

**OBSERVATIONS OF WILDLIFE ON ELLESMORE  
AND AXEL HEIBERG ISLANDS  
BETWEEN JUNE 12-21, 1995**

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## ABSTRACT

An aerial survey of central Ellesmere Island and Axel Heiberg Island was conducted between June 12-21, 1995. This survey was done as part of the Department of National Defence's (DND) gravity survey flights and provided an opportunity to determine wildlife distribution in this area.

1196 muskox and 38 caribou were seen on Ellesmere Island and 165 muskox and 25 caribou were seen on Axel Heiberg Island. Caribou were found on Forsheim, Raanes, and Svendsen peninsulas and muskoxen were found on Forsheim and Svendsen peninsulas.

We cannot determine a total population estimate using these figures as the survey was not done systematically. Comparison of results with previous surveys is difficult because of differences in areas covered, survey techniques used and survey intensities between surveys. We can conclude, however, that caribou numbers appear to have declined on Ellesmere and Axel Heiberg Islands as they have elsewhere on the arctic islands, but that muskox and caribou continue to be found in those areas where they have previously been found in the highest densities.



## TABLE OF CONTENTS

|                            |     |
|----------------------------|-----|
| ABSTRACT                   | iii |
| LIST OF FIGURES            | vii |
| LIST OF TABLES             | xi  |
| INTRODUCTION               | 1   |
| METHODS                    | 2   |
| RESULTS                    | 3   |
| Muskoxen                   | 3   |
| Dead Animals               | 8   |
| Peary Caribou              | 11  |
| Other Wildlife             | 13  |
| Arctic Hare                | 13  |
| Other Land Mammals         | 15  |
| Snow Geese                 | 15  |
| Sea Mammals and Sea Birds  | 15  |
| Miscellaneous Observations | 18  |
| Old Fuel Caches            | 18  |
| Tent Rings - Buildings     | 18  |
| DISCUSSION                 | 22  |
| ACKNOWLEDGEMENTS           | 24  |
| PERSONAL COMMUNICATIONS    | 25  |
| LITERATURE CITED           | 26  |
| APPENDIX A                 | 27  |



## LIST OF FIGURES

|                  |   |    |
|------------------|---|----|
| <b>Figure 1.</b> | Flight lines over Ellesmere and Axel Heiberg islands and gravity stations visited (*) between June 12-21, 1995. . . . .   | 4  |
| <b>Figure 2.</b> | Main areas of wildlife observations recorded during the June 12-21, 1995 gravity survey flights over central Ellesmere and Axel Heiberg islands. ACE: Axel-Central East, AEG: Axel-East Glacier, ALF: Axel-Li Fiord, AXF: Alexandra Fiord area, CNF: Cañon Fiord area, CKP: Cook-Bache-Knud peninsulas, FSP: Fosheim Peninsula-Sawtooth Range, RNP: Raanes Peninsula, STF: Strathcona-Bay fiords, SVP: Sverdrup Pass, SVV: Svendsen Peninsula-Vendom Fiord. . . . . | 5  |
| <b>Figure 3.</b> | Adult muskoxen on Ellesmere and Axel Heiberg islands recorded during the June 12-21, 1995 gravity survey flights. . . . .   | 7  |
| <b>Figure 4.</b> | Animal tracks and faeces encountered on Ellesmere and Axel Heiberg islands during the June 12-21, 1995 gravity survey flights: unknown tracks in snow (♦), with direction (↑); fresh muskox tracks and/or faeces (MO); arctic fox track (AF); polar bear track (PB; pers. comm.). . . . .   | 9  |
| <b>Figure 5.</b> | Dead muskoxen encountered (●) during the June 12-21, 1995 gravity survey flights over Ellesmere and Axel Heiberg islands, or reported through personal communications (○). One animal was sampled and identified with lab. # EL-95-01. A "?" was used for uncertain sightings. . . . .  | 10 |
| <b>Figure 6.</b> | Adult Peary caribou and calves (+1) seen (boxed numbers) or reported through personal communications (non-boxed numbers) on Ellesmere and Axel Heiberg islands between June 12-21, 1995 during gravity survey flights. . . . .  | 12 |
| <b>Figure 7.</b> | Number of arctic hares (boxed numbers) observed on Ellesmere and Axel Heiberg islands between June 12-21, 1995 during gravity survey flights. . . . .   | 14 |
| <b>Figure 8.</b> | Arctic fox (AF), eider ducks (ED), oldsquaw (OS), narwhals (NW), and seals (SL) recorded between June 12-21, 1995 during gravity survey flights over Ellesmere and Axel Heiberg islands. . . . .  | 16 |



## LIST OF TABLES

|          |   |    |
|----------|---|----|
| Table 1. | Adult muskoxen, caribou and arctic hares seen in different areas of central Ellesmere and Axel Heiberg islands between June 12-21, 1995. . . . .          | 6  |
| Table 2. | Number of drums at old fuel caches observed during the June 12-21, 1995 gravity survey flights over central Ellesmere and Axel Heiberg islands. . . . . . | 20 |



## INTRODUCTION

Between June 12-21, 1995, I flew on the Department of National Defence's (DND) gravity survey flights over central Ellesmere and Axel Heiberg islands. The objective was to gather information on wildlife distribution within DND's survey area. Extensive wildlife surveys have not been conducted over central Ellesmere Island since 1961 (Tener 1963, cited in Renewable Resources 1995).

The 1995 DND gravity survey was the last of a three-year program conducted by the Mapping and Charting Establishment (MCE) over the Yukon, Northwest Territories and British Columbia. It completed "one of the last voids of gravity on the Canadian landmass" (Maye 1995). This field operation, OP BOUGHER 95, was primarily sponsored by the Defence Mapping Agency and supported by the Geological Survey of Canada and the Geodetic Survey Division of Natural Resources Canada.

## METHODS

I recorded all the wildlife observations from the front seat of a Bell 206 Long Ranger helicopter as we flew 150-400 meters above ground level to a series of gravity stations located approximately 12 km apart. Altitude and speed of the aircraft were under control of the MCE crew. The flight route was traced on 1:250 000 topographic maps. Sightings of wildlife located within 1.6 km, and occasionally beyond, on both sides of the aircraft were numbered and recorded on the map. Latitudes and longitudes determined by the Global Positioning System (GPS) were recorded for 35% of locations. The helicopter pilot and MCE members provided sightings of wildlife from their sides of the aircraft. Additional wildlife information was obtained through personal communications with other pilots and other military personnel.

Number, sex/age (when possible) and approximate distance from the flight line of muskoxen, caribou, hares, foxes, wolves, geese, sea birds, sea mammals and dead animals were recorded. In addition, during the average 7 minutes spent on the ground at each gravity site, I scanned the area with binoculars and recorded any wildlife seen within about 0.5 km of the station. When time permitted, a general description of soil and vegetation around the station was also recorded. This latter information can be obtained from the field data book, and is available through the Regional Biologist, Renewable Resources, Pond Inlet.

Locations of old tent rings/camp sites and old fuel caches were also noted.

## RESULTS

We flew about 4 392 km (3 776 km over land & 616 km over glaciers) during June 12-21, 1995 covering central Ellesmere and Axel Heiberg islands. Flights were concentrated over the Fosheim, Raanes and Svendsen peninsulas, and Bache Peninsula and Alexandra Fiord area (Figures 1 and 2).

### Muskoxen

We saw a total of 1147 adults and 49 calves on central Ellesmere Island and 156 adults and 9 calves on east central Axel Heiberg Island (Table 1). Animals were mainly on coastal plains and interior vegetated valleys which were largely free of snow (Figure 3).

