13th Arctic Ungulate Conference
Yellowknife, Canada
22-26 August, 2011

Brief Communication

Peary caribou (*Rangifer tarandus pearyi*) and muskoxen (*Ovibos moschatus*) on northwest Victoria Island, Northwest Territories

Tracy Davison[1] & Judy Williams[2]

[1] Government of the Northwest Territories, Environment and Natural Resources, P.O. Box 2749, Inuvik, NT, X0E 0T0, Canada (Corresponding author: Tracy_Davison@gov.nt.ca).
[2] Government of the Northwest Territories, Environment and Natural Resources, P.O. Box 1320, Yellowknife, NT, X1A 2L9, Canada.

Abstract: An aerial population survey of Peary caribou (*Rangifer tarandus pearyi)* and muskoxen *(Ovibus moschatus)* on Victoria Island, Northwest Territories, was conducted in July and August 2010. The population estimate of adult Peary caribou was 150 ± 104 (95% Confidence Interval [CI]) was not significantly different than the 2005 estimate of 66 ± 61 ($P < 0.05$). There was also an estimate of 430 ± 214 (95% CI) adult Dolphin-Union caribou (R. t. groenlandicus x pearyi) in the study area. However, these caribou represent only a small portion of the Dolphin-Union herd. The population estimate of 11 442 ± 1637 (95% CI) adult muskoxen is not significantly different than the 2005 estimate of 12 062 ± 2156 ($P < 0.05$).

Key words: muskoxen; *Ovibos moschatus*; Peary caribou; population survey; *Rangifer tarandus pearyi;* Victoria Island.

Rangifer, 33, Special Issue No. 21, 2013: 129–134

Introduction

Peary caribou (*Rangifer tarandus pearyi)* are endemic to Canada, occurring in the high Arctic islands of the Northwest Territories (NWT) and Nunavut. Peary caribou have declined across their range since the first surveys were done in the 1960s and 1970s; however, surveys of Peary caribou have not been consistent throughout the range. There is little trend information regarding some populations while other populations such as the Prince of Wales – Somerset Island Group have undergone steep declines without recovery (Jenkins *et al.,* 2011). Other islands seem to have small, yet stable numbers of caribou. Peary caribou were listed as endangered under the Canadian Species at Risk Act in February 2011.

Peary caribou are found year-round on northwest Victoria Island and are known as the Minto Inlet herd. At the southern end of Victoria Island, Dolphin-Union caribou *(R. t. groenlandicus x pearyi)* spend summer on the island and migrate to the NWT mainland across Dolphin and Union Strait in the fall to winter on the mainland. They migrate back to the south end of Victoria Island to calve in May/June. Muskoxen are resident throughout Victoria Island.

Caribou surveys on northwest Victoria Island have been done over the same area using the same methods since 1992; however, there were periodic surveys with varying coverage previous to this (Gunn, 2003). The first survey was done for a proposed Polar Gas Pipe-

line in 1980 (Jakimchuk & Carruthers, 1980). The Minto Inlet herd and Dolphin-Union herd ranges were first documented by a satellite telemetry program from 1987 to 1989 (Gunn & Fournier, 2000). There appeared to be a decline of Peary caribou in the 1980s and 1990s with harvesting, predation, and weather cited as possible causes (Nishi & Buckland, 2000; Gunn, 2003). There is currently a voluntary moratorium on harvest of Peary caribou on northwest Victoria Island.

Muskoxen on northwest Victoria Island are harvested by aboriginal subsistence harvesters from Ulukhaktok. The total annual allowable harvest of muskoxen is 1000; however, reported harvest has ranged from 208 to 270 muskoxen per year over the last 5 years.

Study area

Victoria Island is the second largest island in the Canadian Arctic Archipelago and is split between the Inuvialuit Settlement Region (ISR), in the NWT, and Nunavut. Wildlife on the NWT portion of Victoria Island is co-operatively managed by the Wildlife Management Advisory Council (WMAC [NWT]), made up of members appointed by the Inuvialuit, Government of the Northwest Territories and the Government of Canada, and whose mandate includes advising appropriate ministers on all matters relating to wildlife management within the ISR.

