ABUNDANCE AND DISTRIBUTION OF MUSKOXEN NEAR AYLMER LAKE, NWT, JULY 1991

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ABSTRACT

Between 24 - 27 July, 1991, we surveyed an area of 33,825 km^2 in the vicinity of Aylmer Lake to determine the number and distribution of muskoxen. We defined a low density area of 29,959 km^2 and a high density area of 3,866 km^2. No muskoxen were seen west of Aylmer, Clinton-Colden and Artillery lakes leading us to conclude that recolonization has not yet occurred in that area. Only two muskox groups were seen on transect in the low density area and, consequently, we do not offer a population estimate for it. Muskox numbers in the high density area were estimated at 161±39 representing a density of 4 muskoxen per 100 km^2 which is close to the density found in the contiguous high density area along the Hanbury River during the 1989 Artillery Lake survey.

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INTRODUCTION

In the late 19th century, muskoxen (Ovibos moschatus) almost disappeared in the barrenlands between the Thelon/Baillie rivers and the treeline (Barr 1991). Muskox populations are currently rebounding and recolonizing the mainland barren-grounds.

A survey was done in March 1989 near Artillery Lake which showed that muskoxen had recolonized as far south as Lynx Lake and had reached substantial densities around the Hanbury River (Graf and Shank 1989). As a result of the 1989 Artillery Lake survey, a quota of 14 animals (bulls only) was established.

Gunn (1990) did a muskox survey in 1986 from the arctic coast south to Pellatt Lake, just south of Contwoyto Lake. On the basis of this survey, a small quota was established in the southern portions of the study area for access by Coppermine residents. The intervening area, between Pellat and Clinton-Colden lakes has never been surveyed for muskoxen. Because the high density area occurs along the northern edge of the Artillery Lake survey area, we thought that a survey to the north might indicate large enough muskox populations to provide enhanced opportunities for use of the resource by the people of the Northwest Territories. The survey was also expected to provide a much more complete picture of the recolonization of the barrenlands by the muskoxen

from the Thelon Game Sanctuary.

STUDY AREA

The study area was defined to encompass that land which had not yet been surveyed for muskoxen by our Department between the arctic coast and the southern limit of the species (Figure 1). The area extended from Clinton-Colden Lake in the south to Pellatt Lake in the north. The eastern edge of the study area was the Baillie River which is the western boundary of the Thelon Game Sanctuary. The western boundary was defined as longitude 110° W. This area is 33,825 km^2 in size. Following reconnaissance, we defined high and low density strata (Figure 1).

METHODS

The survey was conducted using a Helio-Courier, single engine, fixed-wing aircraft, equipped with floats which was chartered from Nahanni Air of Norman Wells. The aircraft was flown at an altitude of 185m (600 ft) above ground level and at an airspeed of 160 kph (100 mph). Flights were conducted over the four days of 24 - 27 July. Weather was perfect for observation on all days of the survey with sun, warm temperatures, and brisk winds.