On central Ellesmere Island, muskoxen were mainly on Fosheim and Svendsen peninsulas and around Strathcona Fiord. We saw 57% (667 adults + 25 calves) of the animals southeast of Slidre Fiord and north of Eureka. Another 99 adults and 2 calves were south of Sawtooth Range, and 37 adults and 1 calf around Cañon Fiord. On June 15, we counted 24 adults, mostly lone animals, during a second trip through the Sverdrup Pass, east of Knud Peninsula. We did not see muskoxen in the Alexandra Fiord area or on Bache and Cook peninsulas, but encountered 2 adults and 1 calf on the north side

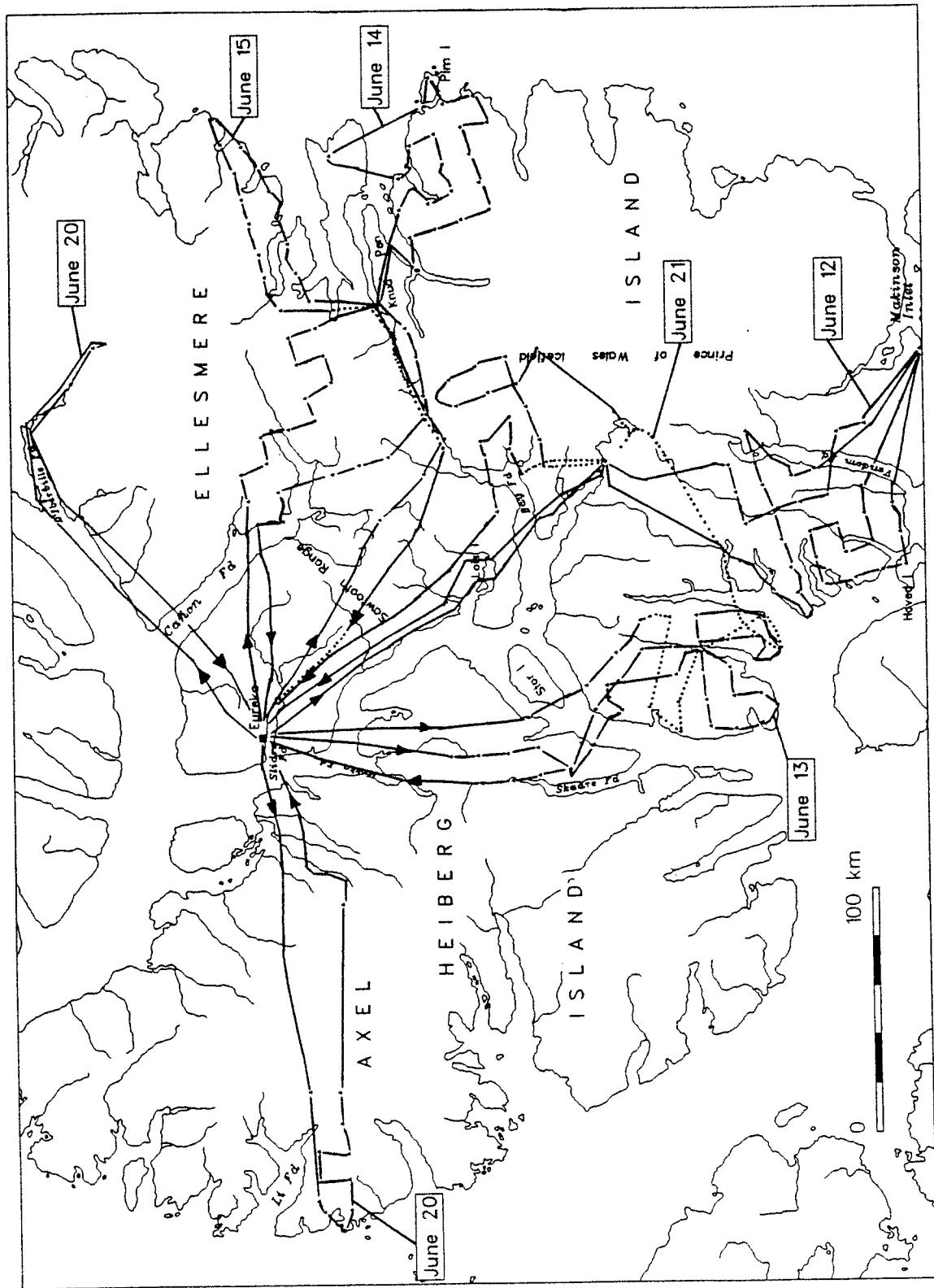


Figure 1. Flight lines over Ellesmere and Axel Heiberg islands and gravity stations visited (▲) between June 12-21, 1995.

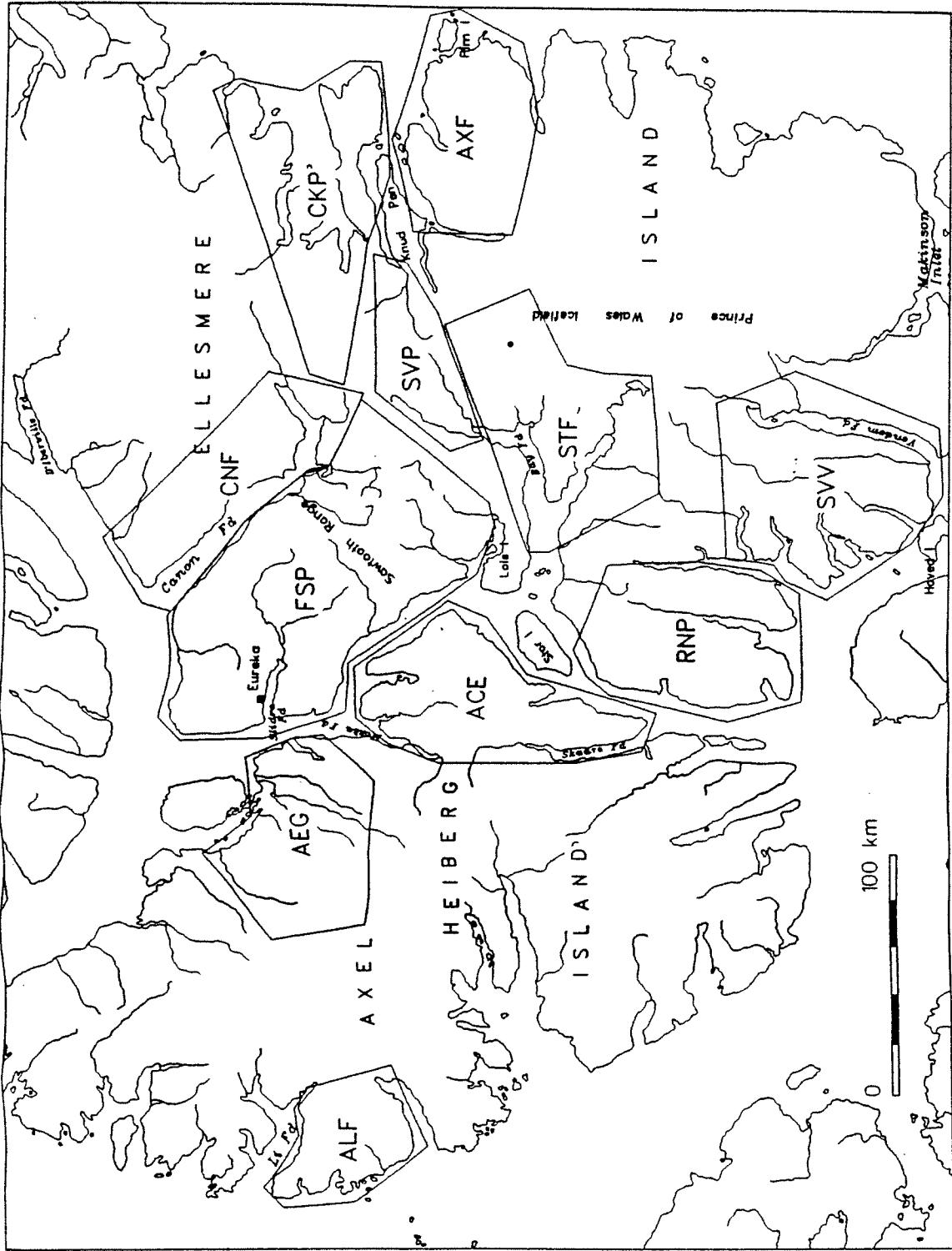
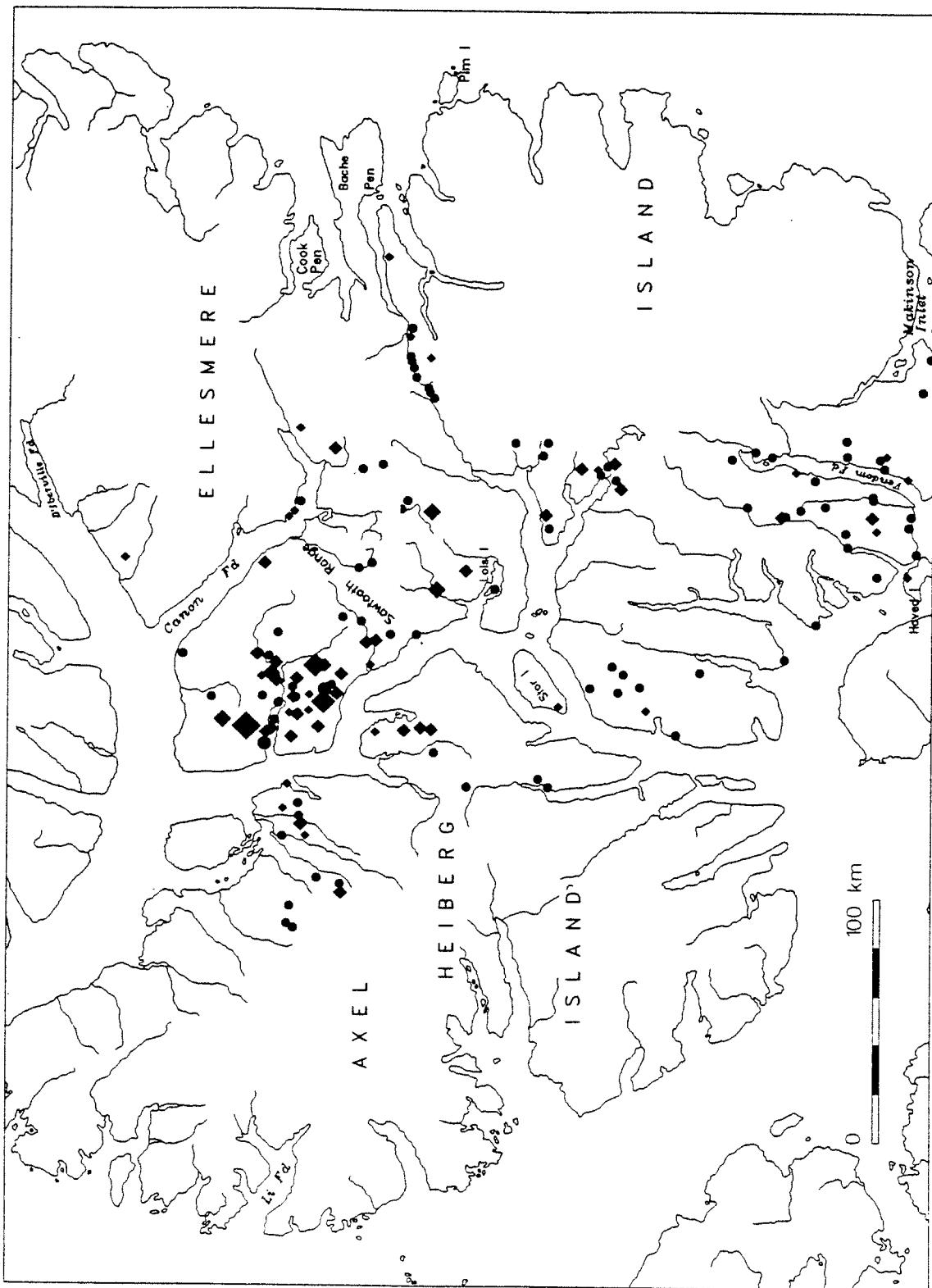


