

Interim Report

Project Number: 32-13-11

Project Title:

**Muskox Aerial Survey (*Ovibos moschatus*)
Of the Kitikmeot Region, Nunavut.**

Project Leader:

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Introduction:

Muskox (*ovibos moschatus*), a native species, constitutes an important source of food for the Inuit communities. Muskoxen are currently re-colonizing their historical range, such as King Williams Island. At this location, sightings of muskox were rare until 1992, and soon after hunter observations have reported that they are increasing in number (Gunn *et al.*, 1996; White, 2002).

While the number of muskox seems to be increasing at some locations, the opposite trend is noticed in other. In Cambridge Bay, Kitikmeot Foods Ltd. stopped their commercial harvest in 2013 due to very few muskox within their harvesting zone (Kitikmeot Foods Ltd, 2012). In addition, the recent documentation of the muskox lungworm, *Umingmakstrongylus pallikuukensis*, in the central part of Victoria Island raised some concerns about the spread of this parasite from the mainland. This parasite can affect muskox survival by making them more vulnerable to other diseases, and increasing the risk of predation where the numbers of predator have been reported to increase. All these factors may affect the muskox population dynamics negatively and impact on management plan and decision making related to harvest levels.

The communities of Cambridge Bay, Gjoa Haven, and Kugluktuk have maintained a current harvesting rate for the past decade. The Kitikmeot Regional Wildlife Board (KRWB) inquires about the current status of the West Kitikmeot management plan, new Muskox Management Units and quota allocations (KRWB, pers. Comm.). These communities need to re-evaluate their respective quotas in order to maintain a sustainable harvest. This task is impossible without bringing the current muskox number estimate up to date in each management area.

This study aims to provide essential inventory information to review existing management strategies and promote the conservation of the muskox herd, so future Inuit generations may continue to practice hunting techniques and harvest this resource. To do so, the relative muskox

number, productivity of the herd and distribution will be assessed for three hunting communities of the West Kitikmeot: Kugluktuk, Gjoa Haven and Cambridge Bay.

Objectives:

This project aims to address the concerns and requests of Inuit hunters, as well as to fulfill two management priorities of the Nunavut Wildlife Management Board in the Kitikmeot Region. These priorities are 1) Muskoxen population assessment on King William Island and 2) Population research on current muskox zones. Therefore, the main objectives of this study are:

1. Determine the estimate number of muskox in each respective zone of each community;
2. Determine calves/adults ratio, to provide information on herd composition and production; and
3. Determine the distribution of muskox and identify areas of high and low density.

Materials and Method:

In July 2013, new Muskox Management Units were established across Nunavut. On Victoria Island, the three previous harvest zones (MX-07, MX-11, and MX-10) were fused into one, MX-07. King Williams Island, referred to as MX-22, is now part of the new management unit called MX-10. The HTO of Gjoa Haven has expressed concerns about a possible over-harvest on the island, if a TAH is set for the entire MX-10. Thus, they have decided to establish a harvest management zone to help distribute the harvest to avoid the risk of local depletion (Dumond, 2010).

The same concern was expressed by the Kugluktuk HTO as the new units, MX-11, represent a very large area that include three old management zones; MX-13, MX-14, and MX-19. Thus, they also requested to also establish a harvest management zones around Kugluktuk, so it will be easier and financially possible to monitor the herd being harvested more often.

With the new Muskox Managements Units, the proposed survey areas, MX-19, MX-11 and MX-22, were reviewed after consultations with NTI, NWMB, and the HTOs of Cambridge Bay and Kugluktuk. Funding availability and field logistic planning restricted the 2013 survey to a portion of the new Muskox Management Unit, MX-07 and MX-11. The survey area reflected the highest known muskox density of Victoria Island.

Consistent standards procedure was used throughout the survey of the three different zones. No reconnaissance survey was effectuated in priory to maximize the coverage area investigated. Instead, anticipated muskox distribution pattern was obtained from past surveys, hunter observations, and Inuit Traditional Knowledge/Inuit Qaujimajatuqangit.

Distance sampling (line transect sampling) was used to detect of objects changes with increasing distance from the observer. A single fixed-wing engine, Turbo Beaver, was used. The number of transects flown in each stratum cover 20% to 25% of each survey area. The transect lines were

surveyed at a speed of 160km/h and at an altitude of 150 m. The observers recorded the number of muskox, GPS location and their distance from the transect line, which was pre-established at 200m, 400m, 600m, 800m (Gunn and Patterson 2000; Howard 2011).

This survey focuses mainly on obtaining a muskox population estimate. However, additional information was recorded, such as sightings of other species (caribou, grizzly bear, polar bear and wolf). The herd was also broken down into adults (female/male), and calves (Howard, 2011). With adults and calves numbers the percentage of production could then be calculated. Information on the sex-selective harvest and harvest location by the sport hunt was also collected based on the muskox harvest record of the summer 2013.

