DISTRIBUTION AND ABUNDANCE OF MUSKOXEN ON NORTHEAST VICTORIA ISLAND, N.W.T.

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ABSTRACT

We conducted a systematic strip transect survey in August 1990 to determine the density and extent of muskoxen (*Ovibos moschatus*) on northeast Victoria Island, N.W.T. The population estimate was 5451 ± 521 (S.E.) based on 700 muskoxen (excluding calves) counted on transect. Density was calculated as 0.1263 muskoxen/km^2. The survey had a coefficient of variation of 10%.

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INTRODUCTION

Muskox (*Ovibos moschatus*) numbers had increased during the 1970s and 1980s on Victoria Island (Gunn 1990, Jingfors 1984 1985, Gunn In Prep.). Most effort toward documenting the increases was on southern and western Victoria Island in the vicinity of Cambridge Bay and Holman. Victoria Island is too large an area (218,129 km^2) to readily contemplate surveying the entire island at one time which has been the approach for estimating muskox numbers on other arctic islands.

In the late 1980s, hunters from Cambridge Bay were wishing to offer combined polar bear – muskox non-resident sport hunts based at Hadley Bay (Figure 1). However, the Muskox Management Unit B2-3 was west of Hadley Bay which restricted the hunters. Unit B2-3 had a quota of 8 which was increased to 30 in 1984 after Jingfors (1985) surveyed the area as one stratum during his survey of northwest Victoria in August 1983. Jingfor's 1983 estimate was 1280 ± 127 (Standard Error). East and south of Hadley Bay had not been systematically surveyed so we flew a systematic survey in 1990 and the resulting estimates were the basis for establishing a quota and management unit in 1990. This report describes the survey.

METHODS

Our survey area was Stefansson Island and the northeast corner of Victoria Island as far south as Washburn Lake and west to 111°W (Figure 1). This systematic aerial survey was not preceded by an aerial reconnaissance. We flew strip transects 20 km apart to obtain 10% coverage. The transects were oriented east-west to be perpendicular to the long axis of the coastline of McClintock Channel and Hadley Bay (Figure 2). We placed the first transect randomly along a line of latitude and evenly spaced the other lines.

The survey aircraft was a Helio-Courier on tundra tires. The survey crew consisted of a left observer seated behind the pilot and right observer in the front seat who recorded the sightings of both observers by observation number. The pilot navigated and plotted observation numbers on 1:250,000 scale topographic maps.

A wire was stretched from an eye bolt on the wing to the fuselage (the Helio-Courier does not have wing struts). Boundaries for the inside and outside of the transect were calculated (Norton-Griffiths 1978) and marked by red tape on the wires and windows. The transect width was 1.0 km on both sides of the aircraft. We checked the markers by flying at survey altitude over the lights and runway end markers on the Cambridge Bay airstrip. When flying along the transects, the aircraft altitude was 300 m above ground level. The airspeed was 160 km/h. No sex and age classification counts were systematically attempted during the aerial survey but we counted calves when they were conspicuous.

We used Jolly's Method 2 estimate (Jolly 1969) to calculate a population estimate from the numbers of muskoxen (excluding calves) counted on transect. The difference between the right and left observer's counts was not tested for significance, as sample sizes were too small.