Figure 2. Main areas of wildlife observations recorded during the June 12-21, 1995 gravity survey flights over central Ellesmere and Axel Heiberg islands. ACE: Axel-Central East, AEG: Axel-East Glacier, ALF: Axel-Li Fjord, AXF: Alexandra Fiord area, CNF: Cañon Fiord area, CKP: Cook-Bache-Knud peninsula, FSP: Fosheim Peninsula-Sawtooth Range, RNP: Raanes Peninsula, STF: Strathcona-Bay fiords, SVP: Sverdrup Pass, SVV: Svendsen Peninsula-Vendom Fiord.

Table 1. Adult muskoxen, caribou and arctic hares seen in different areas<sup>1</sup> of central Ellesmere and Axel Heiberg islands between June 12-21, 1995.

| Code/Name of General Area        | MO  | PC | AH  |
|----------------------------------|-----|----|-----|
| <b><u>Ellesmere Island</u></b>   |     |    |     |
| FSP: Fosheim Pen.-Sawtooth Range | 790 | 11 | 99  |
| CNF: Cañon Fiord area            | 37  | 0  | 22  |
| CKP: Cook-Bache-Knud peninsulas  | 2   | 0  | 0   |
| SVP: Sverdrup Pass               | 24  | 0  | 1   |
| AXF: Alexandra Fiord area        | 0   | 0  | 0   |
| STF: Strathcona-Bay fiords       | 91  | 3  | 102 |
| RNP: Raanes Peninsula            | 47  | 11 | 1   |
| SVV: Svendsen Pen.-Vendom Fiord  | 142 | 12 | 24  |
| Makinson Inlet area              | 14  | 0  | 0   |
| <b><u>Axel Heiberg</u></b>       |     |    |     |
| ALF: Axel - Li Fiord             | 0   | 7  | 0   |
| AEG: Axel - East Glacier         | 46  | 4  | 42  |
| ACE: Axel - Central East         | 110 | 13 | 1   |

<sup>1</sup>Areas are shown on Figure 3.



Adult muskoxen on Ellesmere and Axel Heiberg islands recorded during the June 12-21, 1995 gravity survey flights. Total number of muskoxen in one area: 2-10 muskoxen (•); 11-25 (◆); 26-45 (◆); 55-60 (◆); and 120 (◆). Individual group of 1-10 muskoxen (•); and 11-22 (•).

Figure 3.

of Knud Peninsula. We observed several wide trails coming down the glacier south of Alexendra Fiord but the species of wildlife making these trails was not determined (Figure 4).

On east central Axel Heiberg Island, 110 adults and 7 calves were observed south and north of Mokka Fiord, and 46 adults and 2 calves east of the ice cap. In addition, 7, 6 and 6 adults respectively, were seen on Stor, Lois and Hoved Islands.

Mean group size was  $6.5 \pm 3.5$  (SD) for those groups with calves and  $4.4 \pm 3.5$  (SD) for those without calves. Calves were seen in 44 groups. 75% of those groups had only 1 calf. Eight groups had 2 calves and 3 groups had 3 calves. Groups were not circled so a large proportion of the calves may not have been seen.

#### Dead Animals

We encountered 3 muskoxen carcasses. One additional carcass was seen but the species was not determined (Figure 5). All carcasses were intact and lying on one side with legs outstretched. This suggests the cause of death was natural and may have occurred at anytime since late winter. One muskox skeleton was observed on a river bed on Bache peninsula.

