



ESTIMATING PEARY CARIBOU (*Rangifer tarandus pearyi*) AND MUSKOX
(*Ovibos moschatus*) NUMBERS, COMPOSITION AND DISTRIBUTIONS ON
THE HIGH ARCTIC ISLANDS OF NUNAVUT

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SUMMARY REPORT TO NUNAVUT CO-MANAGERS

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Title: Estimating Peary Caribou (*Rangifer tarandus pearyi*) and Muskox (*Ovibos moschatus*) Numbers, Composition and Distributions on Ellesmere Island, Nunavut.

Summary:

The scientific study of Peary caribou and Muskox on Nunavut's high arctic islands has been ongoing since May 2000. The data collected thus far on West Devon Island, Bathurst Island and Ellesmere Island are being analyzed and archived. The resulting file report will include a history of scientific study of Peary Caribou, the methods used during these studies, the population estimates of all surveys up to and including the 2006 Ellesmere survey, an analysis of satellite collar movement data, a resource selection analysis examining Peary caribou habitat, a summary of IQ collected by GN Biologists and an in-depth section pulling all aspects of the report into comprehensive management recommendations for the future study and continued co-management of Peary Caribou in Nunavut.

Observations of Peary Caribou during the 2005 and 2006 survey of Ellesmere Island yielded 100 adult males, 222 adult females, 32 young males, 34 yearlings, and 193 unclassified adults for a total of 581 animals. Over the same period 4916 adult muskox with 927 calves were observed across the Island. (Figures 1, 2, & 3). These observations represent only a minimum count as only a planned 10 to 20 percent of the land mass of Ellesmere Island was searched. As the observations discussed herein are only summary and require in-depth analysis, discussion as to the present and future status of Peary caribou on Ellesmere Island will be reserved until the final analysis is completed on or about January 2007.

Aerial surveys used to estimate muskox and caribou population status have been based on an adaptive method designed by Mike Ferguson (2000). The method uses a bell long ranger

rotary wing aircraft to follow two sets of line transects configured to increased coverage based on the observation of Peary caribou and or their sign. Observations were then collected using distance sampling techniques.

Background:

The Committee on Species of Endangered Wildlife in Canada (COSEWIC) recognized Peary caribou on the QEI as endangered. Since 1975, self-regulated harvesting restrictions by the Resolute Bay Hunters and Trappers Association (HTA) have prevented harvesting from causing the past population declines on Bathurst Island (BI) and Prince of Wales and Summerset Islands (PW/SI). Nevertheless, the Nunavut Land Claim Agreement provides Inuit with rights to harvest caribou up to their Basic Needs Level (BNL), unless the Total Allowable Harvest (TAH) is less. Although the Nunavut Wildlife Management Board (NWMB) has not yet established either BNL or TAH for these populations, the harvesting restrictions by the HTA recognize that the populations can not meet the needs of Inuit.

Reliable estimates of caribou population size, trends, recruitment and ecology are needed before sustainable TAHs may be established for Peary caribou on the QEI and PW/SI. Inuit have reported that seismic exploration in the High Arctic in the 1960s to 1970's was at least partially responsible for regional shifts in caribou distributions, and Inuit are concerned that future exploration and developments could have similar effects. No scientific studies were conducted that could have detected such shifts.

Both Peary caribou and muskox populations on Bathurst and nearby islands increased from the early 1980s until 1994 (e.g., almost 300 caribou in 1981 to about 3000 in 1994). During severe winters in 1995-97, high mortality of both species led to population crashes (reduced to 75 Peary caribou and 130 muskoxen in 1997). The Peary caribou population has begun to recover based on the 2001 estimate of 240, after a coordinated ground/aerial survey conducted jointly by DoE and the Resolute Bay HTA, as the initial effort in this multi-year research program. However, the muskox population has not shown any significant recovery based on the 2001 estimate of approximately 170 muskoxen.