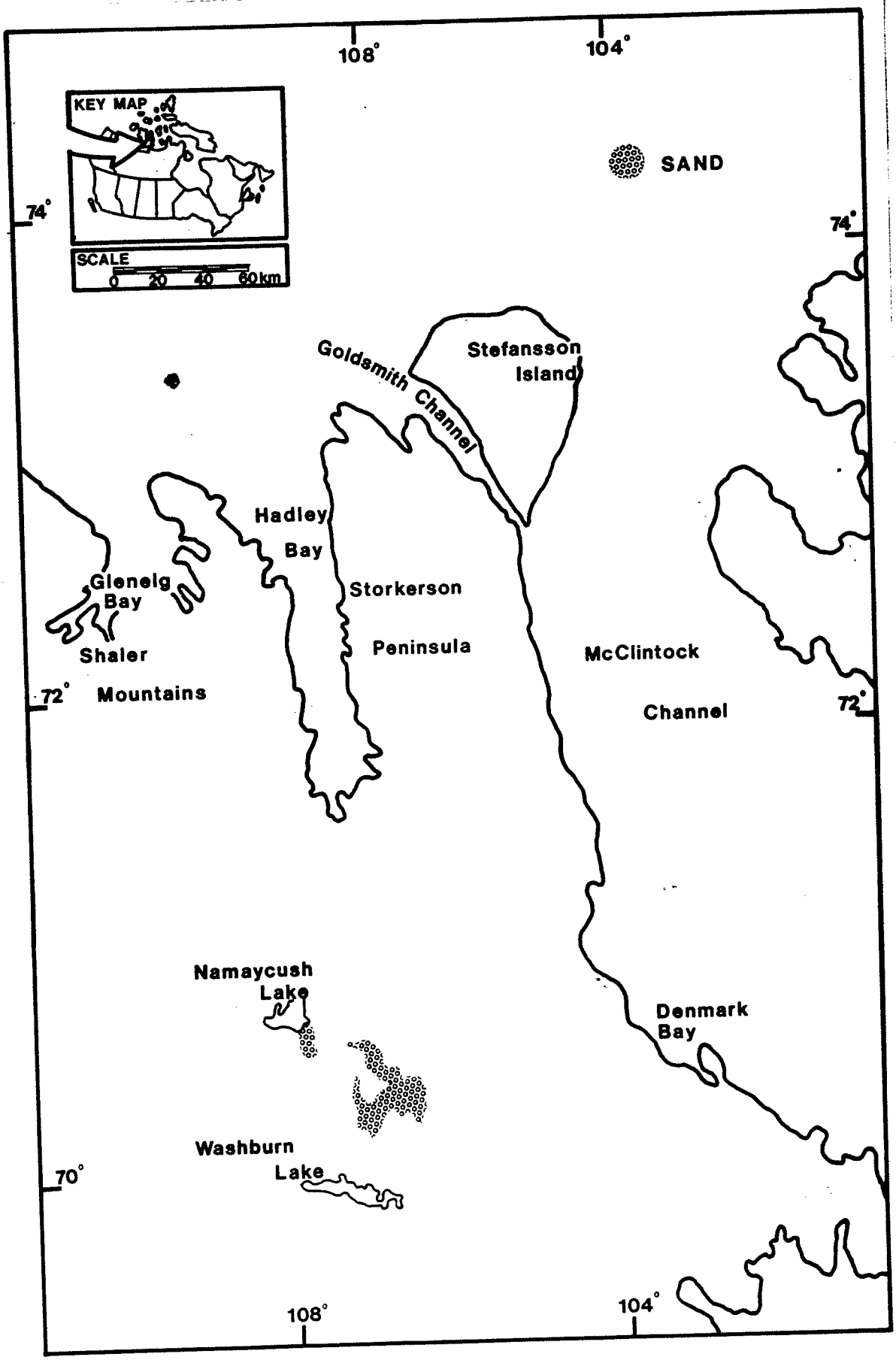

Figure 1. The northeast Victoria Island muskox survey area, August 1990.