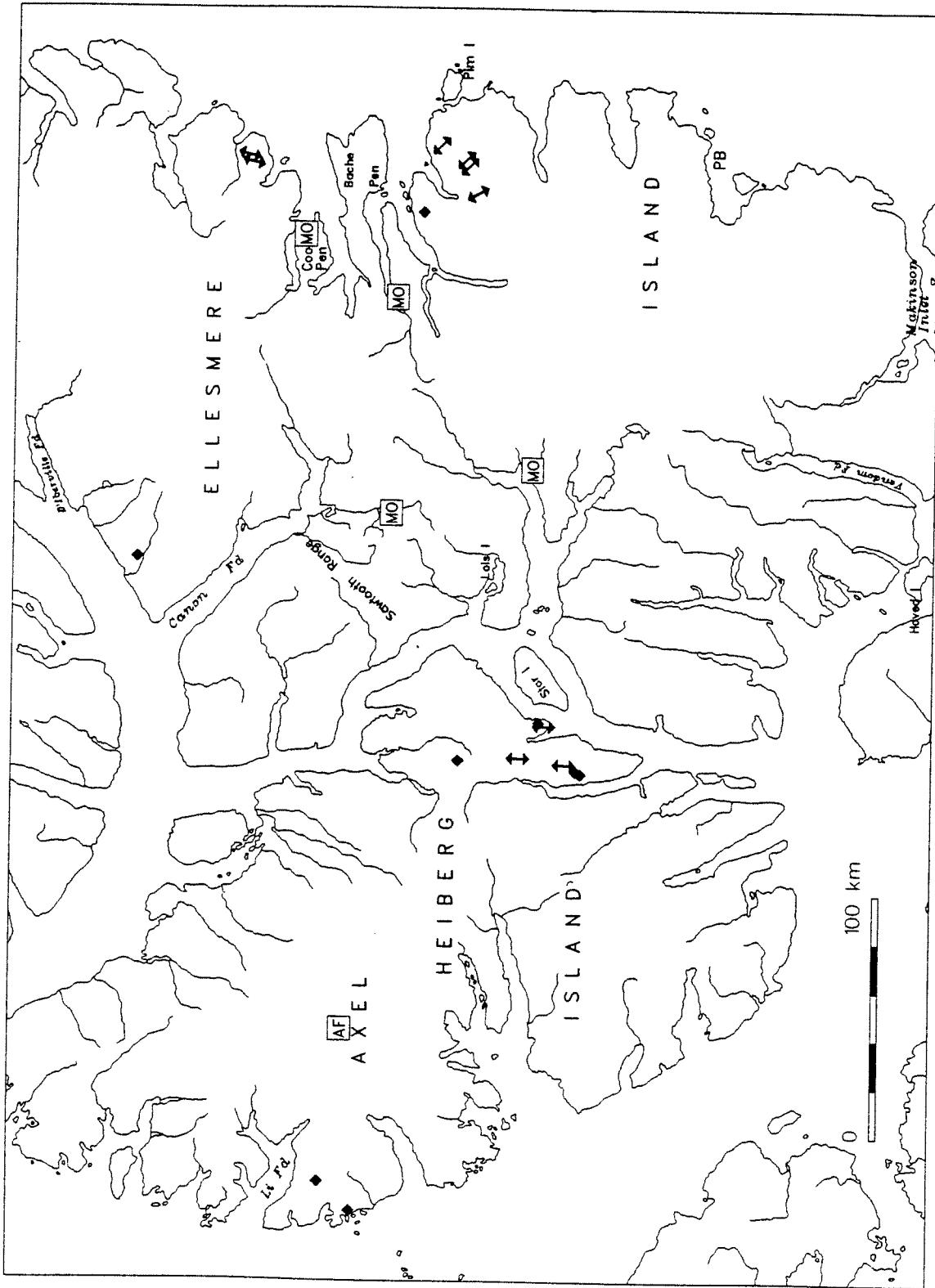


Figure 4. Animal tracks and faeces encountered on Ellesmere and Axel Heiberg islands during the June 12-21, 1995 gravity survey flights: unknown tracks in snow (▲), with direction (↑); fresh muskox tracks and/or faeces (MO); arctic fox track (AF); polar bear track (PB; pers. comm.).

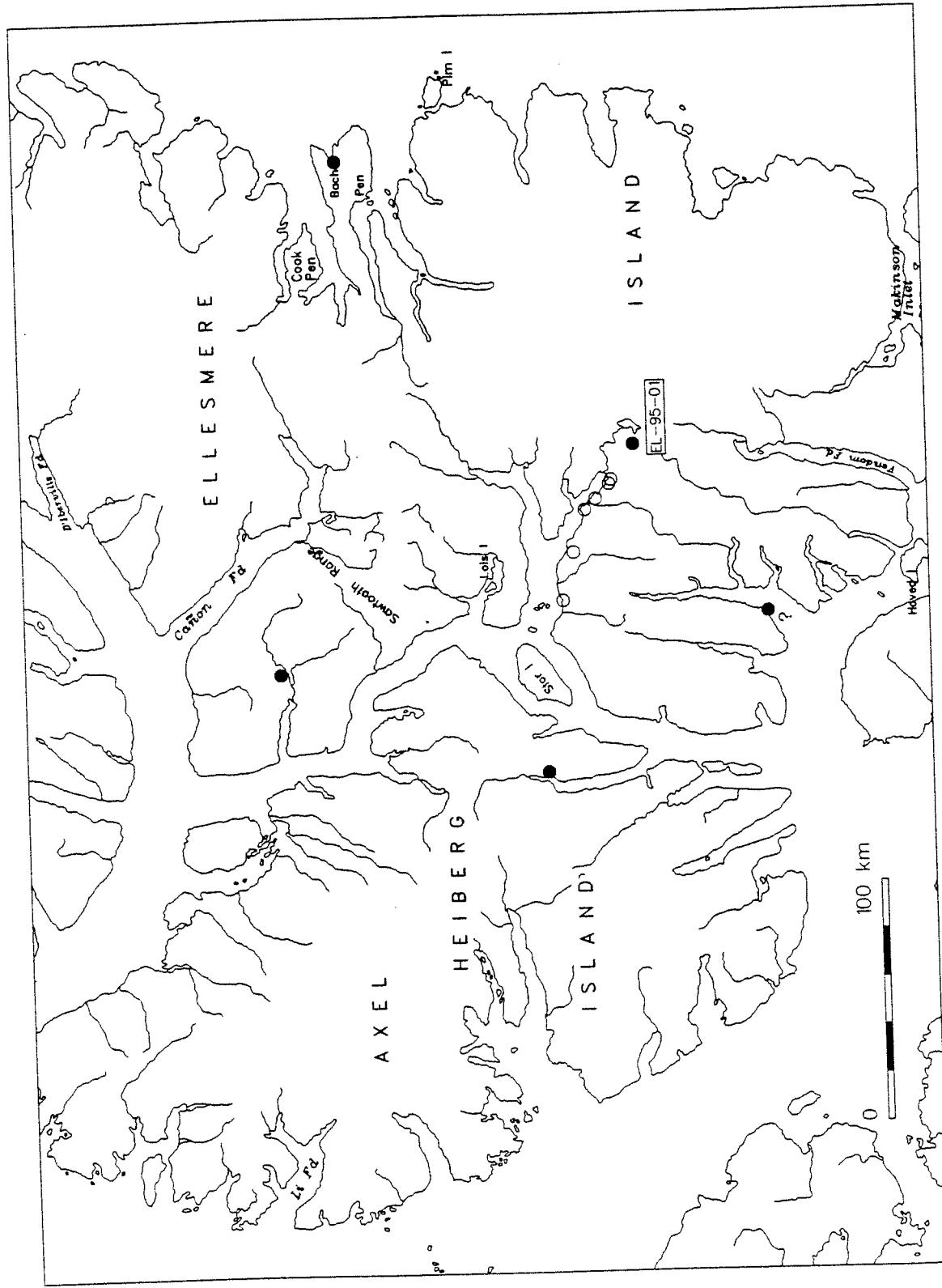


Figure 5. Dead muskoxen encountered (●) during the June 12-21, 1995 gravity survey flights over Ellesmere and Axel Heiberg islands, or reported through personal communications (○). One animal was sampled and identified with lab. # PL-95-01. A "?" was used for uncertain sightings.

We sampled one adult female (EL-95-01). We did not see any sign of scavengers around the carcass. Faecal samples, hind leg muscle and 1/2 of the lower jaw were sent to the Canadian Cooperative Wildlife Health Centre in Saskatoon for analysis. They noted no abnormalities. The bone marrow of the lower jaw contained abundant fat. *Yersinia pseudotuberculosis* was not cultured from the bone marrow of the mandible and ruled out as a cause of death. The protozoan parasite *Sarcocystis* sp., expected in wild ungulates, was present in the muscle. Faecal samples did not contain nematode larvae. The final laboratory report concluded the cause of death as unknown with no evidence of starvation.

Other pilots (D. Forgie pers. comm.) reported 6 additional dead muskoxen on the southwest shore of the Strathcona Fiord area in early June. They saw bones scattered around two carcasses suggesting they had been scavenged by foxes or wolves. The other 4 carcasses appeared untouched and their cause of death remains unknown.

#### Peary Caribou

We saw 42 adults and 2 calves on central Ellesmere and Axel Heiberg islands. Caribou were observed mainly on highlands on Fosheim, Raanes and Svendsen Peninsulas, and on the interior high grounds of central Axel Heiberg (Figure 6). Patchy snow cover 15-50% in these more elevated areas may have reduced sightability.

