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Distribution and Numbers of the Kaminuriak Caribou Herd in March and April, 1977

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ABSTRACT. The distribution and abundance of the Kaminuriak caribou herd were documented through an aerial survey conducted in March and April 1977. It appears that the herd altered its traditional migration patterns and abandoned its southern wintering grounds in this year at least. The size of the herd was estimated at 30,770 animals — a significant decrease from the 63,000 animals found in 1968. Available data, though limited, suggest that the maximum allowable harvest of 5% of the herd has been exceeded in recent years. Although the possibility exists that some Kaminuriak caribou may have dispersed northward, it is considered most likely that the decline in the size of the herd is the result of overharvesting.

RÉSUMÉ. En Mars et Avril '77, une reconnaissance aerienne était effectuée pour inventorier le troupeau de caribous de Kaminuriak et connaître sa repartition sur de terrain. Il apparait qu au moins cette année là, le troupeau n'a pas suivi ses chemins de migration traditionels et a abandonné ses paturages d'hiver, du sud. L'importance du troupeau était estimée à 30,770 animaux, en diminution forte par rapport aux 63,000 animaux dénombrés en 1968. Dans les recentes années, d'après les rensignements disponibles, bien que limités, le contingentement de chasse, limité à 5% maximum de Troupeau, aurait été dépassé. Bien que la possibilité existait de quelques caribous de Kaminuriak, dispersés vers le Nord, il est plus vraisemblable de penser que le déclin dans l'importance de Troupeau est le resultat du dépassement du contingentement de la chasse.

TRADUIT par Alain de Vendegies, Aquitaine Co. Canada Ltd.

INTRODUCTION

Several recent development proposals have focused attention upon the environment of the southern District of Keewatin. One of the most prominent environmental components of the southern Keewatin is the Kaminuriak caribou herd. This herd has played an important cultural and economic role in the lives of native people in communities in the District of Keewatin and in northern Manitoba and Saskatchewan.

The objective of this paper is to document the distribution and size of the Kaminuriak caribou herd during March and April, 1977.

METHODS

An aerial survey to determine the late-winter distribution and abundance of caribou of the Kaminuriak herd was conducted between 2 March and 1 April 1977 in northeastern Saskatchewan, northern Manitoba, southeastern District of Mackenzie, and southern District of Keewatin (Fig. 1). A Dornier DO 28

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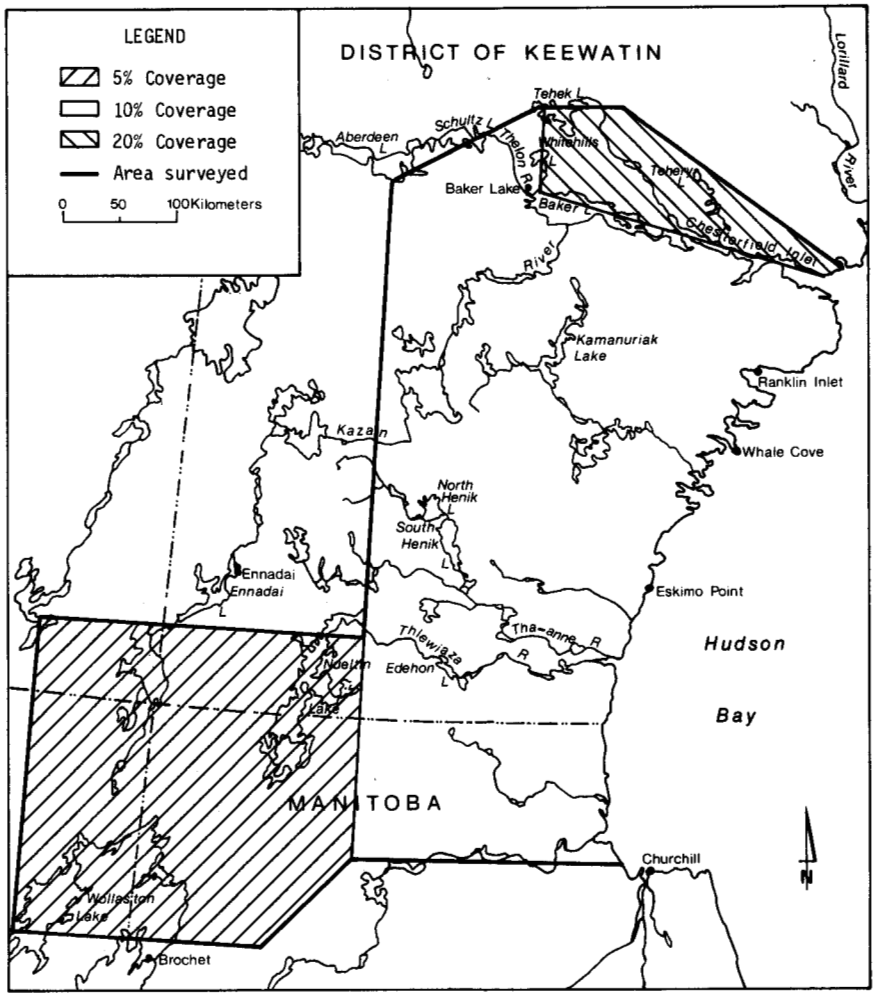