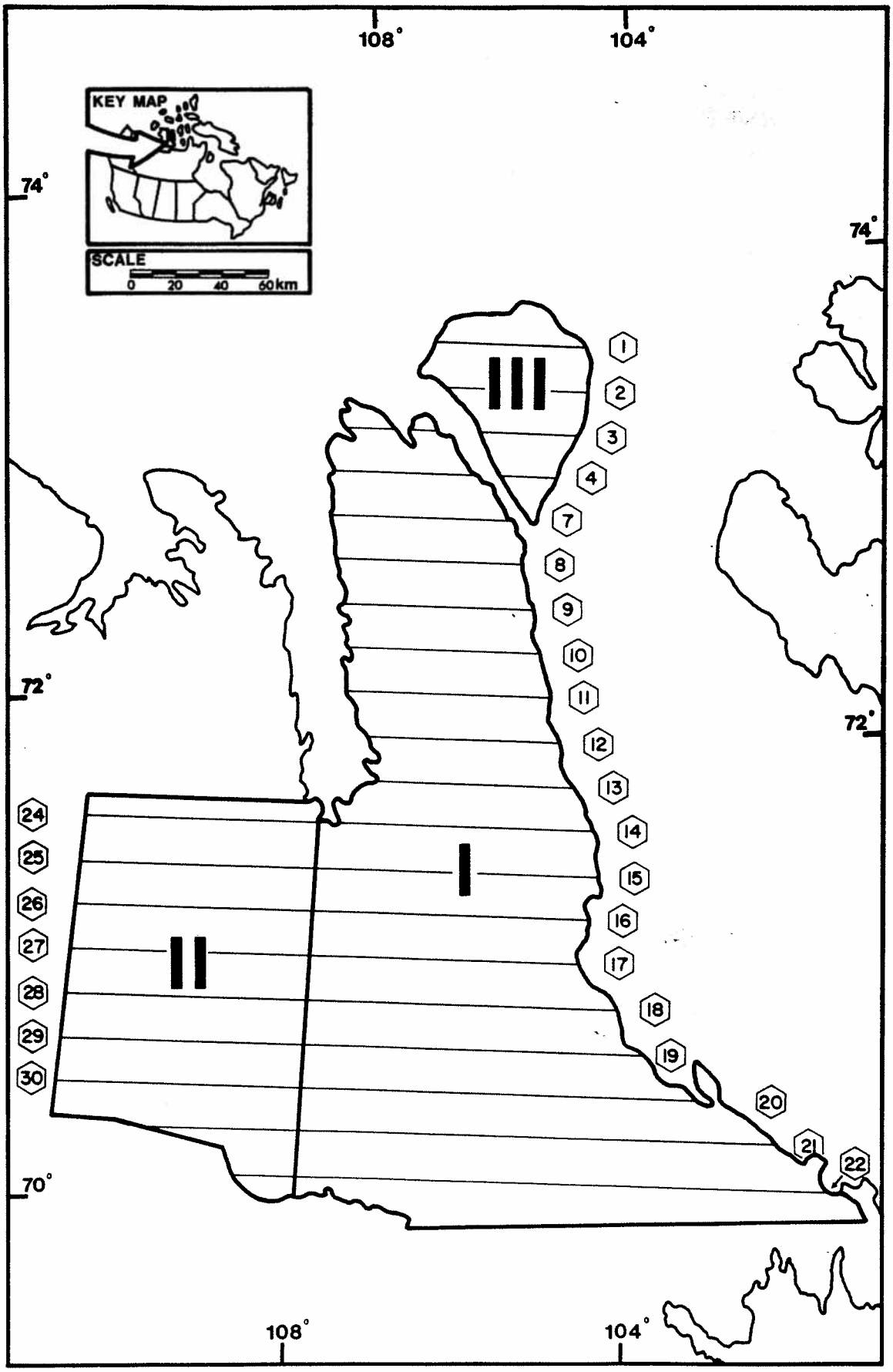

Figure 2. The northeast Victoria Island muskox survey strata, August 1990.

RESULTS

We flew 2,983 km of strip transects for a flying time of approximately 20.0 h. This does not include ferry time from the Wynniatt Bay base camp to either Cambridge Bay or the survey area. We flew the transects north of 71° N latitude and east 108° W longitude (stratum 1 and 3) between August 10 and 12. Those transects remaining to the south (stratum 1) and west (stratum 2) were flown between August 15 and 17.

We counted only one muskox on transects over Stefansson Island. However, we saw 19 others off transect near the southern tip of the island. No estimate was calculated for the Stefansson Island (stratum 3) portion of the survey. On Victoria Island transects, we counted 700 muskoxen (excluding 83 calves) (Figure 3) resulting in a population estimate of 5451± 521 (S.E.) muskoxen (Table 1, and Appendix A). We counted 588 muskoxen (excluding 42 calves) off transect during the survey (Figure 3). The mean group size of all groups greater than 1, that we observed on transect (excluding calves) was 5.1 ± 0.2 (S.E.) (n=132). The proportion of calves was 10.6% (83/783).