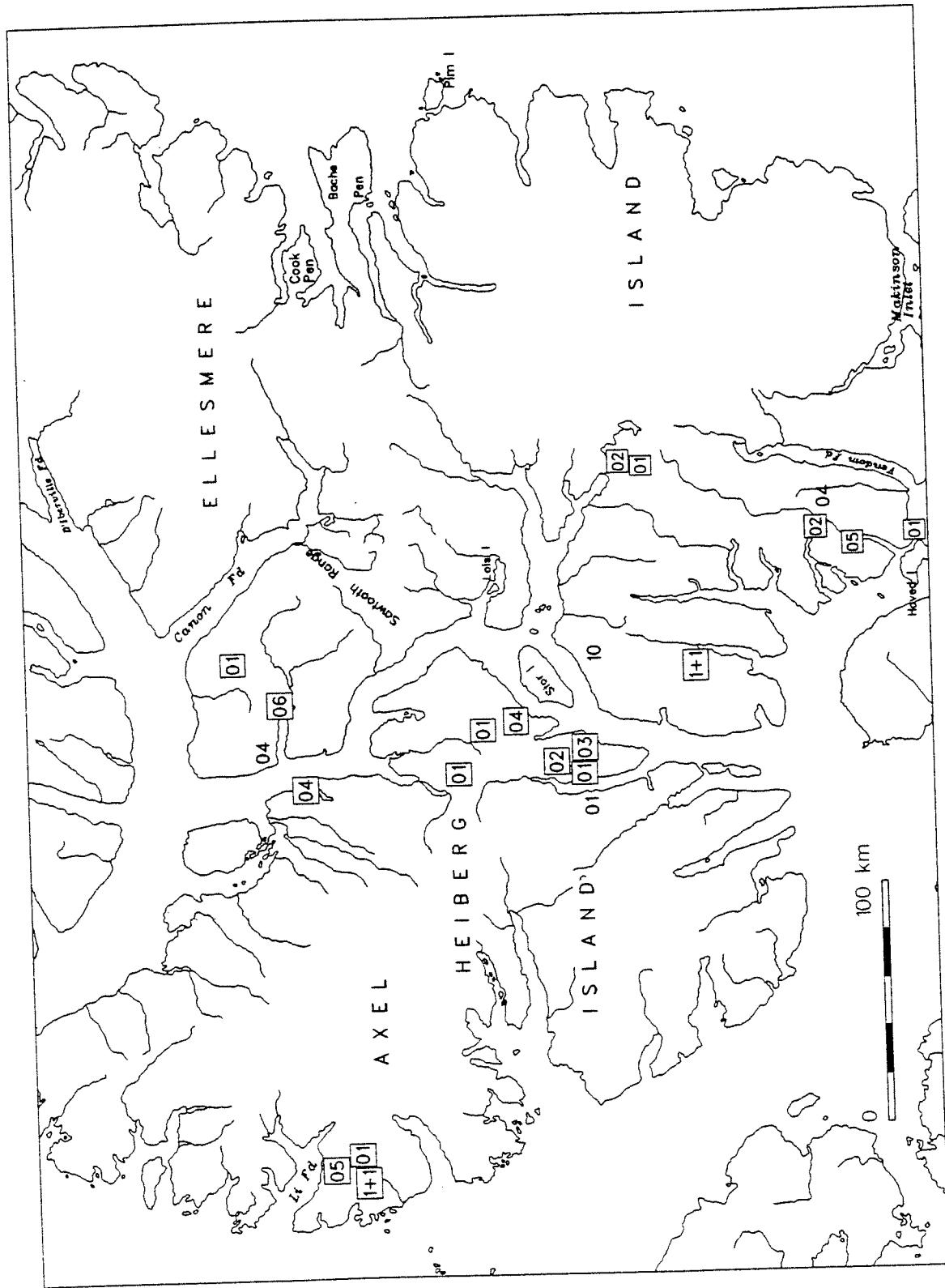


Figure 6. Adult Peary caribou and calves (+1) seen (boxed numbers) or reported through personal communications (non-boxed numbers) on Ellesmere and Axel Heiberg islands between June 12-21, 1995 during gravity survey flights.

On central Ellesmere Island we counted 19 adults and 1 calf. P. Maye and B. Todd (pers. comm.) reported sightings of 18 other caribou (Table 1).

We saw 23 adults and 1 calf on central Axel Heiberg. J. Serpell (pers. comm.) reported one additional adult. We observed 6 groups between Mokka and Skaare fiords, and 3 groups south of Li Fiord, on the west coast of the island.

#### Other Wildlife

##### Arctic Hare

We saw a total of 292 arctic hares. This is a minimal count since our attention was directed mostly to recording muskoxen and caribou. Groups of hares were seen mainly on top of rolling hills east of Eureka, south of Sawtooth range, in Strathcona Fiord area, and north of Mokka Fiord on Axel Heiberg (Table 1 and Figure 7).

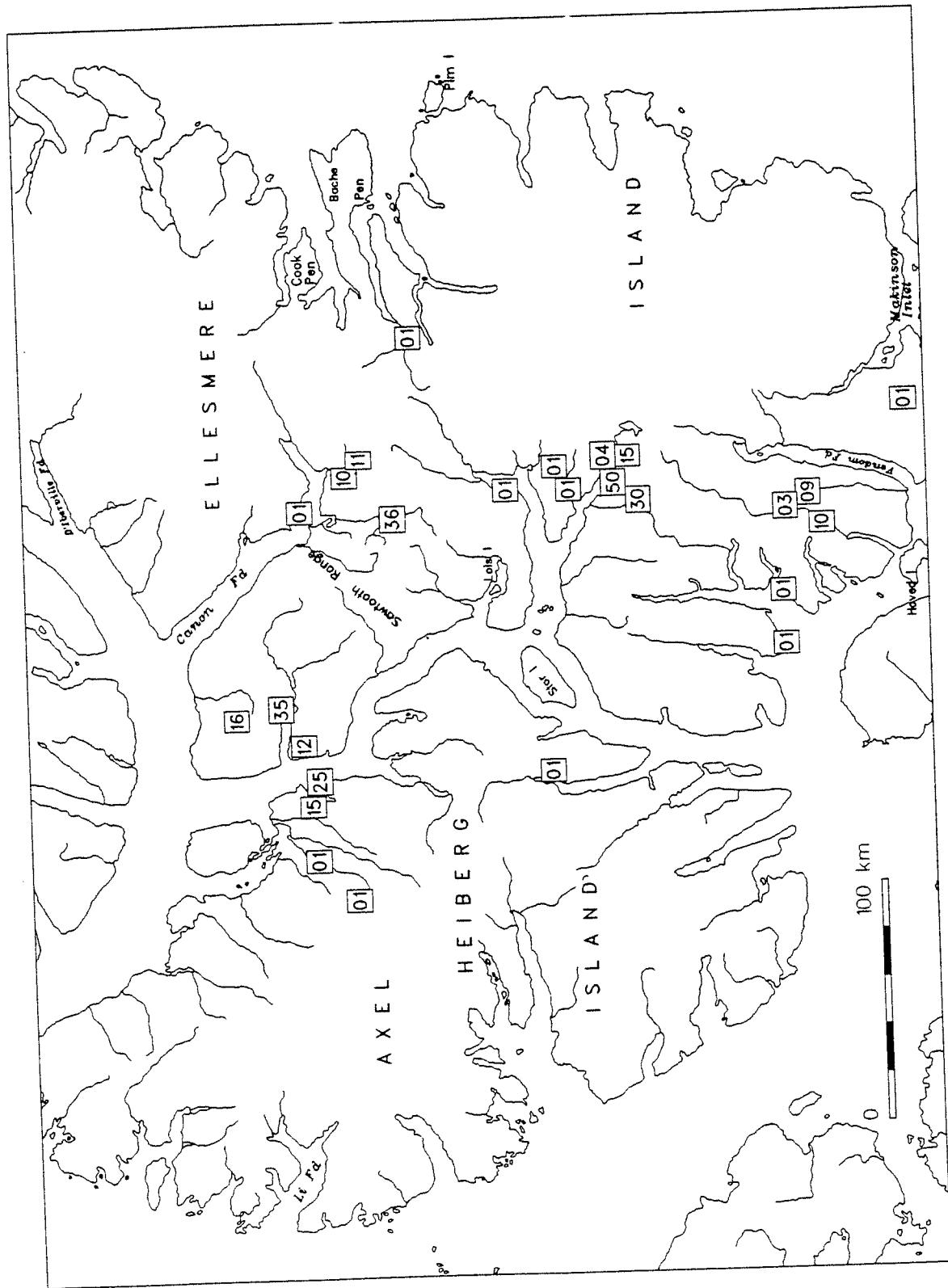


Figure 7. Number of arctic hares (boxed numbers) observed on Ellesmere and Axel Heiberg islands between June 12-21, 1995 during gravity survey flights.

Other Land Mammals

One arctic fox was observed south of Svendsen peninsula during our June 12 flight (Figure 8). Base personnel reported 3 arctic wolves around Eureka. On June 12, E. Quirion (pers. comm.) saw polar bear tracks in the Talbot Inlet area, east shore of Ellesmere Island (Figure 4).