Because of considerable alarm over this decline among individuals, a live capture and captive breeding program was attempted by the GNWT's Department of Resources, Wildlife and Economic Development (DRWED) in November 1998, but the capture failed due to inadequate light and poor weather. The live capture and captive breeding program was again initiated by DRWED in August 1999 but was cancelled due to a general lack of support from the communities of Grise Fiord and Resolute Bay. Conservation and management credibility concerning these populations will continue to be closely scrutinized at all levels, from the local to the international.

Peary caribou on PW/SI declined from an estimate of 6300 in 1974 to only 10-35 in 1995. Inuit of Resolute Bay have doubted the accuracy of the 1996 estimate based on their own knowledge of these islands, but predicted and observed the decline before it was documented scientifically. IQ indicates that the decline was a natural and predicted occurrence caused by the impacts of overabundance in the 1970s and early 1980s. According to IQ the major mechanism of the decline was emigration. Inuit anticipate a long slow recovery of Peary caribou on these islands.

Concurrent with the major decline of Peary caribou on PW/SI, muskoxen have increased in abundance and have expanded their range throughout Somerset Island (SI), where they were not seen by either Inuit or biologists before the 1980s. In 1995, the number of muskoxen on Prince of Wales Island was estimated at about 5,250, up from about 1,125 in 1980. Only 29 muskoxen were seen on SI in 1980 and no estimate was made. In 1995, about 1,140 muskoxen were estimated to occur on SI. No surveys were conducted since 1995, but Inuit report that abundance and distribution of muskoxen have continued to increase on SI. Inuit are concerned that muskoxen are over-abundant on both islands and may be seriously affecting the vegetation. The HTA has requested that the muskox quota be significantly increased.

IQ suggests that increases of large muskox populations and a concurrent severe decline in co-habiting resident caribou populations, as on PW/SI, is historically a common occurrence in many parts of Nunavut, unless severe winters cause declines of both species. The Inuit of Resolute Bay seem uncertain of the causes of this inter-specific relationship, but are never the less concerned that an over abundant muskox population may prevent or delay any recovery of the PW/SI Peary caribou population.

The HTO of Resolute Bay has maintained their commitment to careful harvest management of Peary caribou and muskoxen by canceling community hunts of caribou on Bathurst and Cornwallis islands during 1997-99, and agreeing to DoE recommended harvests of caribou and a massive reduction of the Bathurst Island muskox quota from 40 to 5. Despite an annual quota of 40, Resolute Bay harvested very few muskoxen on Bathurst Island from 1997 to 2003 (e.g., 3 in each of 1998-99 and 2001-02 and none in 1999-2000 and 2000-01). The HTOs and elders of Resolute Bay apparently view recent declines on these islands as natural events that they had anticipated.

The HTO of Grise Fiord has reported evidence that Peary caribou may have been increasing on southern Ellesmere and nearby islands in recent years. As well, Peary caribou have been reported as relatively common on Axel Heiberg Island by various sources. The evidence could also suggest that caribou are re-distributing themselves into areas that have been unoccupied for 15-25 years. Adequate delineation and estimates of caribou and muskoxen populations have not yet occurred on the eastern QEI but are planned for April/may 2007/08.

The controversy over pending quota reductions, inadequate surveys, and associated appropriate conservation and management actions, have made communications with local communities difficult. The Department of Environment (DoE) has/is proceeding to re-establish a cooperative rapport at the local level, while advocating an effective conservation and research program that has been reviewed by the scientific and local Inuit communities, and has received support at the national and international levels.

Application of Results:

The application of project results will lead to the refinement of an IQ and scientifically based management plan for High Arctic Island Peary Caribou and Muskox in Nunavut and a resulting adjustment in TAH's (as study results deem appropriate for conservation) to ensure

the conservation of Peary caribou throughout the High Arctic Islands. In the instance that Peary Caribou become listed as endangered under SARA, these management plans will be also used as recovery plans, a requirement under the SARA process if the avoidance of a moratorium is to be justified under this federal Act.

Study Area:

Ellesmere Island is the second largest of Nunavut's Islands and the largest of Nunavut's High Arctic Islands. The completion of the proposed Peary caribou population/populations assessment is expected by April/May 2007/08.