FIG. 1. Area surveyed during aerial transect surveys in March and April 1977 and percent coverage of various portions of the study area.

aircraft was used for these surveys; it was equipped with full IFR instrumentation including radar altimeter and Global Navigation System (GNS-500). The primary operation bases were Brochet and Churchill, Manitoba, and Baker Lake, District of Keewatin.

The aerial survey was designed to sample most of the expected range of the Kaminuriak herd. The survey involved flying parallel transect lines that were predetermined and marked on 1:250,000 topographic maps. Communication with game biologists in Churchill, Eskimo Point and Rankin Inlet during the planning of this survey suggested that very few animals had migrated to below tree line during the previous fall, and that few caribou were located in northern Manitoba and Saskatchewan during the early winter of 1976-77 (S. Kearney, pers. comm., Wildlife Development Specialist, Dept. of Renewable

Resources and Transportation Services, Government of Manitoba, Churchill; E. Fast, pers. comm., Game Management Officer, Fish and Wildlife Service, Government of the Northwest Territories, Eskimo Point; D. Ayotte, pers. comm., Game Management Officer, Fish and Wildlife Service, Government of the Northwest Territories, Rankin Inlet). Survey coverage varied from 5% to 20% based primarily on expected densities of animals (Fig. 1). Caribou were counted in 0.8 km-wide strips on either side of the aircraft. Caribou observed outside this strip were recorded separately as "off transect". Markers were affixed to the aircraft in the line-of-sight of observers to indicate location of the transect boundaries. Navigation along transects, particularly over tundra areas, was greatly facilitated by the use of GNS-500 in the aircraft as it allowed a predetermined ground track to be precisely maintained and gave a readout of the distance travelled. Transects were oriented along north-south lines. Surveys were flown at an altitude of 90 m and at airspeeds between 140 and 200 km/h.

Survey flights were carried out with two observers in addition to the pilot. In flight, the data were recorded on portable tape recorders. Each time animals or animal signs were seen, the observation was recorded as a checkpoint (e.g., checkpoint 1) and the checkpoint number was plotted on the appropriate 1:250,000 scale topographical map. For each observation, data recorded included time, total number of animals, height above ground level (from radar altimeter), estimated horizontal distance to animal(s), and whether or not the animal(s) was (were) "on" or "off transect". Data from tape records were later transcribed to data recording forms and keypunched onto computer cards for analysis and storage.

Population estimates of caribou were calculated by dividing the total number of animals observed on transect by the proportion of the total area surveyed. In instances where large groups of caribou were encountered, the total number of animals in the group was added to the estimate obtained from "on transect" animals separately, rather than recording these animals separately as being "on" or "off transect". A large group of caribou was defined as a group of 500 or more caribou. It was assumed that all such groups were observed in surveys with 20% coverage, and that only one-half of the large groups were observed in surveys with 10% coverage.

Because there is a possibility of underestimating animal populations as a result of observers overlooking animals, most estimates are probably conservative. Results from other researchers (Fischer and Duncan, 1976; Bergerud, 1963; Watson and Scott, 1956; Banfield *et al.*, 1955) indicate approximately 20% of the animals on transect are overlooked.

RESULTS AND DISCUSSION

The aerial survey was conducted between 2 March and 1 April 1977. A total of 10,132 caribou was observed.