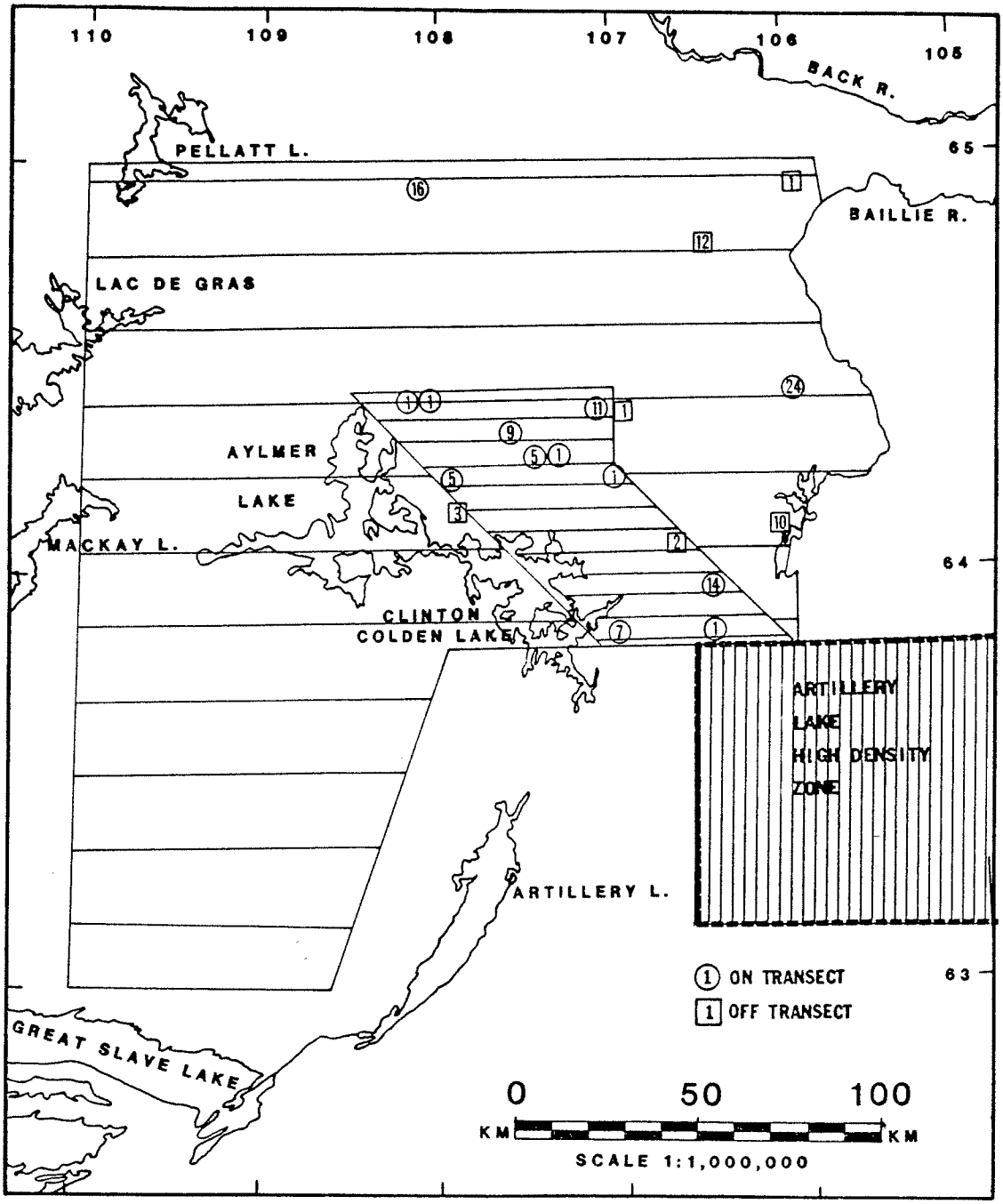

Figure 1. Map of the Aylmer Lake study area showing transect lines in the high and low density areas flown in July 1991. Numbers and locations of muskoxen seen on transect are indicated within circles. Numbers seen off transect are contained within squares.

Transect widths were 1 km on each side of the aircraft. Consistent and accurate strip widths were ensured by using tape attached to a rope stretched from the tie-down eye-bolt under the wing to the float attachment. Strips of tape were attached to the windows and the observers' heads were aligned consistently by lining up the tape on the window with the tape on the rope and floats. Muskoxen were recorded as occurring within the 1 km strip width ("on-transect") or outside it ("off-transect"). We are confident that few or no muskoxen were missed on transect.

We initially conducted a reconnaissance using transect lines 20 km apart (10% of the area) to determine the relative densities and distribution of muskoxen in the survey area (Figure 1). High and low density areas were defined after the reconnaissance was conducted (Figure 1). In the high density stratum we followed transects 6 km apart and thus provided a coverage of 33%. Our estimate for the low density area was calculated using the data from the reconnaissance flights. Groups of muskoxen larger than ten animals were photographed several times and the estimated number in the group verified later from the photographs. The estimates were calculated using Jolly's Method 2 for unequal sample sizes (Jolly 1969) in a computer program prepared by our Department.

RESULTS

Table 1 presents the results of the survey. Only two groups were seen on the 11 transects of the low density stratum. The population estimate of 198 consequently had an extremely high standard error of 255 (CV = 129%).