Preliminary results:

The surveys took place from August 25 to September 17, 2013. Even if we were able to fly most days, the surveys got delay due to bad weather during this period and due to mechanical problems encounter in Cambridge Bay. In total, 11,213 km of transect lines were flown in 126 hours and 395 wildlife sightings were recorded (Appendix 1). The transect lines cover 20 to 25% of the stratum delimited.

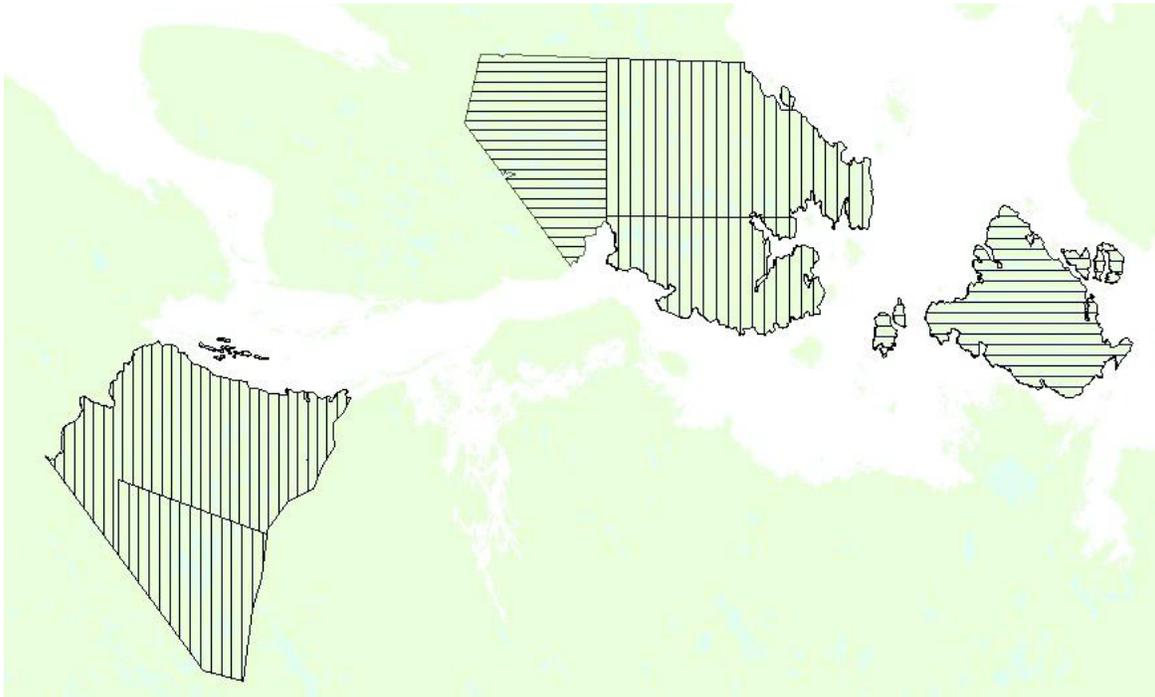


Figure1: Transect lines flown from August 25 to September 17, 2013 around the Community of Kugluktuk and Gjoa Haven.

Cambridge Bay:

A portion of Victoria Island was surveyed from August 25 to September 3. The area survey was divided in three stratum; west at 25% with 1,749 km, north-east at 20% with 2,319 km and

south-east at 20% with 1,187 km. The percentage survey in each stratum was set in function of the higher muskox density reported by hunters. As expected very few muskox were observed close to Cambridge Bay, forming a local depletion zone similar to what has been reported in the Arctic desert in the central part of Victoria Island (Figure2). This observation was consistent with those made during the ground survey in May 2013. The size of the herd was smaller than what was reported in 1999, ranging from 1 to a maximum of 17 and a range of 1 to 3 calves per herd.

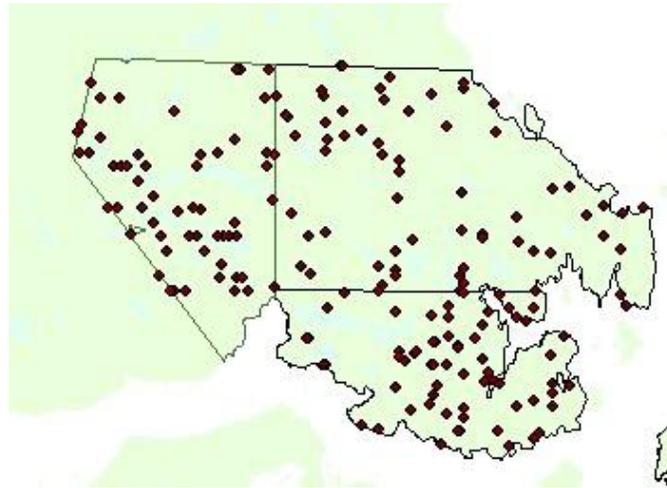


Figure 2: Muskox sighting locations (red diamonds) on the survey area on Victoria Island.

