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Barren-ground caribou resurvey 1955.
[Yellowknife, Canadian Wildlife Service]
1955.
7 l. tables.

1. Caribou - Population distribution - NWT
2. Caribou - Surveys - NWT. I. Title.

BARREN-GROUND CARIBOU RESURVEY
1955
by
John P. Kelsall

Information on the findings of the 1955 barren-ground caribou resurvey in Manitoba and the eastern part of the Northwest Territories is not in the author's hand at the time of writing, and it appears likely that it will not be available in time for incorporation in a single report prior to late June, when the author goes on annual leave. This report is designed, therefore, to cover the most important findings in the western Northwest Territories, Alberta, and Saskatchewan for preliminary scrutiny, and for possible correlation with the presently missing data, at head office.

Only two primary findings of the resurvey are dealt with below; these relate to caribou numbers and distribution. The data clearly indicates that these are crucial matters of immediate importance.

Itinerary

Flying on the 1955 resurvey commenced on March 3 with operations from Yellowknife. With interruptions due only to unfavourable weather or aircraft difficulties, it proceeded until May 13. In late March and early April J.S. Tener, Mammalogist for the Eastern Arctic, also operated on the resurvey from Yellowknife in a second aircraft. In late April Thomas Harper and Robert Ruttan, Game Biologists with the Saskatchewan Government, operated in their Province from a base at Uranium City.

The extent of the country covered and of the job involved may possibly best be judged by consideration of the following hours and mileages contributed by the various field parties. Not included are hours which Tener flew on muskox survey and which were helpful to the caribou resurvey.

Month	Hours Flown	Approx. Miles
March	186	21,390
April	108	12,960
May	33	3,795
Total	327	38,145

Methods

The methods used in conducting the 1955 resurvey were those which the Canadian Wildlife Service has used for a number of years and little enlargement on their application is necessary here. The country was covered by aircraft carrying two observers each. Often the pilot was counted as the second observer. Within areas of caribou occupancy, strip census techniques were used to sample the population and to obtain figures from which an estimate of total population could be developed. Predetermined courses were flown over occupied areas at known altitudes. Caribou were counted within a known distance of either side of the aircraft - the distance being governed by reference to angle lines marked on the windows and struts of the aircraft. Thus at the commonly-used altitude of 500 feet, with an observation angle of 75°, the width of the strip was 1,866 feet out from each side of the aircraft - a total strip width of .71 miles. Boundaries of occupied areas were marked on the maps used in flight so that the total area of occupancy could be calculated accurately. Once the total size of an occupied area was known, and a caribou per square mile figure obtained from the sample transects, the total number of animals present was readily calculated by multiplication.

Coverage

The Cree, Moose, Wollaston, and Reindeer Lake areas in Saskatchewan were covered by provincial biologists and a preliminary, unofficial report of their findings gives information used in this report.

The area surveyed from Yellowknife is shown on Map No. 2. It was extended north and west to cover all possible caribou range areas in these directions and in the south it included the caribou-occupied part of Alberta and a small part of northern Saskatchewan to overlap the provincial survey area. The eastern boundary is artificial. Caribou ranges farther to the east were to be covered by Manitoba representatives and by A.G. Loughrey of the Canadian Wildlife Service operating from Churchill.

The entire area shown was searched for caribou. For the most part transects were no more than 15 to 20 miles apart. In some areas, notably north of Great Bear Lake, a great deal of country was covered by commercial pilots on other business at the time of the survey, and it was possible to reduce transect flying so as to fill in areas which were not already seen and reported on by others.

Transects spaced evenly at more than 20 miles apart were adequate on the barrens. Most search transects were flown at right angles to known caribou movements. Even if there were animals out of sight between transects, their trails could be readily spotted and followed if their numbers warranted. Within tree-line, transects were consistently spaced closer together, hardly ever more than 20 miles and generally more nearly 15 miles apart.

The total ground area adequately surveyed for an absolute count of caribou was close to 5 per cent. This was adequate for searching for caribou-occupied areas, and the financial limitations of the survey would allow no more intensive search. Wherever possible this coverage was increased over occupied areas. In Table 1 will be found the per cent coverage given to each of the caribou concentrations found. They run from 4.6 per cent coverage of total area to 20.3 per cent. It was hoped initially to give 20 per cent coverage to all occupied areas, but as flying progressed, it became clear that finances would not allow this.