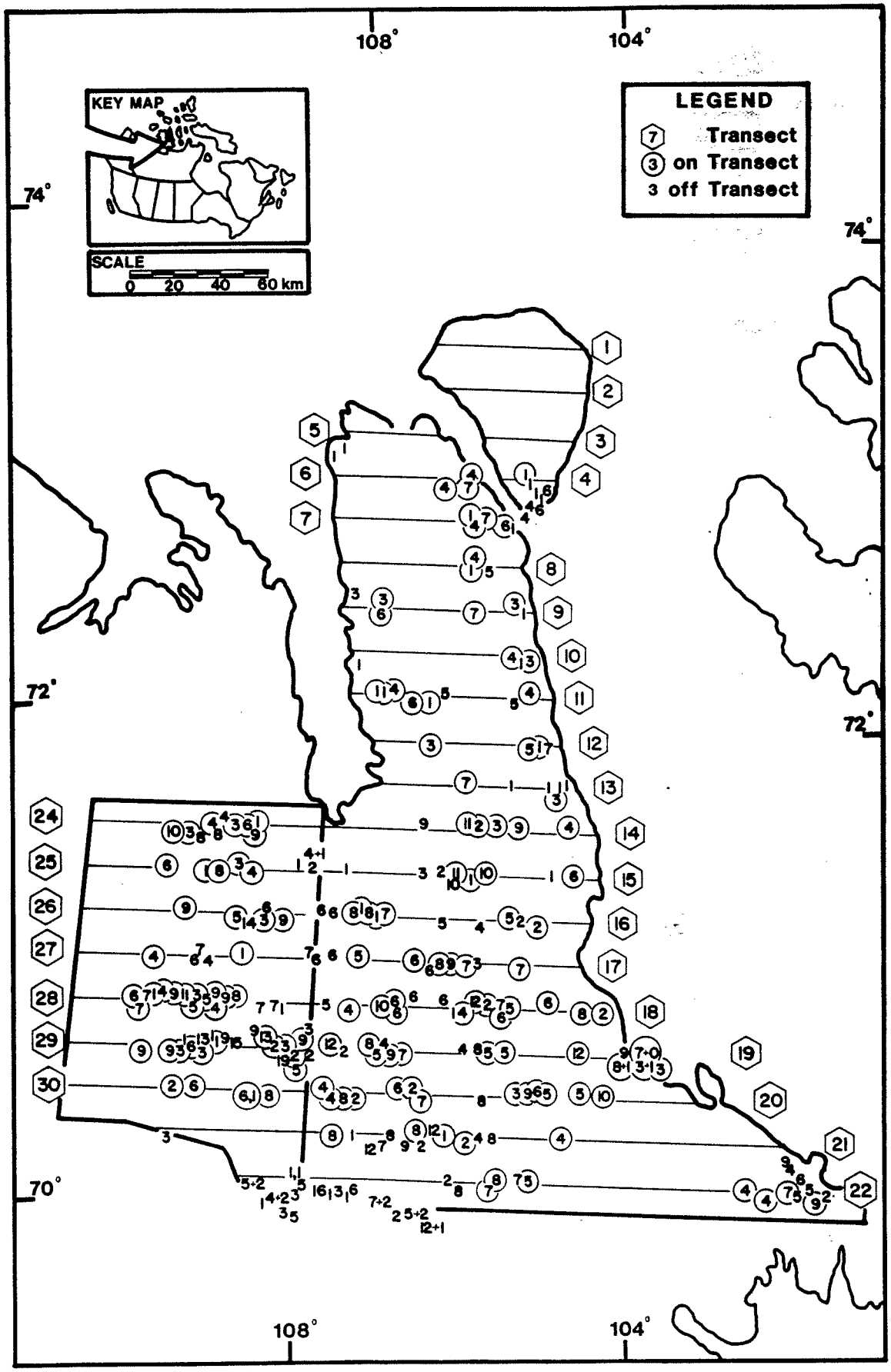

Figure 3. Transect lines flown and muskox observations during an aerial survey on northeast Victoria Island, N.W.T., August 1990.

Table 1. Analysis of data from a muskox transect survey of northeast Victoria Island, N.W.T., August 1990.

	Total	Stratum 1	Stratum 2
Maximum number of transects (N)	159	79	80
Number of transects surveyed and included (n)	27	18	9
Stratum area, km^2 (Z)	43173	29511	13662
Transect area, km^2 (z)	5,544	3748	1796
Number of muskoxen counted (y)	700	475	225
Muskoxen density, muskoxen/km^2 (R)	0.1263	0.1267	0.1712
Population estimate (Y)	5451	3740	1711
Population variance (Var,Y)	271877	395191	291351
Standard error (SE,Y)	521	629	540
Coefficient of variation (CV)	0.096	0.168	0.316

Table 2. Weather and light conditions during a muskox survey, northeast Victoria Island, N.W.T, August 1990.

Date	Transects	Weather and light conditions
10 Aug	13 - 14	Light Broken, Good Visibility
11 Aug	1 - 8, 15, 16	Good to dull
12 Aug	9 - 12, 17,18	Good to dull
15 Aug	24 - 29, 30	Variable, Good to dull
16 Aug	19, 20	Bright to dull, Thin fog patches
17 Aug	22, 23, 31, 32	Bright to dull

We observed 51 caribou while flying the survey. Four of these were near transect four on the south end of Stefansson Island. Thirteen more were sighted not far away near the east end of transect seven. Other caribou sightings occurred in the vicinity of transects 9 and 10, 19 and 20, and along the north shore of Washburn Lake.