Snow Geese

We counted a total of 148 adult geese (Figure 9). Only flying birds could be easily and rapidly recorded during the survey. Most groups were small consisting of a few pairs. Two larger flocks of geese were observed flying in valleys in the Bay Fiord area and on Raanes peninsula.

Sea Mammals and Sea Birds

During our flights we observed seals basking on the ice. The species of seal was not determined and observed numbers were not precise. We saw 6 seals south of Raanes Peninsula, 2 in the Vendom Fiord area, 1 in the Makinson Inlet area and 14 on the east side of Ellesmere Island, around Bache Peninsula (Figure 9). We observed a group of about 10-15 narwhals near Pim Island on June 14. At least one calf was present in the group.

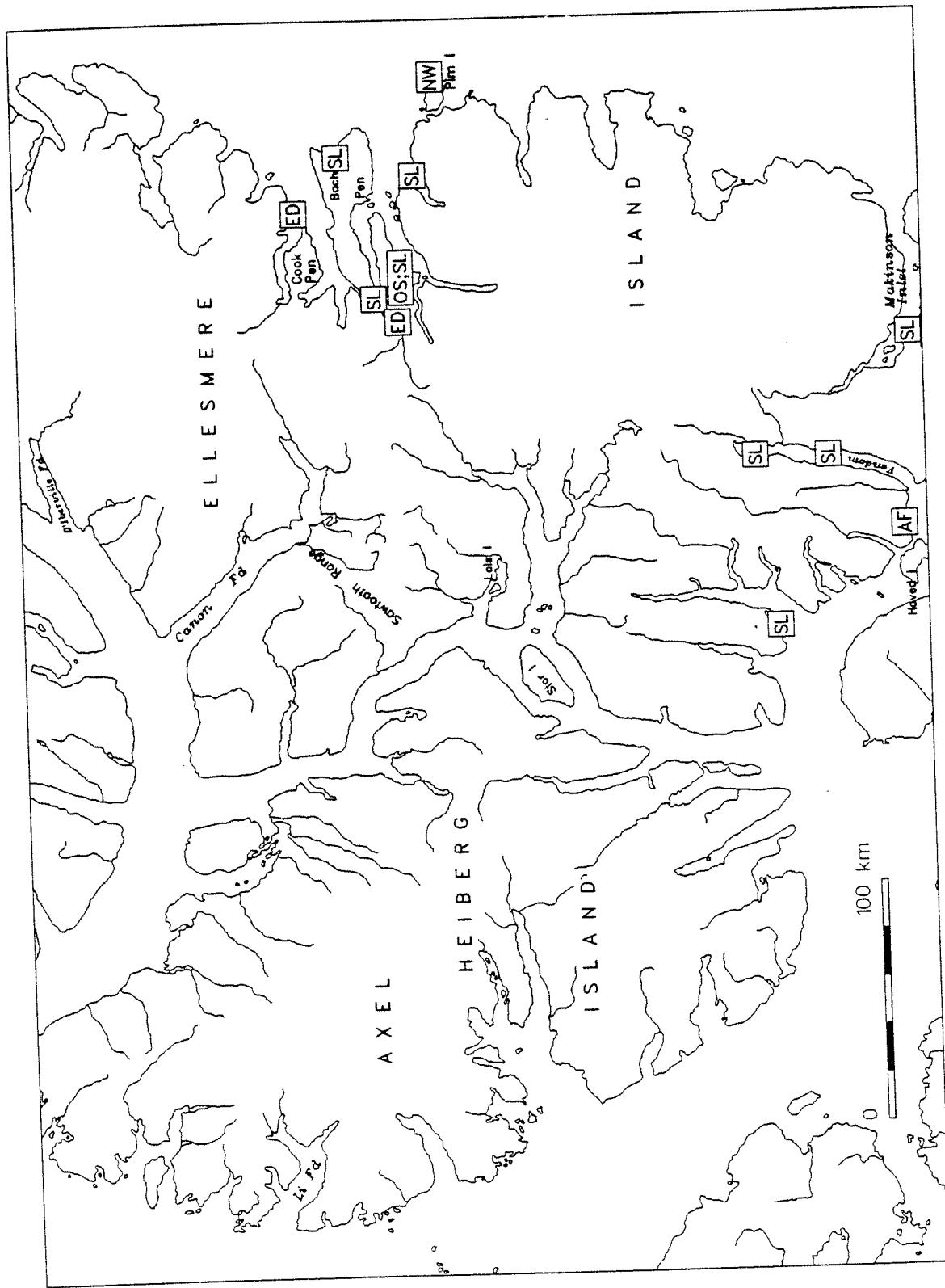


Figure 8. Arctic fox (AF), eider ducks (ED), oldsquaw (OS), narwhals (NW), and seals (SL) recorded between June 12-21, 1995 during gravity survey flights over Ellesmere and Axel Heiberg islands.

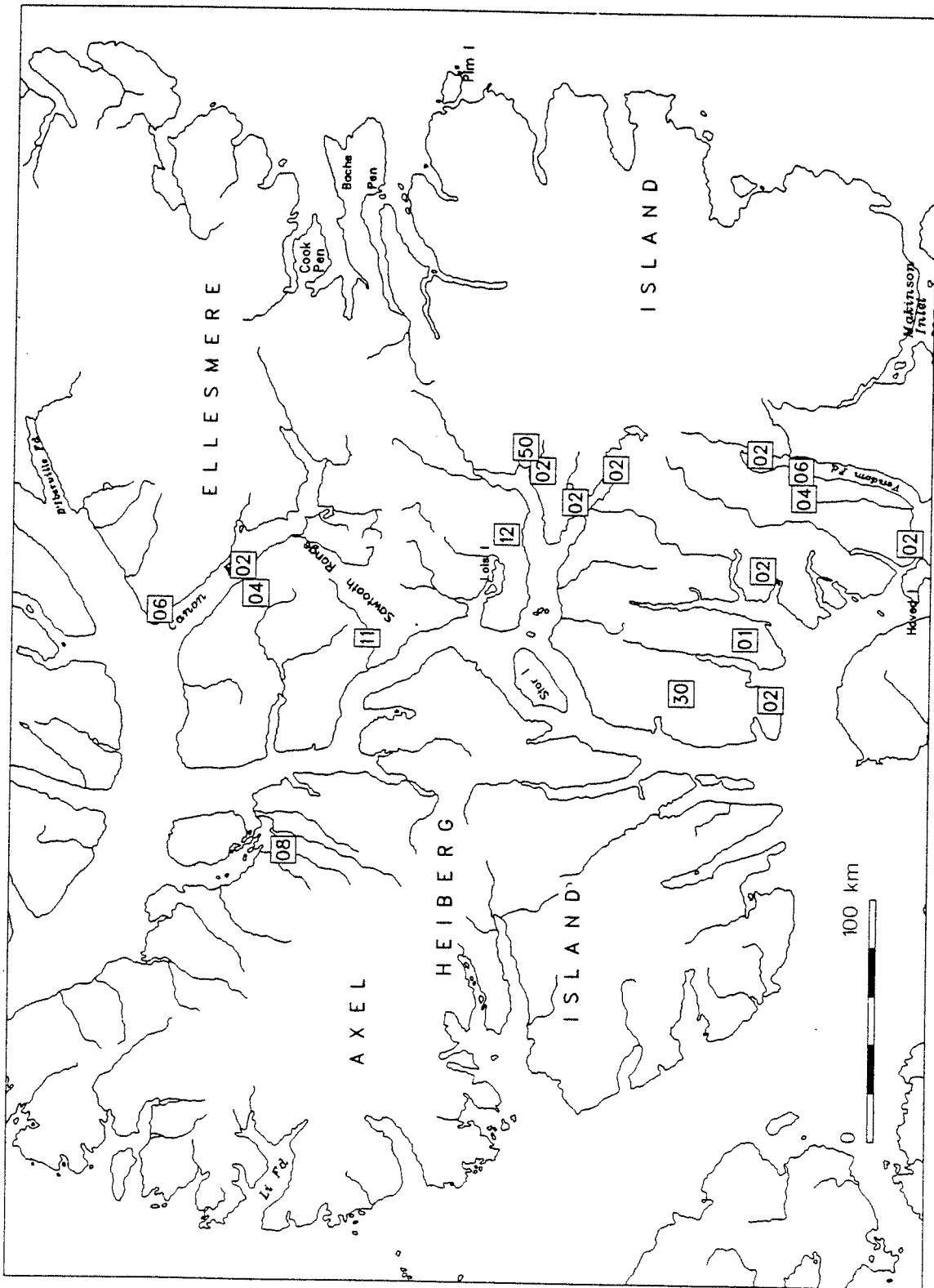


Figure 9. Snow geese (boxed numbers) observed on Ellesmere and Axel Heiberg islands between June 12-21, 1995 during gravity survey flights.