Gjoa Haven:

From September 4 to September 5, King William Island and neighbouring islands were surveyed at 20%. The majority of the muskoxen were found on the north part of King Williams Island. There the number of muskox per herd was higher than what was seen on Victoria Island, with animal per herd ranging from 1 to a maximum of 36 and a range of 1 to 6 calves per herd.

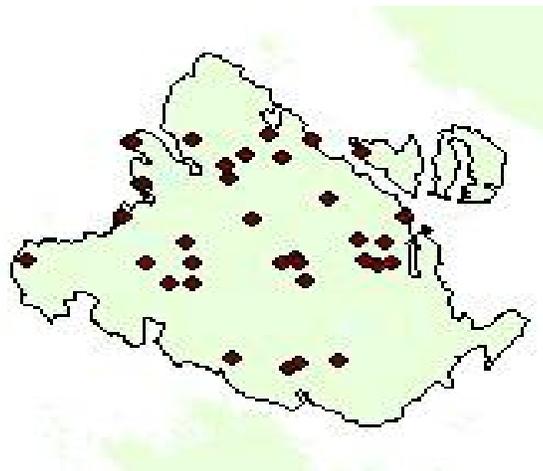


Figure 3: Muskox sighting locations (red diamonds) on the survey area on King Williams Island and neighbouring islands.

Kugluktuk:

Kugluktuk was surveyed from September 9 to the 17. The islands north of Kugluktuk were included in the survey as hunters have been reported the occurrence of muskoxen. Thus, during the survey we found a few herds on the island. Whether these herds are resident or whether they migration ended due to sea ice condition, is unknown. No muskoxen were seen on the east side of the survey zone. This is not surprising as the area cover with rocks and there is little vegetation. This arid land feature seems to form a natural geographical boundary during the summer months. The number of animals per herd ranged from 1 to a maximum of 91 with 1 to 9 calves per herd. The number of muskox per herd was the highest at this location.

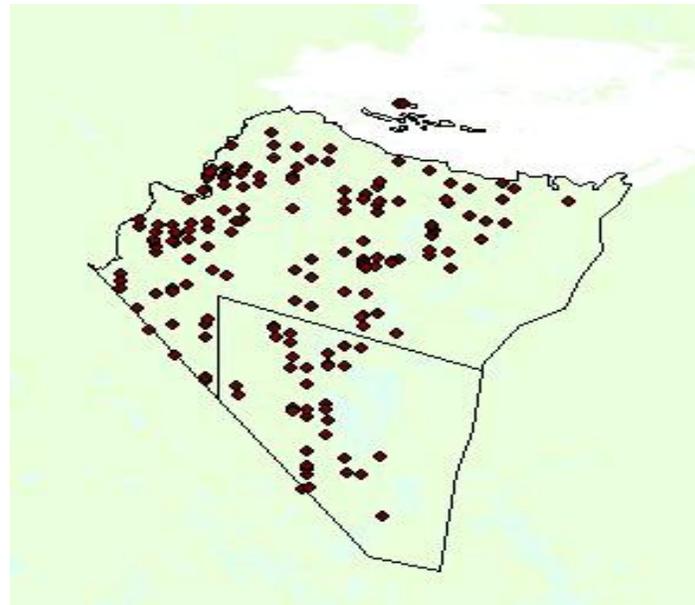


Figure 4: Muskox sighting locations (red diamonds) on the survey area on the mainland and neighbouring islands.

At this time, the estimate muskox number for each of these surveys areas is not yet available. Due to the shortage of human resources, a data analysts will be hired and concentrate his task on analysing the data from this surveys. These findings will help to improve the current management of the muskox and their respective harvesting zones to avoid local depletion, has occurring around Cambridge Bay. HTOs of Gjoa Haven and Kugluktuk are concerned that extending the management zones to represent the muskox population boundaries in the Kitkmeot will cause problems by increasing the number of animal that could be harvested at the same hunting ground. Muskoxen have an astonishing low genetic variability that could be explained by the virtual extirpation at the beginning of the century and their recent re-colonisation. Two populations have only been identified in Nunavut, the Island (Victoria Island to Elsmere Island) and the Mainland muskox (Peatkau, 2010, 2008). It is only recently that cross between these two populations was notified (Peatkau, 2010). Therefore, managing muskox according to their population, as required in the NLCA, might cause conservation problems for a relatively known sedentary animal that have low genetic diversity.