Nearly all of the caribou observed (10,077) were within an area of concentration located to the north and east of Baker Lake. This concentration

area was roughly bounded by the communities of Chesterfield Inlet, Rankin Inlet, and Baker Lake, and by Tehek and Tehery lakes; it encompassed approximately 10,800 km² (Fig. 2). The greatest concentration of animals was in the vicinity of Chesterfield Inlet and extended from the eastern end of Baker Lake to approximately 60 km west of the community of Chesterfield Inlet. A smaller concentration of animals was observed in the vicinity of Whitehills and Tehek lakes. The estimated number of caribou within the area of concentration to the north and east of Baker Lake was 29,920 caribou (Table 1).

A few small groups were found in northeastern Saskatchewan and the southeastern District of Mackenzie (37 animals), and directly south of Baker Lake (18 animals). No caribou or caribou signs (tracks, craters) were

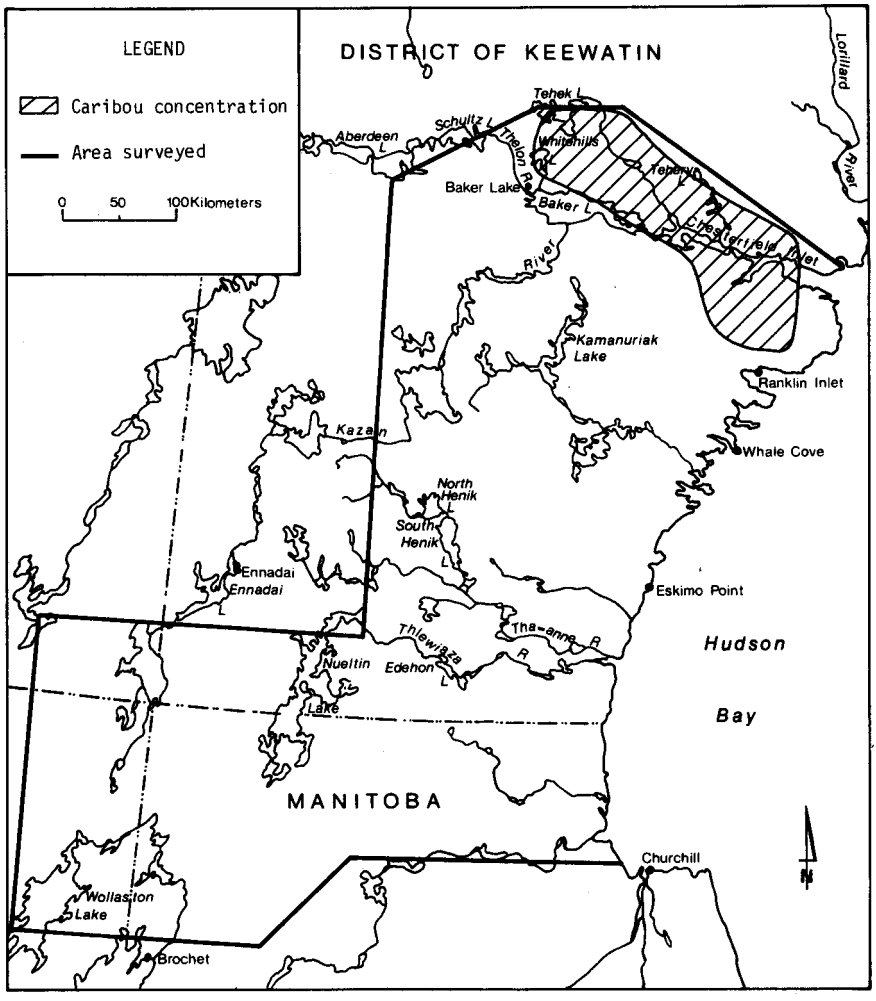

FIG. 2. Major area of caribou concentration during aerial surveys in March and April 1977.

TABLE 1. Estimated number of caribou in the known range of the Kaminuriak herd based upon aerial surveys conducted between 2 March and 1 April, 1977. Strata are as illustrated in Figures 1 and 2.

			Number observed				
Strata	Area (km^2)	Survey coverage	On transect	In large groups[a]	total	Population estimate[b]	Adjusted population estimate[c]
Concentration area							
South of Chesterfield Inlet	4,700	10%	920	3,500	5,562	16,200	18,500
North of Chesterfield Inlet	6,100	20%	1,667	1,000	4,515	9,335	11,420
Remainder of 10% coverage area	98,280	10%	18	0	18	180	225
5% coverage area	52,580	5%	25	0	37	500	625
Total	161,660		2,642	4,500	10,132	26,215	30,770

[a]Groups consisting of 500 or more caribou.