On June 14, we counted 5 pairs of eider ducks, possibly common eider, in a small pond east of Sverdrup Pass (Figure 8). One pair of oldsquaw were seen in the same area. On June 15 a pair of common eiders were observed at the east tip of Cook Peninsula.

#### Miscellaneous Observations

##### Old Fuel Caches

We recorded 7 old fuel caches during our survey flights. Four of these were located in the southern part of Raanes Peninsula (Figure 10). The number of drums per cache varied between 2-6 (Table 2).

##### Tent Rings - Buildings

We observed one old camp site with 3 tent rings along the shore of south Raanes Peninsula (Figure 11). Further east, we saw a rock formation on a beach which may have been a tent ring. Two other camp sites were located on the east side of Ellesmere Island. West of Pim Island, we landed beside two 1-meter wide tent rings at an altitude of about 36 m. A picture was taken. On Cook Peninsula, we saw a distinctive pile of rocks on a gravelly beach which could have been an old camp site.

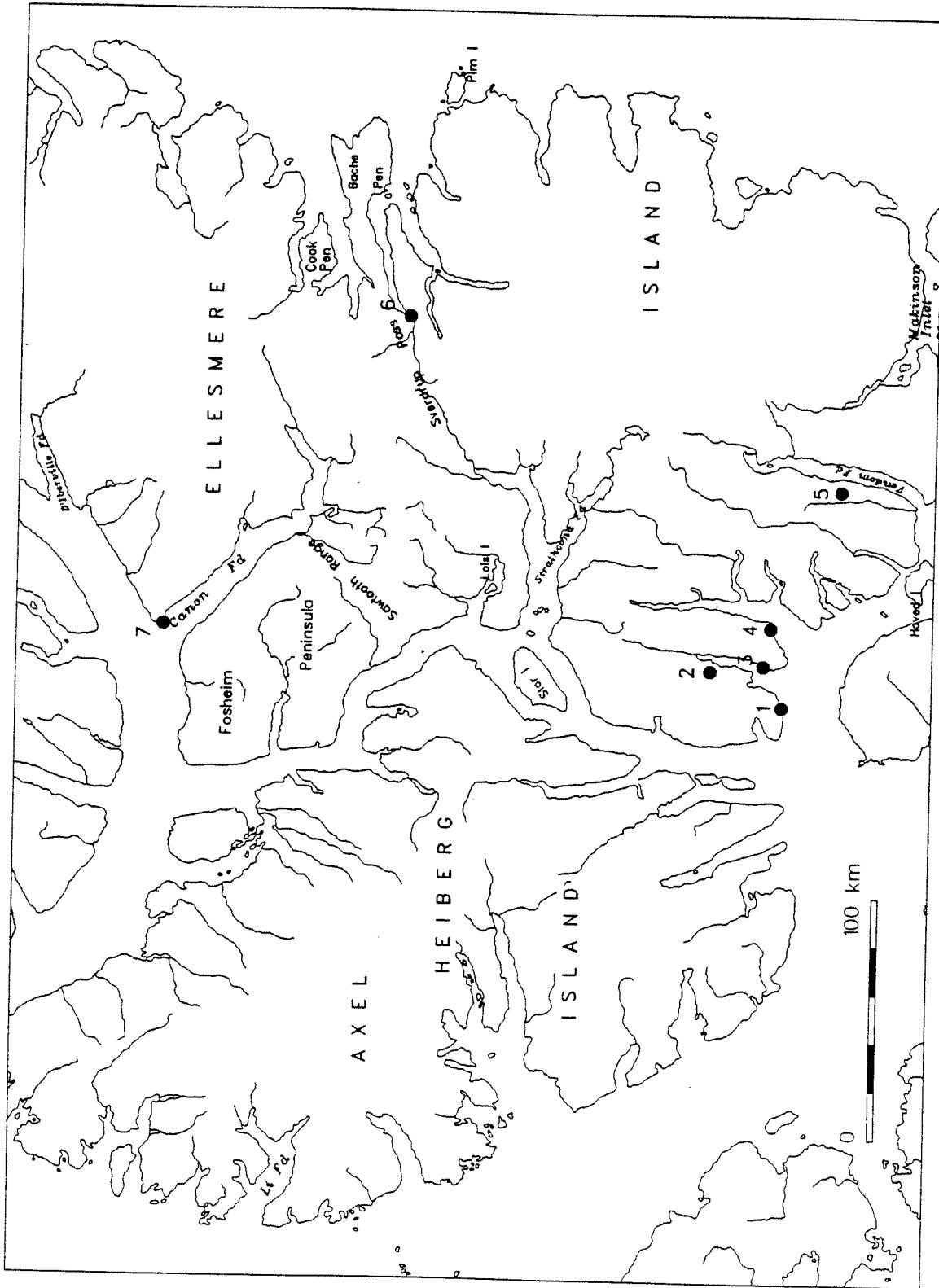


Figure 10. Old fuel caches (# 1-7) encountered during gravity survey flights over Ellesmere and Axel Heiberg islands between June 12-21, 1995.

Table 2. Number of drums at old fuel caches observed during the June 12-21, 1995 gravity survey flights over central Ellesmere and Axel Heiberg islands.<sup>2</sup>

| Cache Number | Number of drums |
|--------------|-----------------|
| 1            | 3-4             |
| 2            | 2-3 (RED)       |
| 3            | 5-6             |
| 4            | 4-5             |
| 5            | 5-6             |
| 6            | 4               |
| 7            | 5-6             |

On June 13, while flying along the east shore of Mokka Fiord, we noticed a rectangular shape in the ground which may have been a building foundation (Figure 11). We did not collect any detailed information about this observation. We also observed a small cabin southwest of Pim Island.

<sup>2</sup>Location of caches are shown in Figure 10.

