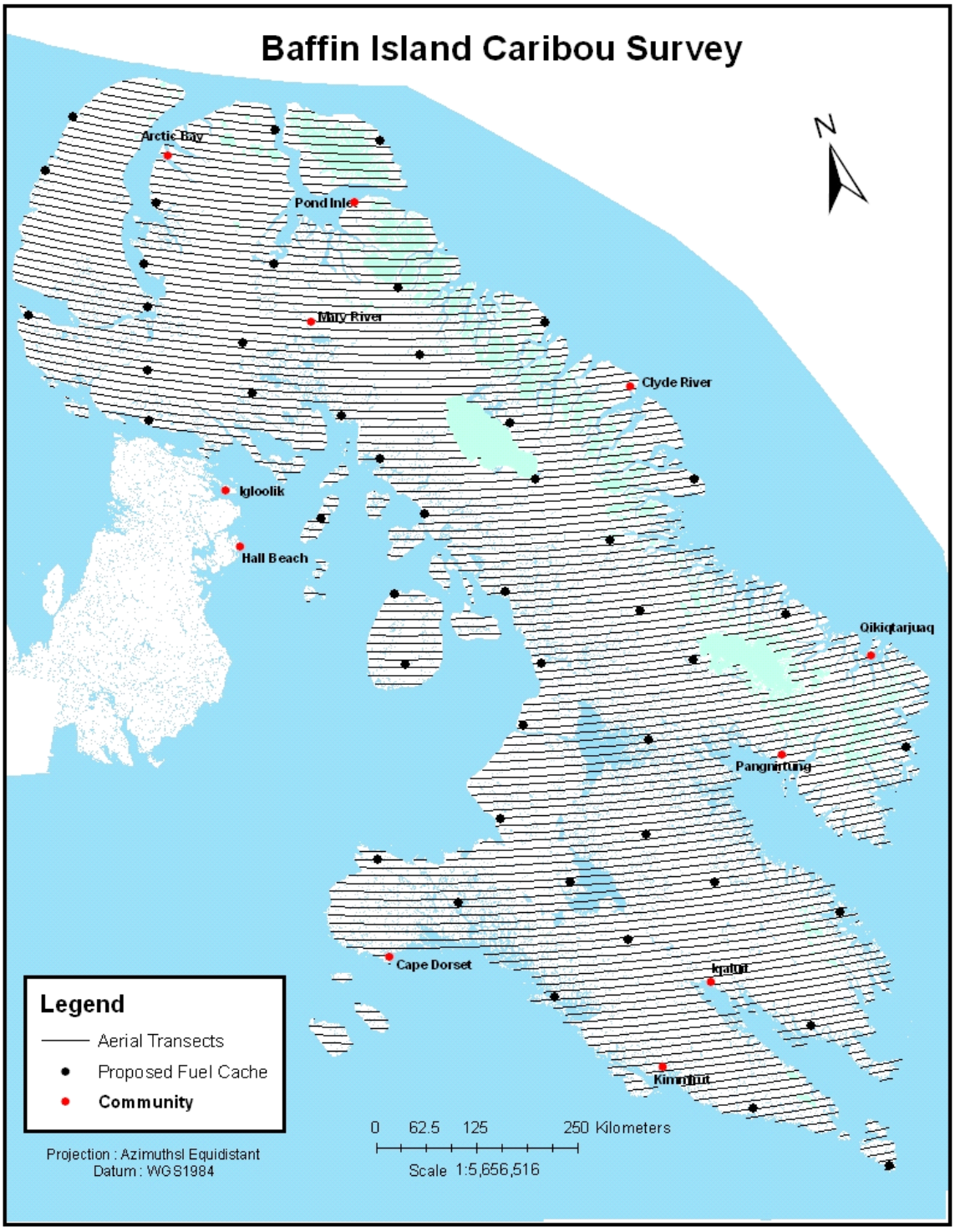

Figure 1: The study area includes Baffin Island and small proximal islands. Survey design, including the layout of transects and fuel caches, has not been finalized.

recommended by Buckland et al. (2001) will be used to analyze the data and the most parsimonious model will be selected using Akaike's information criterion (AIC). Fecal samples will be sent to Wildlife Genetics International, British Columbia, Canada, for DNA analysis.

Logistical preparations for the field program include the calculation of fuel, time, and staffing requirements, and determining the locations for fuel caches and field camps. Additionally, the purchase, delivery, storage and management of project materials, including helicopter fuel, is critical to project execution.

RESULTS

In 2010, fuel was purchased for the field program and delivered via sea lift to various communities across Baffin Island for storage and management. Fuel will be cached in the field just prior to the aerial survey. All other work on the Baffin Island caribou survey was postponed in 2010-11 to accommodate other Government of Nunavut research priorities. If sufficient resources can be garnered, the program will continue in 2011-2012 and 2012-13.

DISCUSSION and MANAGEMENT IMPLICATIONS

Results from this research project will be critical to the management and conservation of barrenground caribou on Baffin Island. Data from the survey will lead to the estimation of population densities and abundance. The abundance estimates from this survey will be the first at the scale of populations and will be used to inform future decisions related to wildlife management.