Fortunately, caribou on most occupied areas were much more scattered than is usually the case. This was particularly true on such large areas as those designated in Table 1 as Athabasca-Great Slave (9) and Fort Franklin (4). A scattered and random distribution greatly increases the accuracy of population estimates even with a relatively low sampling of the area.

Survey Results

The areas in which caribou were found are shown on May No. 1. The data for each occupied area shown is presented in Table 1. For convenience each occupied area has been assigned a name, used in the Table, relating to some topographical feature of prominence which is either included in the area or is near by. Each area has also been assigned a number which is used for reference in both map and table.

The area covered by Saskatchewan representatives is not shown on the map. It included all caribou-occupied areas in the province south of the limits shown. Caribou in the area covered by Saskatchewan representatives must have been in some measure continuous with the Misekuma Lake (10) concentration shown on the map. Duplication of animals in making estimates of numbers there is not likely, since boundary areas were flown at nearly the same time.

Caribou were seen in the survey area in addition to those accounted for in the mapped areas of occupancy. Their numbers were, however, very small, and their inclusion would not increase the total population figures significantly. All would be classed as strays and many were far from any area of concentration. Examples were seven caribou seen on Adelaide Peninsula and eight seen near Gros Cap on Great Slave Lake. Stray animals will be considered in compiling a later, and fuller, report on the resurvey.

To facilitate comparison of the present data with that gathered in the past it will be considered by areas as follows:

North of Great Bear Lake (No. 1 on Map No. 2):

Only three groups of caribou were found north of Great Bear Lake. Their positions are shown on Map No. 1 and their statistics presented in Table 1. The largest group of the three numbered only 2,355 animals and together they make up an estimated population of a little less than 5,000 animals. Banfield's estimate of caribou numbers in this area, developed from information derived from various sources in 1950, was 35,000. Subsequent aerial surveys confirmed this and the following summarizes the findings of the various surveys:

Banfield - 1950	35,000
Loughrey - 1951-52	24,200 to 29,200
Kelsall - 1952-53	34,000
Kelsall - 1954-55	4,928

The last figure was determined from the most thorough of all the surveys north of Great Bear Lake, during which both winter and summer ranges were covered within a period of a week. Flight lines were sometimes 30 to 40 miles apart, but intervening areas were adequately covered by pilots of commercial aircraft on northern construction work. The only caribou seen by the several other pilots interviewed were those also seen by the caribou resurvey party.

Small, scattered groups of caribou were seen within hunting radius of Fort Good Hope throughout the winter, and some of these were taken by hunters. Two such groups, and tracks of others, were seen during the resurvey. The animals seen were woodland caribou.

Even should the population estimates above be far from correct there is no doubt whatever that the caribou population has recently been very drastically reduced. It may be recalled that a survey in the winter of 1953-54 failed to find any caribou north of Great Bear Lake. At the time this was not thought particularly remarkable and it is still not believed to indicate positively that a reduction was under way at that time. Little over 1,000 miles were flown at that time and only prime winter ranges were covered, and there were many thousands of square miles left unsurveyed which could have contained the herds. The reduction could, however, have started as early as the spring of 1953.

Between Great Bear and Great Slave Lakes (No. 2 on Map No. 2):

Five groups of caribou were found in the area between Great Bear and Great Slave Lakes. Their positions are shown on Map No. 1 and their statistics in Table 1. The largest group of the five numbered only about 26,000 and together they are estimated to number only 55,952. This is the only area in which the relatively small numbers encountered in 1955 were no surprise. The various estimates of numbers for the animals wintering in the area since 1949 have shown a progressive decrease. They are given below:

Banfield - 1948-49	219,000
Kelsall - 1950-51	147,000
Kelsall - 1952-53	51,000
Kelsall - 1954-55	55,952

The last figure above is still subject to some revision, which is likely to be upward, but not significantly so. There has been a progressive diminution of caribou in this area ever since the continuing study was initiated in 1950 and this has been the subject of much comment and speculation in previous reports. The decrease cannot be due to hunting pressure, except in part, and has not been thought due to disease. There has been some positive evidence that it might be accounted for in terms of movement to other range areas to the eastward.

It is interesting to note that half the caribou in this region were in a relatively small area of 3,900 square miles in the extreme northwest. They, unlike most other groups, were subject to constant hunting pressure from Franklin Indians during the past winter. The other occupied areas were widely scattered.

The concentration at Indian Mountain Lake might well be a small segment from the larger herds south of Great Slave Lake rather than from animals regularly wintering north of the lake. For this reason no significance is placed in the fact that the 1955 estimate of numbers is larger than the 1953 estimate.