[b]Population Estimate = (Number observed on transect ÷ Survey Coverage) + (Number observed in large groups ÷ Proportion of large groups observed). It was assumed that one-half of the large groups of caribou was observed in 10% coverage and that all of the large groups of caribou were observed in 20% coverage.

[c]Assumes that 20% of animals on transect were missed.

encountered in northern Manitoba or in the District of Keewatin south of Kaminak Lake.

The fact that few caribou were located within our survey area in northern Manitoba and Saskatchewan is emphasized by the fact that very few caribou were killed by residents of this area during the winter of 1976-77 (S. Kearney, pers. comm., Wildlife Development Specialist, Dept. of Renewable Resources and Transportation Services, Government of Manitoba, Churchill).

Based upon the survey, the number of caribou within the historic range of the Kaminuriak herd was estimated to be 30,770, assuming that 20% of the caribou were missed during the survey flights (Table 1).

Over one-half of the caribou groups observed contained 12 caribou or less; however, three groups of 500, one group of 1,000, and one group of 2,000 animals were also encountered.

Seasonal distribution

Parker (1972) summarized the historical distribution of the Kaminuriak herd and also discussed in detail the recent distribution and movement patterns of the herd as determined from in-depth studies conducted by the Canadian Wildlife Service from 1966 to 1969. In the past, the main body of this herd wintered south of the tree line in northeastern Saskatchewan and northwestern Manitoba; a smaller portion (approximately 20% of the herd in 1966-1967) occasionally overwintered near Eskimo Point. Typically, by early May, most pregnant female caribou began spring migration to the calving grounds located east of Kaminuriak Lake; the remaining cohorts began their

migration as late as one month after. Immediately after calving, large aggregations of caribou consisting mostly of cow-calf groups formed in the area between the calving grounds and Baker Lake. Southward migration generally began in mid-July, with large groups heading toward Ennadai, Edehon Lake, and the Eskimo Point area. The rut occurred in early October, apparently near the tree line in the vicinity of South Henik Lake. Movement into the taiga for wintering generally occurred in November.

During the winter of 1975-76, there was some variation in this traditional pattern of distribution. Surveys conducted by the authors showed that over 20,000 caribou of the Kaminuriak herd spent the late winter in the vicinity of Baker Lake (Fischer *et al.*, 1977). Although the distribution of the remaining portion of the herd (probably over 20,000 animals) was not documented, surveys conducted by personnel from the Government of Manitoba indicated that few caribou were on the traditional taiga wintering grounds (S. Kearney, pers. comm., Wildlife Development Specialist, Dept. of Renewable Resources and Transportation Services, Government of Manitoba, Churchill). Hence, it appears that the remainder of the herd which was unaccounted for in the winter surveys at Baker Lake in 1975-76 must have also wintered on the tundra in areas that were not surveyed. Indeed, in early April 1976, a helicopter pilot with Viking Helicopters reported large groups of caribou in the vicinity of Eskimo Point. Also, large numbers of caribou were continuously being taken by Native hunters from Eskimo Point during March and April 1976 (D. Ayotte, pers. comm., Game Management Officer, Fish and Wildlife Service, Government of the Northwest Territories, Rankin Inlet). Additionally, during weekly flights between Baker Lake and the Tha-Anne River in April and May 1976, no significant numbers of caribou were observed migrating northeastward toward the calving grounds (Fischer *et al.*, 1977).

It is apparent that this general pattern was repeated during the winter of 1976-77. The only place any number of caribou was observed was to the north and east of Baker Lake; no caribou were observed in the Eskimo Point area during the present surveys.

It therefore appears that the Kaminuriak herd has altered its traditional migration patterns and abandoned, at least temporarily, its southern wintering grounds.