Project Design:

The population survey of Peary caribou and Muskox on Ellesmere in April/May 2005 and 2006 was modeled after those previously developed using joint ground-aerial surveys on the south-central QEI. During the ground portion of the survey hunters delineated specific areas not occupied and occupied by Peary caribou, based on observations of recent tracks, foraging sites and animals, within watershed boundaries and topographic elevations. This information was communicated to the DoE rotary-wing crew who, depending on the result either excluded or surveyed the identified areas (assuming an effective 500 m strip width). In areas too rugged for the ground crew to access the rotary wing crew flew a recon style survey at 20% coverage and increased the coverage to 40% if signs of caribou were detected. The rotary-wing aerial survey was flown using a Bell 206L helicopter. To maximize accurate detection an air speed of 130 K/hr was targeted though, due to the rugged nature of the terrain a range of 110 to 150 Km/hr was, at times, realized. Altitude was kept at between 400 and 500 ft AGL though in areas of extreme ruggedness ranges from 200 to 800 feet were observed, over peaks and valleys respectively, in order to maintain crew safety. East-west transects were followed along latitudinal lines entered into a GPS and followed by the pilot. The distance that animal groups were from each transect was determined using the GPS cross-track error function (or off-transect distance) initially then verified using GIS software. All groups without calves were approached to sex and age individuals. The software, Distance 4.0 is being used to obtain the population estimate that provides the best model fit with the data.

During the rotary-wing survey scat (fresh frozen tissue in the case of dead animals) was collected for genetic analysis. No dead and/or dying caribou were observed during the aerial survey though the ground survey recovered tissue from 4 dead caribou of uncertain age and sex over 2005 and 2006 ground surveys.

Results:

The 2005/2006 Ellesmere Peary Caribou and Muskox survey was successfully completed June 1st/ 2006. Approximately 280 hours were flown on transect and an estimated 25,000 to 35,000 statute miles covered while flying along randomly pre-determined transect lines (Figure 1). Observations of Peary Caribou yielded 100 adult males, 222 adult females, 32 young males, 34 yearlings, and 193 unclassified adults for a total of 581 animals. Relative

abundance was greatest over Graham Island and the Northwest portions of the Island (Figure 2, 3). Over the same period 4916 adult muskox with 927 calves were observed across the Island (Figure 2, 4). These observations represent only a minimum count as only a planned 10 to 20 percent of the land mass of Ellesmere Island was searched. Generally caribou were not found in areas of high muskox densities nor were muskox generally found in areas of high caribou densities, findings that will be analyzed in detail in the coming months. Of note was the extremely poor condition of all age classes of musk in May 2005. Animals in too poor a condition to stand or run were observed frequently and over 40 emaciated recently dead carcasses were observed throughout the survey area. Reports of poor muskox condition were also described by the hunters of Grise Fiord over the same period. All dead carcasses of muskox observed were sampled for genetic studies. In contrast during April/May 2006 both caribou and muskox were found to be in good to excellent condition across the survey area.

As weather conditions during the month of April and much of May 2006 were clear and relatively calm, ungulate sign was persistent over periods of weeks. Under these conditions it was apparent that neither caribou nor muskox were traveling to any extent. All track evidence seems to indicate that animals remained within localized watersheds throughout much of the winter. Only rarely were long distance movements apparent between watersheds. Though weather conditions were not as stable during May 2005, evidence of long-term occupation of watersheds was also apparent when comparing hunter mid-winter observations to rotary wing late winter findings.

As the observations discussed herein are only summary and require in-depth analysis, discussion as to the present and future status of Peary caribou on Ellesmere Island will be reserved until the final analysis is completed. Of additional interest was the observation of a Peary caribou that had fallen into a crevasse an Albino muskox in the Eureka area and curious wolves that came right into re-fuelling sites (Figure 5, 6).