Methods

Survey lines, spaced 5 km apart, were flown with a Helio Courier fixed-wing aircraft over northwest Victoria Island. The survey crew consisted of a pilot, two rear seat observers, and a front seat recorder/navigator. The island was divided into 3 blocks for survey purposes (A, B, and C). Survey lines could be flown in less than 30 minutes to reduce observer fatigue. The survey was flown at 120 m above ground level at an average approximate speed of 160 km/hr, and markers were placed on the aircraft windows to delineate a strip width of 500 m on each side of the aircraft. The pilot maintained altitude using an aircraft altimeter. No correction factor was used for missed or over-counted animals due to inability to maintain survey altitude due to steep terrain. This type of terrain is rare on northwest Victoria Island, with most of the area being flat except for some rolling hills near Minto Inlet. Past surveys also did not have a correction factor and covered the same terrain with similar methods and would have similar biases. Observations within 500 m were considered 'on' transect. Muskoxen on transect were classified as adults or calves based on body size as calves are noticeably smaller than adult animals. All caribou observations (on or off transect) were classified as bulls, cows/young bulls, or calves. Mature bulls were identified by their antlers, and cows and young bulls were grouped as distinguishing them from the aircraft is more difficult. If necessary, the aircraft would leave the transect line to allow for classification of animals. Animals directly under the aircraft, and not visible from the side window, were considered 'off' transect as transect width were measured using the area visible to the observer from the side of the aircraft. Sightings of other wildlife were also recorded.

Movement data from collared caribou collected from 1987 to 1989 for Peary caribou and 1996 to 2005 for Dolphin-Union caribou were used to assign which survey blocks were utilized by each type of caribou (Gunn & Fournier, 2000; Nagy *et al.,* 2009c; Fig. 1).

Population estimates for adult caribou and muskoxen were calculated using a ratio method for unequal-sized units sampled without replacement (Krebs, 1999; Ecological Methodology, Version 7.0). Population estimates were calculated for the adult portion of the population because of the high variability of caribou calf production year-to-year and higher mortality rate in their first year (Larter & Nagy, 1999).