DISCUSSION

The muskoxen were relatively evenly dispersed in small herds across two of the three survey strata (Figures 2 and 3) which contributed to a precise estimate (5451± 521) despite the low coverage (12%). As this was the first estimate for the area, we cannot comment on trend although hunters had reported seeing more muskoxen around Hadley Bay in the 1980s (D. Aminganik pers. comm.). The survey results were the justification for expanding the boundaries of B2-3 to east and south of Hadley Bay.

Although there are no comparable data for 1990, we note that mean densities and group sizes on northeast Victoria differ from south Victoria Island when compared with data available from 1988. Herd sizes of 5.1 ± 0.2 SE on northeast Victoria Island averaged smaller than on south where in August 1988, we described mean herd sizes of 9.9 ± 1.4 (SE). Densities (0.13 muskoxen/km^2) were lower than on south Victoria Island (Gunn In Prep) where they averaged 0.2 in March 1988 and 0.3 muskoxen/km^2 in March 1993. Summer temperatures and thus plant growth decrease from south to north Victoria Island (Edlund and Alt 1989, Maxwell 1981) which suggests northeast Victoria Island may support lower muskox densities than the south.

Our impressions were that Stefansson Island and Storkeson Peninsula (Figure 1) were relatively poorly vegetated with frequent rock outcrops. On the extensive sandy areas between Namaycush and Washburn lakes, we observed concentrations of muskox herds feeding on a thin cover of grasses and semi-aquatic sedges along the lake and water-course edges.

During the survey we observed one dead muskox bull. We found severe bruising

under the skin on the rump, flank and abdomen with bleeding into the muscles of the left shoulder. The abdominal cavity contained serous fluid and intestinal contents with severe haemorrhaging on the rumen and duodenum. Although we found no perforations, we concluded that the bull had died from injuries during fighting with another bull.

ACKNOWLEDGEMENTS

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LITERATURE CITED

Edlund, S. and B. Alt. 1989. Regional congruence of vegetation and summer climate patterns in the Queen Elizabeth Islands, Northwest Territories, Canada. *Arctic* 42:3-23.

Gunn, A. 1990. The decline and recovery of caribou and muskoxen on Victoria Island. Pages 590-607 *in* C.R. Harington, ed. *Canada's Missing Dimension: Science and History in the Canadian Arctic Islands*, Volume II. Canadian Museum of Nature, Ottawa, ON.

Gunn, A. In Prep. Abundance, composition and distribution of muskoxen on southeastern Victoria Island, 1983-88. Northwest Territories Department of Resouces, Wildlife and Economic Development. File Rep. No .

Jingfors, K. 1984. Abundance, composition and distribution of muskoxen on southeastern Victoria Island. N.W.T. Wildlife Service File Report No. 36. 245 pp.

Jingfors, K. 1985. Abundance and distribution of muskoxen on northwestern Victoria Island. N.W.T. Wildlife File Report No. 47.22pp.

Jolly, G.M. 1969. Sampling method for aerial census of wildlife populations. E. Afr. Agric. For. J. 34:46-49.

Maxwell, B. 1981. Climatic regions of the Canadian Arctic Islands. *Arctic* 34: 225-240.

Norton-Griffiths, M. 1978. Counting animals. Hand Book No. 1, African Wildlife Leadership Foundation, Kenya. 139pp.

APPENDIX A: Numbers of muskoxen observed during an aerial survey of northeast Victoria Island, August, 1990.

Transect Number	Area (km^2)	Muskoxen On Transect	Muskoxen Off Transect
Stratum 1 Storkerson Peninsula			
5	87	0	0
6	127	13	1
7	190	16	1
8	173	5	10
9	175	15	5
10	181	7	2
11	191	17	11
12	186	8	8
13	130	9	5
14	252	25	10
15	261	24	22
16	253	30	28
17	246	28	34
18	255	65	23
19	257	65	47
20	259	64	7
21	261	21	61
22	264	63	38
Stratum 2 Southwest Hadley Bay			
24	210	32	25
25	212	20	1
26	214	24	17
27	216	5	29
28	218	62	21
29	220	60	69
30	222	22	6
31	222	0	0
32	62	0	0
Stratum 3 Stefansson Island			
1	138	0	0
2	136	0	0
3	94	0	5
4	56	1	10