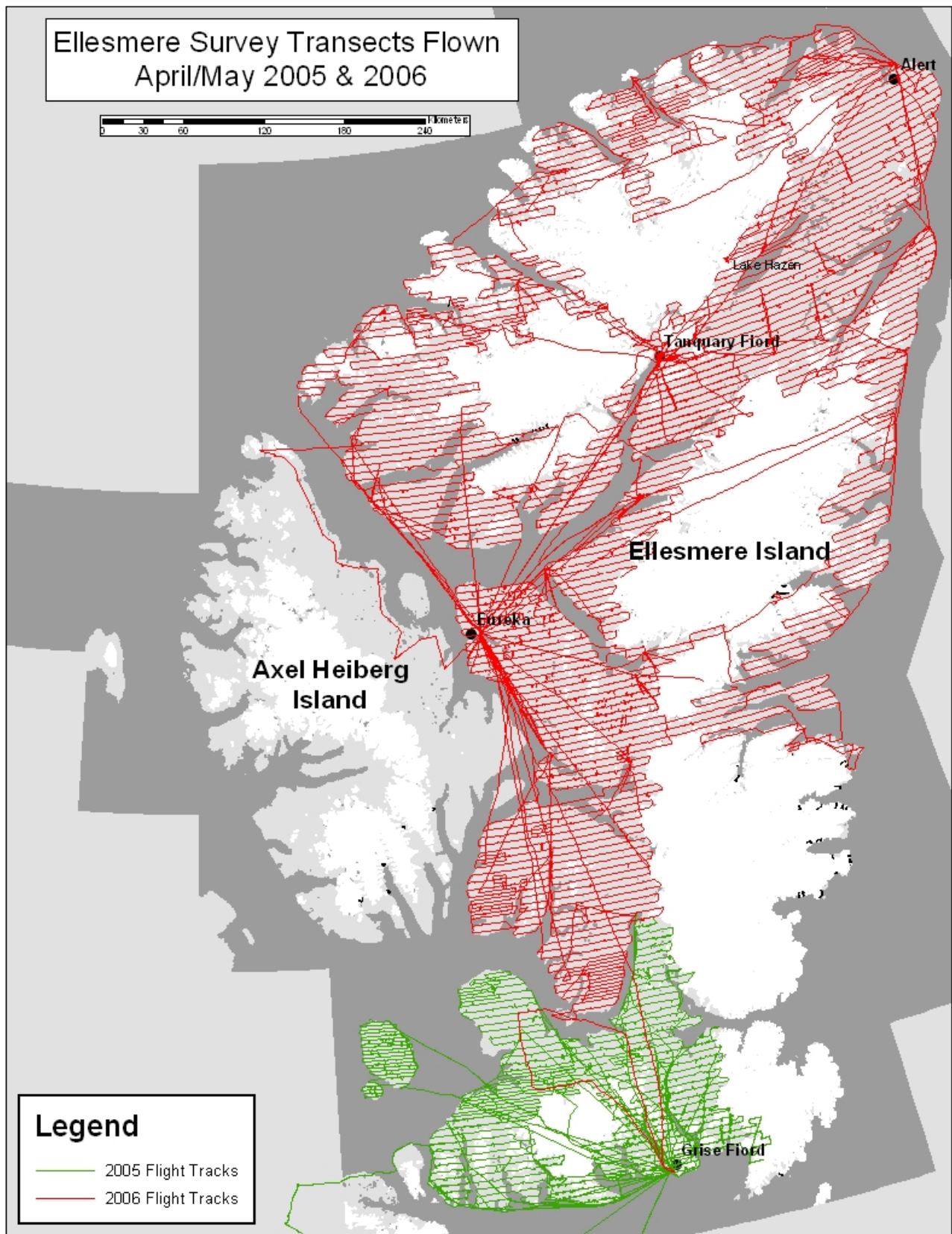


Figure 1 The flight paths of the 2005 and 2006 Ellesmere Peary Caribou & Muskox survey. Flight paths followed pre-determined transect lines.