The aerial survey will also provide data on caribou distribution. Although the information will be limited temporally to late winter it will comprise the very first large scale data set on caribou distribution for the entire island. As a critical first step in understanding the spatial range of Baffin Island caribou, the data will be integrated into GIS and mapped. This information will be meaningful in the assessment and direction of land-use activities.

Cancelation of the survey program in 2010-2011 has delayed the program by a year and thwarted funding commitments. Nonetheless, the GN remains committed to the survey program and activities will resume in 2011 and 2012.

REPORTING TO COMMUNITIES / RESOURCE USERS

A full island survey of Baffin Island caribou was proposed at HTO consultation and training sessions in Arctic Bay (October 2008) and Pond Inlet (October 2008, November 2009). Members from the Clyde River HTO attended the Pond Inlet session (October 2008). The survey proposal was presented at the QWB meeting in 2008, 2009 and 2010 and presented at the DoE Wildlife Symposium, Rankin Inlet, February 2009 and at the Caribou Strategy Consultations for Baffin Region in September 2010. Additionally, to initiate dialogue with all Baffin Island communities, the proposal was introduced in the fall 2009 issue of Wildlife Tracks, a DoE publication distributed across Nunavut through the HTOs and Conservation Officers.

Notably, the proposed research project is significant in magnitude and full consultation will occur at all Baffin Island communities to receive input on design and implementation (proposed for summer 2011). At the same time local knowledge on caribou distribution, movement and space use will be collected. The minutes from all meetings will be recorded and shared with each community. Updates will be posted in DoE Wildlife Tracks or DoE - Baffin Region Information Bulletins. The survey results and local knowledge will be documented in a GN report but also published in a scientific peer-review journal.

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Appendix 1

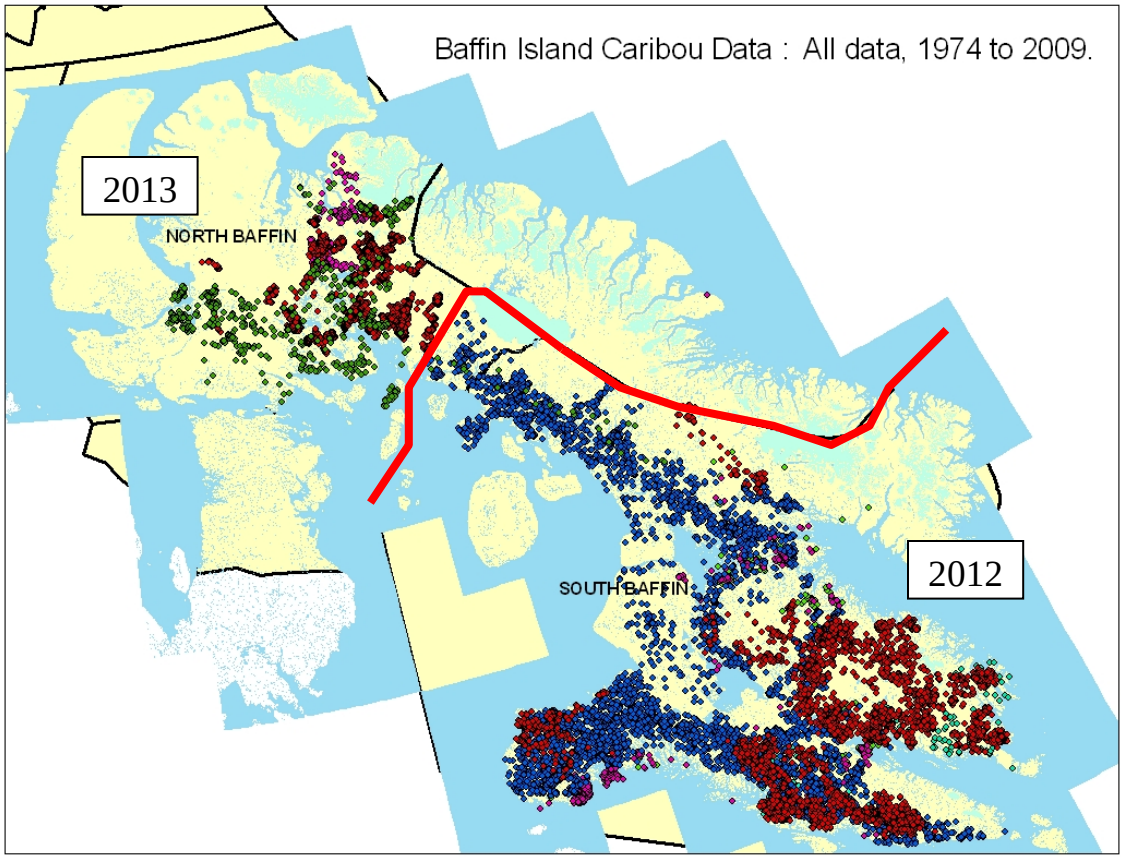

Figure 1A: Caribou location data and Inuit knowledge will help inform study boundaries if resources dictate that the survey occur over a 2 year period.