The estimate for the high density stratum (3,866 km^2) was 161 ± 39 (CV = 24%) which appears to be a reliable result. The density in the high density stratum was .042 muskoxen/km^2 (24 km^2/muskox) which is comparable to the high density stratum of the Artillery Lake survey (Graf and Shank 1989).

Of the 180 muskoxen we saw both on and off transect, only 14 were calves, giving a calf percentage of 7.8%. Calves are difficult to count from the air because of the manner in which muskox groups coalesce when disturbed. The calf percentage figure must, therefore, be considered as approximate.

The mean group size of the 29 muskox groups seen (Appendix B) both on and off transect was 8.6±9.1 (SD). Ten of the 29 groups were single bulls. The largest group was 40. By contrast, mean group size observed during the March Artillery Lake survey was 26.6.

TABLE 1. Analysis of data from the stratified transect survey for muskoxen in the Aylmer Lake area, July 1991.

Study area (km^2)	33,825
Low density stratum (I) area (km^2)	29,959
High density stratum (II) area (km^2)	3,866
Area surveyed (km^2) - in I	3,031
- in II	1,342
Total Study Area	
Population estimate	359
Population variance	66,448
Population Standard Error	258
Coefficient of Variation	72
95% Confidence Interval	505
Density (muskox per km^2)	0.011
Low Density Stratum	
Population estimate	198
Population variance	64,913
Population Standard Error	255
Coefficient of Variation	129
Density (muskox per km^2)	0.007
High Density Stratum	
Population estimate	161
Population variance	1,536
Population Standard Error	39
Coefficient of Variation	24
95% Confidence Interval	93
Density (muskox per km^2)	0.042

DISCUSSION

We saw no muskoxen west of Aylmer, Clinton-Colden and Artillery lakes. Staff at MacKay Lake Lodge indicated that they had never seen muskoxen west of Aylmer Lake. Muskox skulls are occasionally found near MacKay Lake (Steve Ward and Gary Jaeb, pers. comm.) suggesting presence of the species probably during the latter part of the 19th century. We conclude that muskoxen have not yet recolonized the western portion of the study area to a substantial extent.

We think that it makes little sense to propose a population estimate for the low density stratum based on only two data points. We concluded that the increased effort required to obtain a good population estimate in the low density stratum was not warranted by the density indicated in the reconnaissance. We, therefore, offer no firm estimate for the low density stratum or for the total study area. We simply conclude that west of Aylmer Lake there are few or no muskoxen, whereas in the remainder of the low density stratum muskoxen are rare but present in densities of approximately 1 per 100 km^2.

If muskox populations are allowed to increase in the east and north, population pressure can be expected to result in animals wandering long distances and recolonizing the western portion of the study area.

The area immediately to the east of Aylmer and Clinton-Colden lakes was designated as the high density

stratum and is the only portion of the study area for which an acceptable population estimate was derived. This area contained muskoxen at about the same density as the contiguous high density stratum delineated on the Artillery Lake survey (Graf and Shank 1989). We consider the two high density strata to represent a single functional unit or, loosely speaking, a population.

There appeared to be very few calves in the muskox groups relative to other areas. Our estimate of 7.8% calves is lower than that reported for the Queen Maude Gulf Region (Table 5 in Gunn 1990) or Banks Island (Table 2 in Gunn et al. in press). Large wolf and grizzly populations sustained by caribou might cause considerable early calf mortality thereby slowing population growth rate and the rapidity with which recolonization is occurring.

MANAGEMENT OPTIONS

There are a number of management options available which will allow the Aylmer/Artillery lakes muskox population to continue to grow while allowing utilization by people of the Northwest Territories.

The option preferred by the Department of Renewable Resources comprises the following components: a) definition of a new muskox zone north of the existing zone H/3-1, west of the Baillie River and following the northeast shore of Clinton-Colden and Aylmer lakes as far west as the northern tip of Aylmer Lake and then continuing north to the latitude of the southern tip of Pellat Lake, b) that resident hunters be provided an allowable harvest of 4 muskoxen of any age or sex in this new zone, and c) the quota of 14 for H/3-1 be changed from a bull-only harvest to allow any age/sex class to be taken.