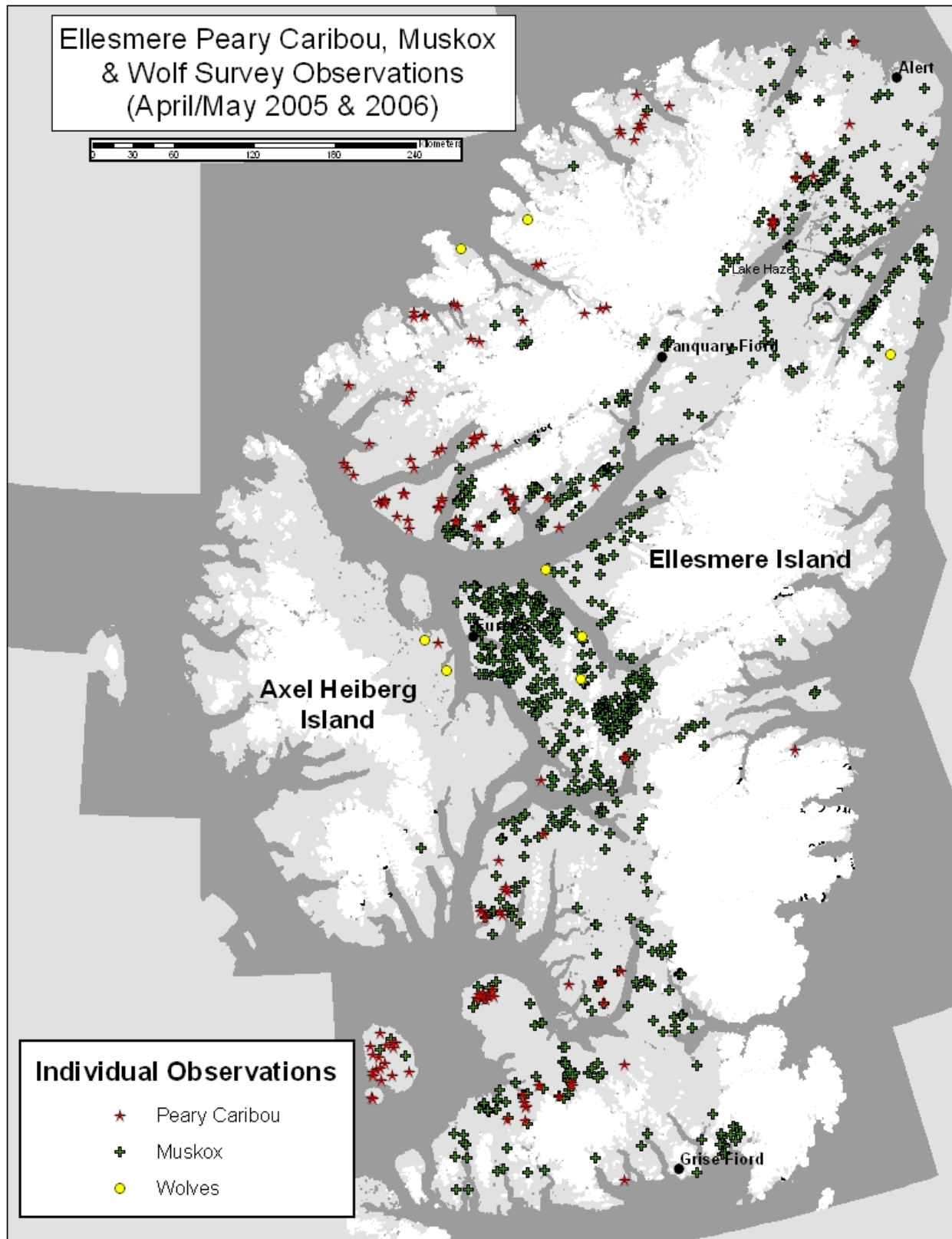


Figure 2 Observed distributions of Peary Caribou, Muskox and Wolves on Ellesmere Island over April/May 2005 & 2006.