There is now no doubt that the animals between Great Bear and Great Slave Lakes are so reduced in number that they can stand only very light usage from natives in the area. In some winters in the past the Rae Indians alone have been recorded as having used over 9,000 caribou. One or two such winters, with the population at its present level, would spell disaster.

Between Athabasca and Great Slave Lakes (No. 3 on Map No. 2):

The most satisfactory caribou populations found during the resurvey from Yellowknife were between Great Slave Lake and Lake Athabasca and in the southeast toward the Manitoba boundary. Even so, the numbers were not as large as expected. Their positions are shown on Map No. 1, and their statistics on Table 1. As can be seen on the map, the area of occupancy is a very large one. Actually it was continuous, although two adjacent areas, rather than a single large one, are shown on the map. This was done because the concentration of animals was much heavier in the small area designated as Misekuma Lake (10) than it was over the rest of the area. A more accurate estimation of total numbers should result from treating the two degrees of concentration separately.

This area has not been subject to continuing study and the only prior estimate of numbers for it are Banfield's. Included in the area are Banfield's winter ranges for Hanbury, Athabasca, Saskatchewan and (in some years at least) Brochet herds.

Banfield's estimate including Brochet herd	-	315,000
Kelsall, Huttan and Harper, 1955	-	79,534

The latter figure will be subject to some revision when complete data is in from Saskatchewan and it is believed that the revision is likely to be upward.

The distribution and movement of the caribou in this area during the time of the survey - April 13 to 25 - was somewhat remarkable. With very few exceptions the caribou in the Athabasca-Great Slave (9) and Misekuma (10) areas were heading southwest. At that time they are usually expected to be heading north. Trails and feeding areas indicated that the southwest movement had not been progressing long and had been preceded by a brief northward movement. Distribution in the Athabasca-Great Slave (9) occupied area was exceedingly random and scattered. No tendency to form large groups, which is normal at that time of year, was noted. Caribou had actually dispersed and scattered widely shortly before the survey, from a few areas where it was obvious that they had been concentrated during the winter. This was, of course, ideal, if unexpected, for making a population estimate from strip counts.

Barren-ground Region (No. 4 on Map No. 2):

Within the huge expanse of barren-grounds shown as Region 4 on Map No. 2, Banfield listed only one regularly wintering herd - the Adelaide Peninsula herd numbering 500 animals. He did not preclude the possibility of parts of other of his listed herds being in the barrens.

The author has found caribou numbering in the tens, even hundreds, of thousands wintering in the barrens, particularly along the south of Coronation Gulf, in the Bathurst Inlet area, and south of Queen Maude Gulf. In the spring of 1950 herds numbering between 126,000 and 176,000, which could scarcely have wintered anywhere but on the barrens, crossed Bathurst Inlet in migration. In the winter of 1951-52 Loughrey did not receive reports of heavy wintering populations, but in 1952-53 a wintering population of more than 100,000 between Kent Peninsula and the Murchison River was indicated. In that winter, reasonably accurate reports indicated that natives killed over 9,000 caribou in a few months.

Caribou were in the barrens during the 1955 resurvey in widely scattered and small numbers. Three areas contained enough animals to make a population estimate profitable. These were the sand ridge and esker country along the eastern Back and Bullen Rivers, the rolling country east of the Thelon across the Clarke River and a small area of tundra and tree-line east of Fort Reliance (Table 1 and Map No. 1). Altogether caribou involved numbered 12,009.

No survey was necessary to testify to the greatly reduced number of caribou in Eskimo-occupied barren-grounds during the winter of 1954-55. Great hardship prevailed everywhere. Human starvation was not reported but many dogs were lost. Even experienced white trappers like Matt Murphy and George Hagrum lost dogs and reached near starvation conditions. The spectacle of the Eskimos arriving at Burnside Harbour for the annual Easter celebrations, which the author and his pilot witnessed, was pitiful. In some instances two or more families had pooled their remaining dogs, and even with men helping dogs the komatiks barely made headway.