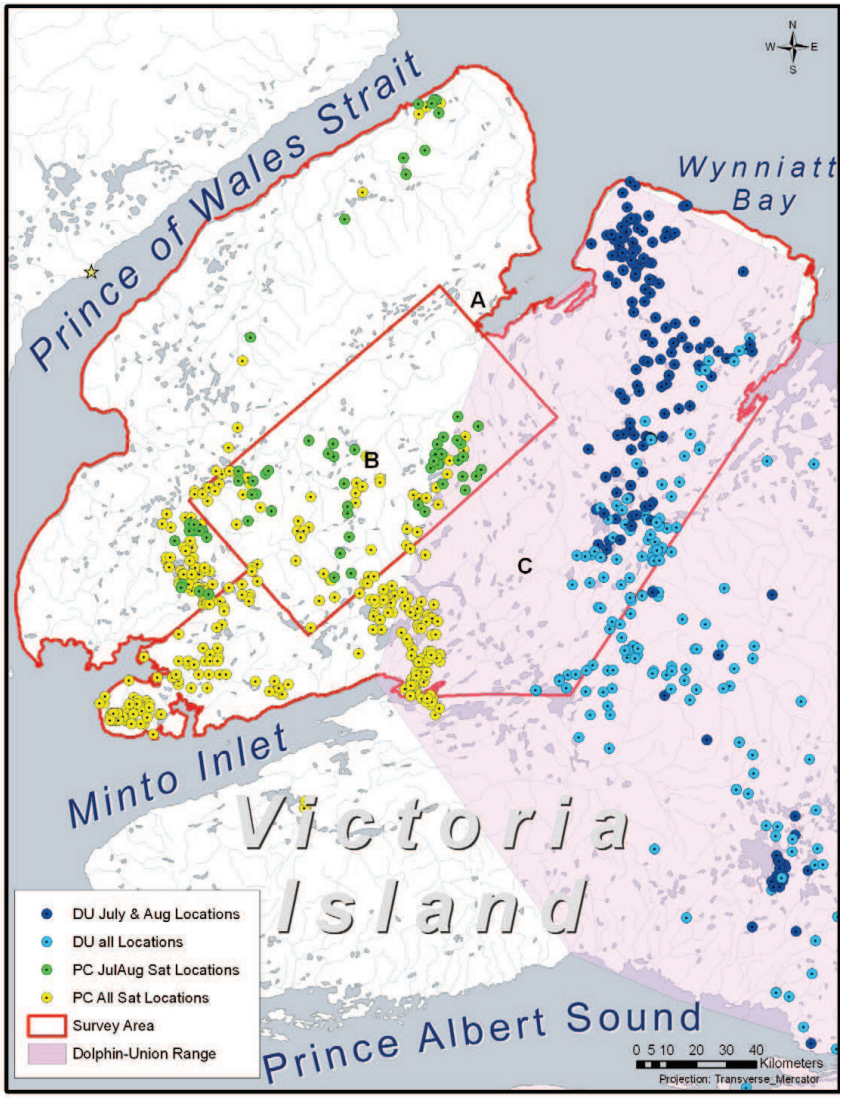

Fig. 1. Locations of collared Minto Inlet Peary caribou (PC) (1987 – 1989) and Dolphin-Union caribou (DU) (1996 – 2005) during the time of the survey (July-August) and throughout the year rest of the year (September – June: all locations). (Peary caribou data are from Gunn & Fournier [2000] and Dolphin-Union caribou data are from NWT & Nunavut [unpublished data])

This is also consistent with historic population estimates. A two-tailed t-test was used to determine if the population estimates of adult muskoxen and Peary caribou were significantly different from the 2005 estimates of Nagy et al. (2009a) for the same area, following statistical methods of Gasaway et al. (1986).

Results & Discussion

The survey was flown over 11 days between July 28th and August 15th, 2010. The survey was delayed intermittently by poor weather, and short line segments in the southwest end of Block A and northeast end of block C were missed due to fog (Fig. 2). The number of weather days increases the chance that caribou could have moved during the survey. There were 140 transects totalling 7155.7 km in length flown on the survey. With a transect width of 1 km this is a 19.9% coverage of the 36 021.2 km2 study area.

Caribou in blocks A and B were considered to be Peary caribou (Fig. 1). A total of 30 adult caribou and 4 calves were seen on transect in blocks A and B resulting in a population estimate of 150 ± 104 (95% Confidence Interval [CI], CV= 0.693) adult caribou for survey blocks A and B. The 2010 population estimate of adult Peary caribou is not significantly different than the 2005 estimate of 66 ± 61 ($t = 1.39$, $P < 0.05$, $df = 80$). The average group size for Peary caribou observed on transect was two animals with the largest group being six and the smallest group being one. The population trend for adult Peary caribou from 1998 – 2010 has been stable (Fig. 3).

Caribou observed in block C were considered to be of the Dolphin-Union herd (Nagy et al. 2009c; Fig.1). A total of 85 adult caribou and 14 calves were seen on transect in block C giving an estimate of 430 ± 214 (95% CI) adult Dolphin-Union caribou. However, these caribou represent only a small portion of the Dolphin-Union

herd; therefore historic counts do not represent population trend but just use of the study area. The average group size for Dolphin-Union caribou observed on transect was 2.4 animals with the largest group being nine and the smallest group being one. Caribou distribution was concentrated in the east side of the study area (Fig. 2).