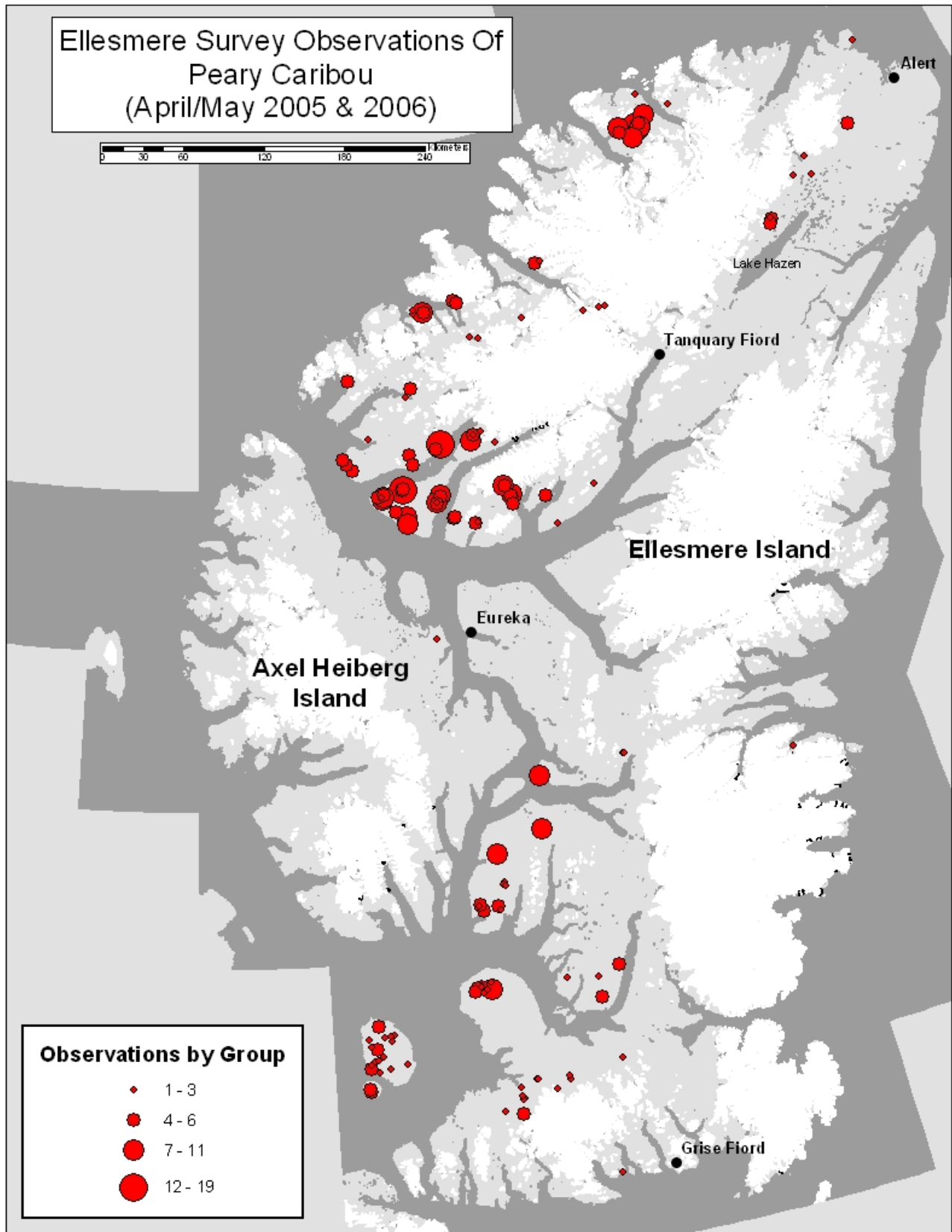


Figure 3 Observed distributions and relative abundance of Peary caribou on Ellesmere Island in April/May 2005 & 2006..