Total numbers

Parker (1972) estimated the Kaminuriak herd to number approximately 63,000 animals in June 1968. Estimates prior to Parker's study suggested that the herd had undergone considerable fluctuations in numbers. Loughrey (1955) estimated it to contain 149,000 animals in 1955. However, Kelsall (1968) reported only 40,000 caribou in the winter of 1957-58. From his evaluation of the evidence, Parker (1972) concluded that his pre-calving estimate of 63,000 animals in 1968 was probably close to that which existed in primitive times. Since 1968, the Game Management Division of the Government of the Northwest Territories has carried out annual calving ground surveys. However, the authors generally express a lack of confidence

in their estimates; they cite weather (Bowden 1972), survey methods (Hawkins and Howard, 1974) and calving ground shifts (Land and Hawkins, 1973) as possible sources of inconsistency. Robertson (1975) surveyed the wintering grounds in 1974-75 and estimated 55,000 animals in the taiga. He further estimated that 6,500 animals overwintered on the tundra near Eskimo Point, bringing the total population estimate to 61,500.

Surveys of the Kaminuriak herd conducted by the authors in 1976 resulted in a population estimate of 42,376 caribou — nearly 20,000 fewer animals than Parker's 1968 estimate (Fischer *et al.*, 1977); it was concluded that the difference of 20,000 animals probably could not be accounted for solely on the basis of survey error. Calef and Hawkins (1977) also suggested that the Kaminuriak herd has declined during recent years by approximately 20,000 animals. The results of the present survey suggest that a further reduction of approximately 11,600 animals has occurred. Several possible mechanisms have been suggested by biologists as capable of producing a decline in the Kaminuriak herd, including overharvest by hunters and dispersal of Kaminuriak animals into other areas.

Hunter harvest

During 1967-68, Parker (1972) estimated that 3,560 caribou of the Kaminuriak herd were harvested by hunters. At that time, the number harvested represented approximately 5% of the total herd size. He suggested that this level of mortality, in conjunction with other natural mortality (estimated at 5%), was sufficient to prevent the herd from increasing in numbers. Calef (1978) states the reported harvest from the Kaminuriak herd has averaged 8.8% of the total herd in recent years, not including any kill which may be occurring in Manitoba and Saskatchewan, a figure which is significantly above the maximum of 5% suggested by Parker's (1972) work.

Dispersal of Kaminuriak caribou

Herd *et al.* (1977) have recently reported the existence of two caribou herds, the Lorillard herd and the Wager Bay herd, in a previously unstudied area north of Chesterfield Inlet. Herd *et al.* (1977) estimate that a total of approximately 29,000 caribou occur in these two herds. It is tempting to speculate that Kaminuriak caribou have simply dispersed northward since the Kaminuriak herd has been known to cross Chesterfield Inlet, the ranges of these three herds appear to be virtually contiguous, and the reduction noted in the Kaminuriak herd roughly corresponds with the estimated numbers in the two herds north of Chesterfield Inlet. Herd *et al.* (1977) suggest that, although it is possible that some of the caribou of the Wager Bay and Lorillard herds are emigrants from the Kaminuriak herd, the Wager Bay and Lorillard herds must currently be considered to be separate from the Kaminuriak herd. However, since these areas were not surveyed prior to 1977, it is impossible to tell whether more or fewer caribou are currently inhabiting the Lorillard and Wager Bay areas (Herd *et al.*, 1977).

CONCLUSION

Aerial surveys carried out in March and April, 1977, indicated that the size of the Kaminuriak herd of barren-ground caribou was 30,770 animals at that time. This represents a significant decline from the population estimate of 63,000 animals obtained from aerial surveys in 1968 (Parker, 1972). The present study also determined that the Kaminuriak herd spent the winter of 1976-77 on the tundra in areas to the north of Chesterfield Inlet and along the coast of Hudson Bay. Some limited data suggest a similar change in the herd's traditional winter range during the winter of 1975-76.

Current data do not allow clear resolution of the possibilities concerning the cause of the decline in the numbers of the Kaminuriak herd. It is possible that overharvest, dispersal, or other factors, contributed to the decline. However, wildlife officers in the Keewatin appear to be unanimous in their opinion that the Kaminuriak herd is currently being overharvested in excess of its recruitment rate (Calef, 1978). Assuming that Parker's (1972) figure of a 5% maximum allowable harvest is correct, it appears that the maximum harvest has been exceeded in most recent years (Calef, 1978; Thompson *et al.*, 1978; Fischer *et al.*, 1977). Therefore, we also consider that it is most likely that the decline which has occurred in the Kaminuriak herd is primarily the result of overharvesting.

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