There were a total of 2273 adult and 31 calf muskoxen seen on transect, yielding a population estimate of 11 442 ± 1637 (95% CI, CV=0.143) adult muskoxen. The 2010 population estimate of adult muskoxen is not significantly different than the 2005 estimate of 12 062 ± 2156 (t = -0.463, P < 0.05, df = 128) for this part of Victoria Island. However, the number of calf muskoxen seen in 2010 was lower than the number of calves in 2005 (321 calves). The average group size for muskoxen observed on transect was 6.4 animals with the largest group being 23 and the smallest group being one. Muskoxen were distributed throughout the study area, with the highest concentration on the western portion (Fig. 4). The population of muskoxen had declined between the 2001 and 2005 survey (Nagy *et al.*, 2009c; Fig. 5).

The results of the 2010 survey indicated that the population of Peary caribou on Northwest Victoria Island is not recovering further from its low in the 1990s. It is not known the reason for this lack of recovery; however harvest is not a factor. Although the population of muskoxen in the survey area is

Fig. 2. Transects flown during the 2010 survey and distribution of adult caribou found 'on' and 'off' transect on northwest Victoria island, NWT.

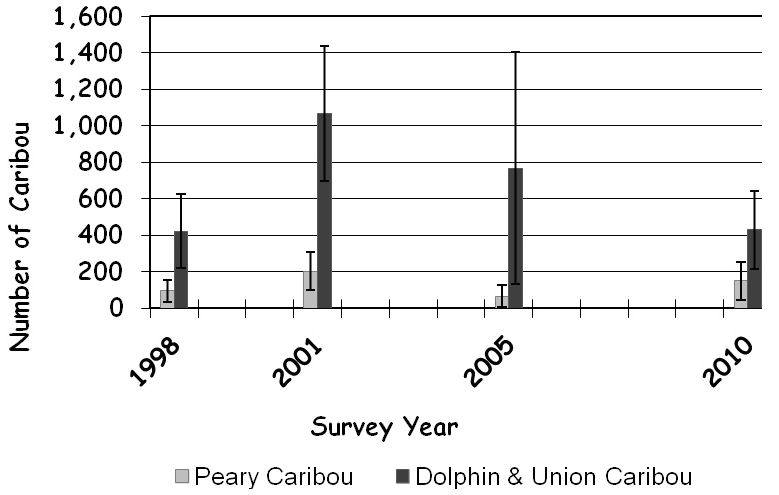

Fig. 3. Population counts of adult Minto Inlet Peary caribou and Dolphin-Union caribou on northwest Victoria Island, NWT with 95% confidence intervals around the population estimates.

Fig. 4. Transects flown during the 2010 survey and distribution of adult muskoxen found 'on' transect on northwest Victoria Island, NWT.

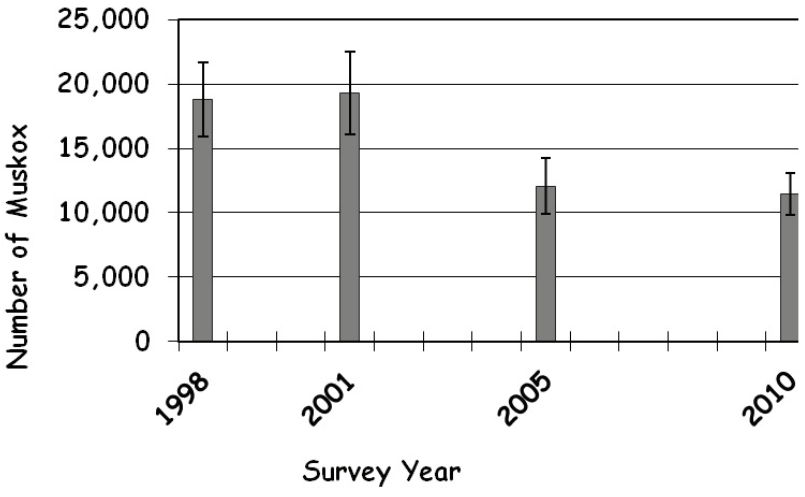

Fig. 5. Population trend of adult muskoxen on northwest Victoria Island, NWT, with 95% confidence intervals around the population estimates.

stable from the 2005 estimate, the low number of calves observed is a concern with possible implications for the population in further years.