Representatives of the Department met with Snowdrift Wildlife Committee on 18 October, 1991 to explain the results of the survey. The recommendation made by the Committee was a) that the above mentioned new muskox zone be instituted with an allowable harvest of 4 for resident hunters and b) that the Dene people of Snowdrift not be restricted in the number or age/sex of muskoxen taken in Muskox Zone H/3-1.

ACKNOWLEDGMENTS

We would like to thank Sam Boucher, Chairman of the Snowdrift Wildlife Committee, and Tom Lockhart of our Department, for accompanying us on the survey. Perry Linton did an excellent job of flying and contributed enormously to the survey by using his vast experience in the North to our benefit. We would also like to thank Gary and Bertha Jaeb, Steve Ward and the other staff of the MacKay Lake Lodge who made our stay as much a holiday as a working survey.

PERSONAL COMMUNICATIONS

Steve Ward and Gary Jaeb, c/o MacKay Lake Lodge, Yellowknife, NWT.

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APPENDIX A
TRANSECT DATA

Transect Number	Transect Length	Muskoxen on Transect	Muskoxen Off Transect
1 High	71	2	1
2 High	65	11	0
3 High	58	9	0
4 High	53	6	0
5 High	53	6	0
6 High	53	0	3
7 High	53	0	0
8 High	53	0	2
9 High	53	0	0
10 High	53	14	0
11 High	53	0	0
12 High	53	8	0
1 Low	75	0	0
2 Low	81	0	0
3 Low	87	0	0
4 Low	93	0	0
5 Low	144	0	0
6 Low	140	0	10
7 Low	160	0	0
8 Low	143	24	0
9 Low	200	0	0
10 Low	194	0	12
11 Low	200	16	1

APPENDIX B
WILDLIFE SIGHTINGS

July Date	Latitude	Longitude	Observation
24	64°26′	110°18′	4 dead caribou floating
24	64°58′	108°13′	16 muskoxen
24	64°57′	106°27′	1500 caribou
24	64°57′	105°51′	1 muskox
24	64°47′	106°19′	20 caribou
24	64°47′	106°32′	12 muskoxen
25	64°28′	110°08′	3 wolves
25	64°24′	106°00′	24 muskoxen
25	64°25′	107°17′	7 muskoxen
25	64°26′	108°00′	1000 caribou
25	64°24′	108°07′	1 muskox
25	64°25′	108°14′	11 muskoxen
25	64°25′	108°14′	500 caribou near muskoxen
25	64°13′	106°10′	1 wolf
25	64°05′	105°56′	10 muskoxen
25	64°03′	107°18′	1 muskox
26	63°51′	110°27′	1 wolf
26	63°52′	110°10′	2000 caribou
26	63°52′	110°06′	4000 caribou
26	63°53′	108°11′	200 caribou
26	63°53′	106°23′	19 muskoxen
26	63°39′	106°26′	6 muskoxen
26	63°39′	107°03′	1 muskox
26	63°38′	107°05′	21 muskoxen
26	63°38′	107°21′	1 grizzly
26	63°38′	107°22′	3 muskoxen
26	63°38′	107°38′	1 moose
26	63°38′	108°05′	1 moose
26	63°44′	107°42′	15 muskoxen
26	63°48′	107°26′	40 muskoxen
26	63°50′	106°54′	7 muskoxen
26	63°50′	106°20′	1 muskox
26	63°58′	106°28′	14 muskoxen
26	64°06′	107°53′	10,000 caribou
26	64°00′	109°03′	2 wolves
27	64°09′	107°53′	3 muskoxen
27	64°09′	107°40′	3K, 4K, 7K caribou groups
27	64°13′	107°00′	1 muskox
27	64°12′	107°55′	5 muskoxen
27	64°16′	107°53′	1000 caribou
27	64°16′	107°45′	300 caribou
27	64°16′	107°25′	5 muskoxen
27	64°16′	107°13′	1 muskox
27	64°19′	107°29′	1 grizzly
27	64°19′	107°41′	9 muskoxen, 10,000 caribou
27	64°21′	108°21′	800 caribou
27	64°21′	107°22′	11 muskoxen
27	64°23′	107°01′	1 muskox
27	64°26′	108°04′	1 muskox
27	64°26′	108°12′	1 muskox