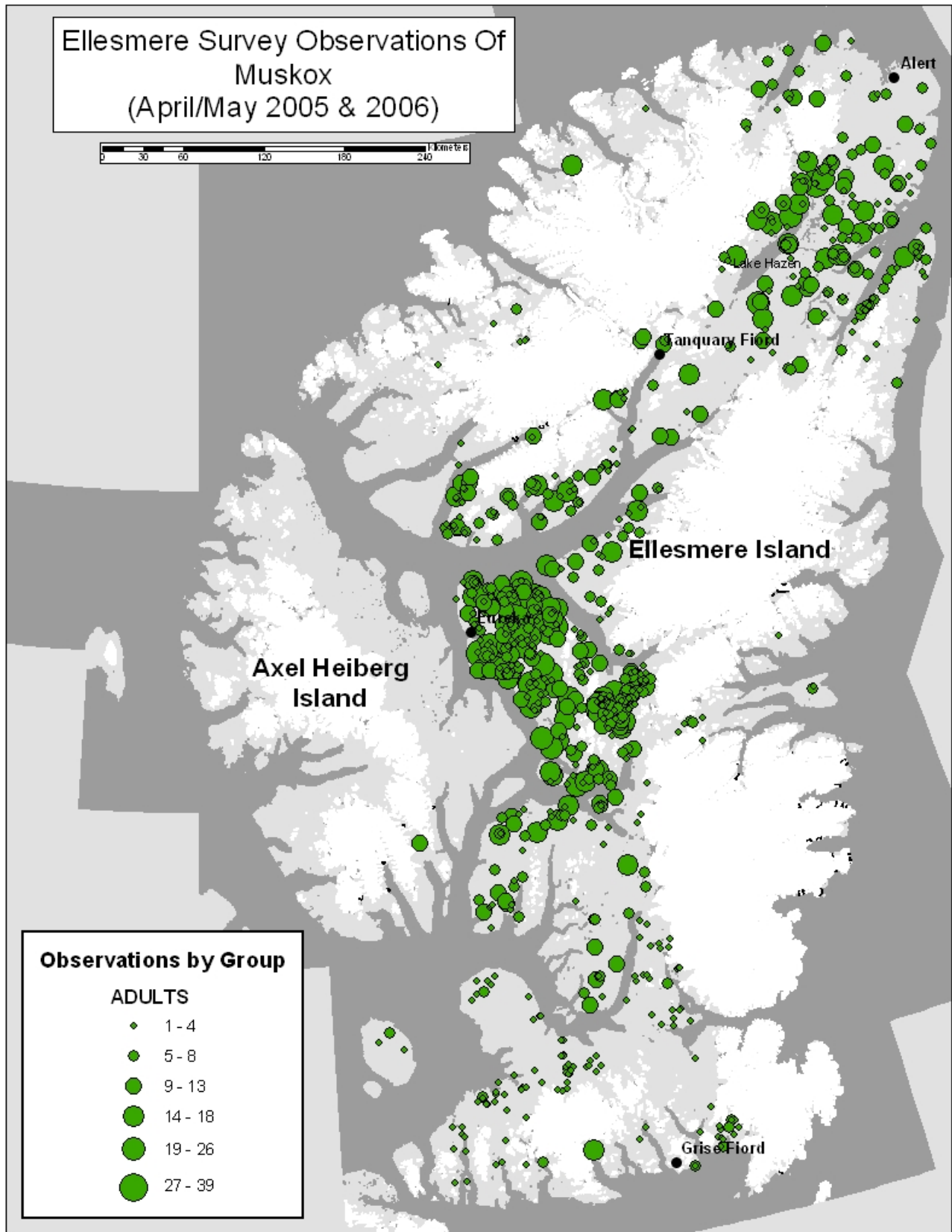


Figure 4 Observed distributions and relative abundance of Peary caribou on Ellesmere Island in April/May 2005 & 2006..



Figure 5 Top-An albino muskox near Eureka, Bottom-Fueling within sight of Greenland.



Figure 6 Top-A Peary Caribou in a crevasse near Tanquery Fiord, Bottom- Visitors at a fuel cache near the Agassiz Ice Cap.

Management Implications:

Management implications will be discussed following an in-depth analysis of this summary data.

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Partners:

The proposed studies would be a cooperative effort between the Department of Environment, Parks Canada, Agriculture Canada, Polar Continental Shelf Project, the Resolute Bay and Grise Fiord HTO's and the NWMB.