Acknowledgments

The authors would like to thank Allan Pogotak (Ulukhaktok) for his assistance as an observer and Perry Linton (North-Wright Airways Ltd.) for piloting the fixed-wing aircraft. This study was jointly funded by Inuvialuit Wildlife Studies Funds, Polar Continental Shelf Program, and Environment and Natural Resources.

References

Gasaway, W.C., DuBois, S.D., Reed, D.J. & Harbo, S.J. 1986. Estimating moose population parameters from aerial surveys. — *Biological Papers of the University of Alaska* 22: 1-108.

Gunn, A. & Fournier, B. 2000. *Caribou Herd Delineation and Seasonal Movements Based on Satellite Telemetry on Victoria Island* 1987-89. Department of Resources, Wildlife, and Economic Development, Government of the Northwest Territories, Yellowknife. File Report 125. 104pp. http://www.enr.gov.nt.ca/_live/documents/content/Caribou_Herd_Delimitation.pdf.

Gunn, A. 2003. *The De-*

cline of Caribou on Northwest Victoria Island 1980-93. Department of Resources, Wildlife, and Economic Development, Government of the Northwest Territories, Yellowknife. File Report 133. 60pp. http://www.enr.gov.nt.ca/_live/documents/content/Decline_of_Caribou_on_Northwest_Victoria_Island_1980%e2%80%9393.pdf.

Jakimchuk, R.D. & Carruthers, D. 1980. *Caribou and Muskoxen on Victoria Island, N.W.T.* Prepared for Polar Gas Project, R.D. Jakimchuk Management Associates Ltd., Sidney, BC. 93pp.

Jenkins, D.A., Campbell, M., Hope, G., Goorts, J. & McLoughlin, P. 2011. *Recent Trends in Abundance of Peary Caribou (Rangifer tarandus pearyi) and Muskoxen (Ovibos moschatus) in the Canadian Arctic Archipelago, Nunavut.* Department of Environment, Government of Nunavut, Pond Inlet, Wildlife Report 1. 184pp. http://env.gov.nu.ca/sites/default/files/2_pc_mxreport_june10_2011_v2.pdf.

Krebs, C. J. 1999. *Ecological Methodology.* Second edition. Benjamin/Cummings, Menlo Park, CA. 620pp.

Larter, N.C. & Nagy, J.A. 1999. *Sex and Age Classification Surveys of Peary Caribou on Banks Island, 1982-1998: A Review.* Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Inuvik. Manuscript Report 114. 31pp. http://www.enr.gov.nt.ca/_live/documents/content/sex_age_classification_peary_caribou.pdf.

Nagy, J.A., Larter, N. & Wright, W.H. 2009a. *Population Estimates for Peary Caribou (Minto Inlet Herd), Dolphin and Union Caribou, and Muskox on Northwest Victoria Island, NT, July* 1998. Department of Environment and Natural Resources, Government of the Northwest Territories, Inuvik and Fort Simpson. Manuscript Report 201. 29pp. http://www.enr.gov.nt.ca/_live/documents/content/201_manuscript.pdf.

Nagy, J.A., Gunn, A. & Wright, W.H. 2009b. *Population Estimates for Peary Caribou (Minto Inlet Herd), Dolphin and Union Caribou, and Muskox on Northwest Victoria Island, NT, July* 2005. Department of Environment and Natural Resources, Government of the Northwest Territories, Inuvik and Yellowknife. Manuscript Report 203. 39pp. http://www.enr.gov.nt.ca/_live/documents/content/203_manuscript.pdf.

Nishi, J.S. & Buckland, L. 2000. *An Aerial Survey of Caribou on Western Victoria Island (5-17 June* 1994). Department of Resources, Wildlife, and Economic Development, Government of the Northwest Territories, Kugluktuk, NU and Yellowknife, NT. File Report 128. 88pp. http://www.enr.gov.nt.ca/_live/documents/content/Aerial_Survey_of_Caribou.pdf.