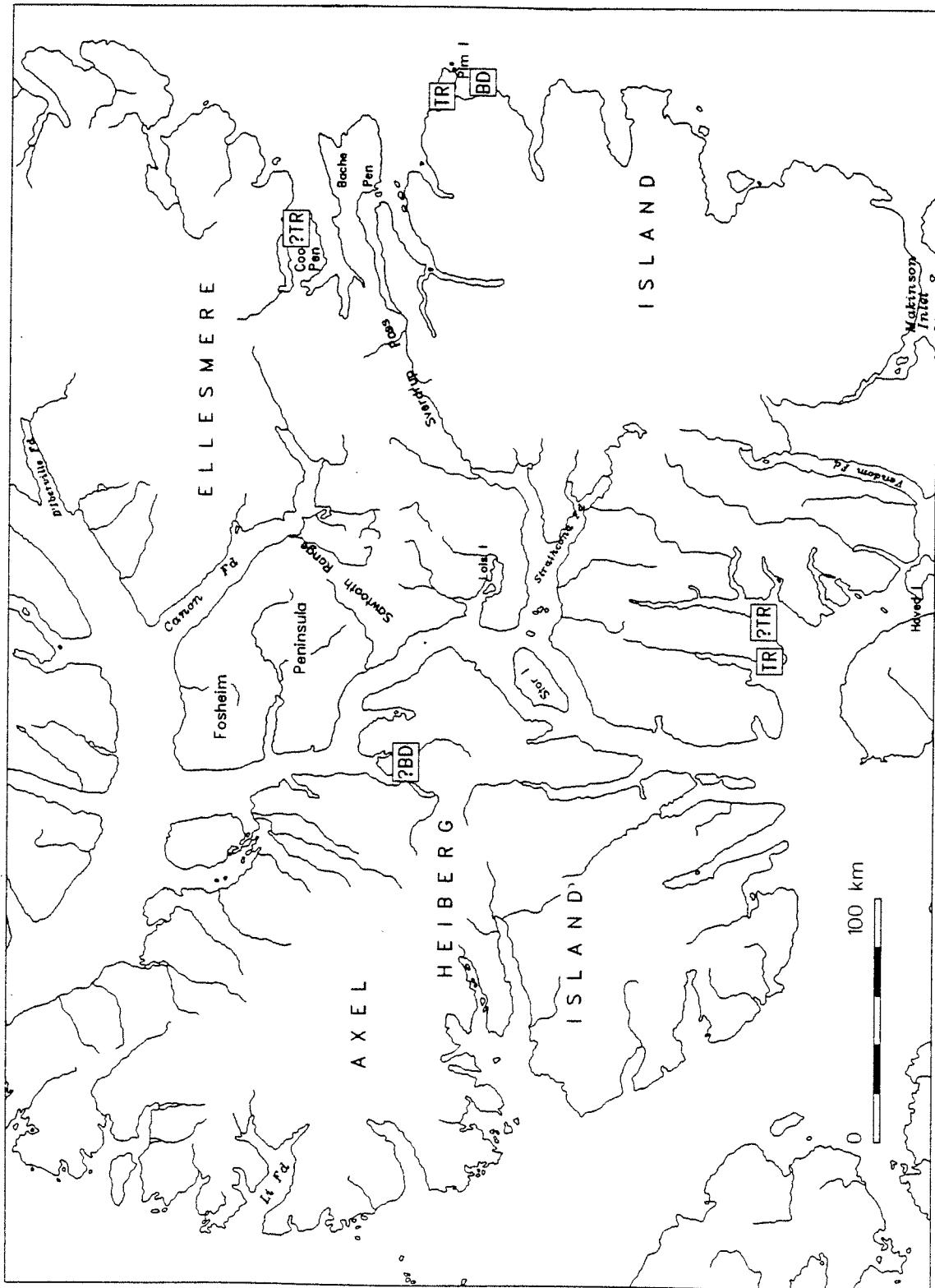


Figure 11. Tent rings/old camp sites (TR) and buildings (BD) recorded during gravity survey flights over Ellesmere and Axel Heiberg islands between June 12-21, 1995. Uncertain sightings are marked with a "?".

## DISCUSSION

The 1196 muskoxen and 38 caribou seen in June 1995 on Ellesmere and 165 muskoxen and 25 caribou seen on Axel Heiberg cannot be extrapolated to estimate total population size as the counts are from an unsystematic survey and it is difficult to compare those counts to previous ones. Other surveys covered only portions of the two islands but some portions overlap with those covered during this survey. Besides differences in areas covered, differences in techniques and survey intensity constrain comparing my results to those from other surveys. Only Tener (1963) had estimated population size during his island-wide transect surveys in summer 1961. He estimated 4,000 muskoxen on Ellesmere and about 1,000 on Axel Heiberg. He acknowledged the shakiness of his caribou estimates given the few caribou seen and their scattered distribution but he estimated 200 caribou on Ellesmere from the 74 caribou seen. On Axel Heiberg, Tener (1963) guessed 300 caribou from 60 caribou counted.

Caribou are of particular interest as their numbers have declined so much elsewhere on the arctic islands. I found caribou in really only three areas on Ellesmere (Forsheim, Raanes and Svendsen peninsulas). Tener (1963) counted one caribou on Forsheim, 11 on Raanes and 11 on Svendsen peninsulas in August 1961. Riewe (1973) collected information on caribou and muskox distribution on the Bjorne Peninsula (Ellesmere Island) in May and July 1973. Riewe (1973) surveyed Raanes Peninsula and counted 219 caribou in July

1973 using a Twin Otter flying at 165 m, agl. Hunters from Grise Fiord have identified Raanes Peninsula as a preferred area for caribou and they also describe a decrease in caribou since the early 1970s. Case and Ellsworth (1991) surveyed southern Ellesmere in July 1989 and estimated  $89 +/ - 31$  caribou but they did not cover Raanes Peninsula. Riewe (1973), Case and Ellsworth (1991) and I did cover Svendsen Peninsula and caribou counts were 33 in 1973, 24 in 1989 and 12 in 1995.

The same difficulties of areas covered and different techniques limit muskox comparisons. Tener (1963) counted 227 muskoxen in August 1961 and estimated about 1,000. I counted 790 muskoxen on the Forsheim Peninsula and neither Riewe (1973) nor Case and Ellsworth (1991) surveyed that area. Tener (1963) counted 60 muskoxen in the Svendsen Peninsula where Riewe (1973) counted 425, Case and Ellsworth (1991) counted 89 and estimated  $350 +/ - 90$  and I counted 142 muskoxen.

Repeated counts using different methods over an area approximately every decade shed relatively little light on population trend. Perhaps the only conclusions are that the areas that previously had the most caribou or muskoxen are still the areas where both species were found in 1995. Also, there are very few caribou compared to muskoxen.

## ACKNOWLEDGEMENTS

I first address my thanks to Captain P. Maye and DND for this unique opportunity to gather wildlife information over an extended area of Ellesmere and Axel Heiberg islands, and for all the logistical support provided during this trip. Also to the MCE field personnel including Warrant Officer R. Smith, who kindly planned his flight routes in regards of our interests, and Corporals L. Lemieux, E. Quirion, D. Rodd and G. Simpkin who assisted in providing wildlife observations in many occasions. I specially thank J. Serpell, helicopter pilot with Canadian Helicopters, for his visual help in spotting wildlife. Many thanks to Staff Officer B. Partridge and his staff of Operation Hurricane for the warm welcome and help and providing information received at Eureka Base. The Polar Continental Shelf Project (PCSP) assisted in providing logistical support for transportation. Thanks to the efficiency of D. Maloley, J. Godden and B. Hough at PCSP bases in Resolute and Eureka. I also thank A. Gunn, M. Ferguson, S. Matthews, F. Miller and B. Troke for sharing some of their thoughts with me about field methodology. A last thanks goes to M. Ferguson and Anne Gunn for their helpful comments on the manuscript. Judy Dragon finalized the report.

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Todd, B., Station Warrant Officer, OP Hurricane, National Defence Headquarters, Ottawa.

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## APPENDIX A

Databases

Each sighting marked on the map was entered on computer using with DBASE IV software 2.0 under a KEY\_SITE number according to the following species code (field SP\_CODE):

| SPECIES<br>CODE | DESCRIPTION   | SPECIES<br>CODE | DESCRIPTION   |
|-----------------|---------------|-----------------|---------------|
| AF              | Arctic fox    | BD              | Building      |
| AH              | Arctic hare   | DE              | Dead muskox   |
| ED              | Eider duck    | DR              | Fuel drum     |
| MO              | Muskox        | FC              | Muskox faeces |
| NW              | Narwhal       | TK              | Animal track  |
| OS              | Old squaw     | TR              | Tent ring     |
| PB              | Polar bear    |                 |               |
| PC              | Peary caribou |                 |               |
| SG              | Snow goose    |                 |               |
| SL              | Seal          |                 |               |

A letter (A,B, etc) was added to the KEY\_SITE number when two or more observations were recorded under the same location. KEY\_SITE numbers for gravity stations, and active fuel caches, were identified with the letter "G". Abbreviations were as follows: BDCH=Blind Fiord cache; BTCH=Bartlett Bay cache; FGCH=Flagler Bay cache; GHCH=Geodetic Hills cache; IBCH=Iberville Fiord cache; MKCH=Makinson Inlet cache; STCH=Strathcona Fiord cache; and WTHM=Witch Mountain gravity station.

Coordinates for locations were either obtained from a GPS (logical field GPS=.T. or Y) or from the map (logical field GPS=.F. or blank). A 3-letter code of a general location was given to each record as follows:

Ellesmere Island

AXF: Alexandra Fiord area  
 CNF: Cañon Fiord area  
 CKP: Cook-Bache-Knud peninsulas  
 FSP: Fosheim Peninsula-Sawtooth Range  
 RNP: Raanes Peninsula  
 STF: Strathcona-Bay fiords  
 SVP: Sverdrup Pass  
 SVV: Svendsen Peninsula-Vendom Fiord

Axel Heiberg Island

ACE: Axel - Central East  
 AEG: Axel - East Glacier  
 ALF: Axel - Li Fiord

Others

HVI: Hoved Island  
 LSI: Lois Island  
 STI: Stor Island  
 IBF: Iberville Fiord  
 MKI: Makinson Inlet

Also entered were total number of adults (1 yr +), calves or unknown for each observation within 1.6 km of the aircraft (logical field DIST IN=.T. or Y) or beyond the 1.6 km limit (logical field DIST\_OUT=.T. or Y). Maps were drawn with QUIKMAP version 3.0.