Community consultation plan and reporting:

This project relies strongly with the support of the community of Kugluktuk, Gjoa Haven, and Cambridge Bay. As two of the five communities of the Kitikmeot region are requesting a muskox survey, this proposal was made in collaboration with the HTOs to set the objectives of this project and to take their comments and suggestions. Close contact with the community through the entire duration of this research project will be maintained to allow input and insight. Kugluktuk HTO held a community consultation to identify concerns and to establish a harvest management zone around Kugluktuk. The community members were receptive of such a zone.

In October, preliminary results were presented at the KRWB AGM meeting in Cambridge Bay. The HTO managers were pleased to have a report on what was done and that the survey has been successful (not cancelled due to weather.). In addition, the need to hold a muskox workshop was recommended.

Opportunities for local participation:

Local and Inuit knowledge on the muskox distribution was used to set up the percentage of area cover in each stratum. Community members were able to be involved to during the aerial surveys. They learned scientific methodology, and see from their own eyes their land and help counting muskoxen. The table below (Table1) list the name of the participant for each community. In total, eight local people participated. Having a youth and experienced hunter observed on the plane was a perfect fit. The youth had the opportunity to ask questions and learn about the geography, hunting locations, and important areas around their community.

Table1: List of trained observers

Community	Observers
Kugluktuk	Eric Hitkolok Dennis Kokak Gordon Kokak
Gjoa Haven	Kyle Aglukkaq George Konana Sam Takkuruq
Cambridge Bay	Clarence Klengenber Jospeh Tikhak

Way forward:

During field observations, the number of muskox per herd, low number of calves, and their distribution, raised concerns for the muskox on Victoria Island. The Government of Nunavut, Department of Environment, recognises the need to extend what has been a surveyed in 2013 to include the remaining portion of the new Muskox Management Units, MX-07. To do so, a second proposal will be submitted to NWRT for consideration.

References:

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Howard, F., 2011. Aerial Wildlife Survey Manual. Aerial Procedure Manual v. 0.9 (Uganda). Wildlife Conservation Society. 81 pp.

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Peatkau, D. 2008. WGI Project g0310 Nunavut Muskox, Report. Wildlife Genetics International. 8 p.

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Appendix 1

Date 2013	Location	Hours		Description
		Air Time	Flight Time	
August 25	YZF -YCO- YCB	4.9	5.1	Position aircraft to YCB. Pick up Lisa in YCO first.
August 26	YCB LOCAL	3.3	3.4	VICTORIA ISLAND SURVEY
August 28	YCB LOCAL	7.7	7.8	VICTORIA ISLAND SURVEY
August 29	YCB LOCAL	10.9	11.1	VICTORIA ISLAND SURVEY
August 30	YCB LOCAL	10.7	10.9	VICTORIA ISLAND SURVEY
August 31	YCB LOCAL	4.2	4.3	VICTORIA ISLAND SURVEY
Sept 1	DAY OFF - WX			DAY OFF
Sept 2	YCB LOCAL	9.7	9.9	VICTORIA ISLAND SURVEY
Sept 3	YCB LOCAL	5.8	5.9	VICTORIA ISLAND SURVEY
Sept 4	YCB - YHK	3.1	3.2	KING WILLIAM ISLAND REPOSITION/ROYAL GEOGRAPHIC ISLAND
Sept4	YHK LOCAL	5.6	5.7	KING WILLIAM ISLAND SURVEY
Sept 5,	YHK LOCAL	8.4	8.6	KING WILLIAM ISLAND SURVEY
Sept6,	YHK - YHK	1.1	1.2	REPOSITION - RETURNED TO GJOA HAVEN DUE WEATHER
Sept 7	YHK - YCB	2.4	2.5	REPOSITION TO CAMBRIDGE BAY
Sept8,	YCB - YCO	2.7	2.8	REPOSITION TO KUGLUKTUK
Sept 9,	YCO LOCAL	0.5	0.6	KUGLUKTUK SURVEY
Sept10,	YCO LOCAL	10.1	10.3	KUGLUKTUK SURVEY
Sept11,	YCO LOCAL	10.2	10.4	KUGLUKTUK SURVEY
Sept13,	YCO LOCAL	6.3	6.4	KUGLUKTUK SURVEY
Sept 14	YCO LOCAL	9.2	9.4	KUGLUKTUK SURVEY
Sept 15	YCO LOCAL	0.2	0.3	KUGLUKTUK SURVEY
Sept 17	YCO LOCAL	8.5	8.7	KUGLUKTUK SURVEY
TOTAL BILLABLE TIME		125.5	128.5	