Discussion

It is pointless to give close and critical analysis to the resurvey results presented above until information from all sources and areas can be correlated and put together in one complete report. However, one thing is certain: since Banfield's original work in 1948-1950 the caribou populations in the areas considered above have greatly diminished either through migration or mortality. The reduction in numbers was first noted between Great Bear and Great Slave Lakes as long ago as 1950-51, but it was not hitherto suspected that the decrease extended over so wide an area, or on so great a scale. It was actually anticipated that more caribou would be found east of Slave Lake, in areas not covered by the continuing study, than had been found by Banfield. A comparison of the two estimates has been presented above in the discussion of areas but it is here presented again in summarized form:

Area	1950 Estimate	Present Estimate
North of Great Bear Lake	35,000	4,928
Between Great Bear and Great Slave Lakes	219,000	55,952
Great Slave-Athabasca Lakes and east	315,000	79,534
Barren-grounds	500	12,009
Totals	569,500	152,423

It is thought that no significance is attached to the apparent increase of barren-ground wintering caribou since 1950. The numbers of barren-ground wintering caribou appear to show wide variation under all circumstances. Neither should it be inferred that the present estimate is particularly accurate because the author has chosen not to reduce the numbers to round numbers. The total of 152,423 and all its component figures are subject to wide, and regrettably uncalculable, margins of error. Banfield considered his estimates minimum ones. The new estimates are also considered minimum. It is believed, however, that the latest figures should be subject to less error than the original ones, since they are based on the experience gained in the original study and in five years of continuing study.

Table 1. Transect data and caribou population estimates for the various caribou-occupied areas located during survey flying in March, April, and May, 1955.

* Figure includes a concentrated group of 2,900 caribou added to the estimate from transect data.

N.B. The total figures in columns 5 and 7 above are average figures calculated from the other totals.

Area Reference	Size Occupied Area - Square miles	No. Miles Flown	Width of Transect in Miles	No. Square Miles Surveyed	% Coverage of Occupied Area	Total Caribou Seen	Caribou per Survey - Square Mile	Estimated Total No. of Caribou in Area	
1 - Anderson River	48	10	0.71	7.1	14.8	305	42.9	2,059	2,100
2 - Tsoko Lake	736	49	0.71	34.8	4.7	112	3.2	2,355	2,400
3 - Caribou Point	321	69	0.71	49.0	15.3	77	1.6	514	1,500
4 - Fort Franklin	3,904	640	0.71	454.4	11.6	2,692	5.9	25,934 *	26,900
5 - Lac Grandin	672	92	0.71	65.3	9.7	288	4.4	2,957	3,000
6 - Lever Lake	1,328	184	0.50	92.0	6.9	485	5.3	7,038	7,000
7 - Gordon Lake	1,152	330	0.71	234.3	20.3	797	3.4	3,917	3,900
8 - Indian Mountain Lake	224	26	0.71	18.5	8.2	1,330	71.9	16,106	16,100
9 - Athabasca-Great Slave	27,242	1,779	0.71	1,263.1	4.6	1,886	1.5	40,863	40,900
10 - Misekuma Lake	1,376	94	0.71	66.7	4.1	1,414	21.2	29,171	29,200
11 - Fort Reliance	1,984	180	1.07	192.6	9.7	329	1.7	3,373	3,400
12 - Clarke-Thelon Rivers	3,516	278	1.32	367.0	10.4	629	1.7	5,977	6,000
13 - Back-Bullen Rivers	6,648	394	1.32	520.1	7.8	210	0.4	2,659	2,900
Saskatchewan Survey Area	Based on advance information from Saskatchewan and subject to revision							9,500	
Totals	49,151	4,125		3,364.9	6.8	10,554	3.1	152,423	

Table 1. Census of Caribou which Wintered in the Western Arctic

Area Reference	Size Occupied Area - Square Miles	No. Miles Flown	Width of Transect in Miles	No. Square Miles Surveyed	% Coverage of Occupied Area	Total Caribou Seen	Caribou per Surveyed Square Mile	Estimated Total No. of Caribou in Area
Bear Lake Northeast	2,496	254	.49	124.5	5.0	523	4.2	10,500
Yellowknife	696	150	.49	73.5	10.6	1,448	19.7	13,700
Snowdrift	768	152	.49	74.5	9.7	216	2.9	2,300
Rutledge Lake	1,216	258	.49	126.4	10.4	1,227	9.7	11,800
Bathurst Inlet East	682	56	1.50	84.0	12.3	1,259	15.0	10,200
*South of Slave Lake - estimate on basis of 147 caribou seen in a 3% coverage of area								4,900
*Islands in Slave Lake - estimate only								4,000
*Barrens west of Bathurst - estimate on basis of 300 caribou seen in 7.5% coverage of area								4,000
*North of Great Bear Lake - estimate on basis of 513 caribou seen in 5% coverage of area								10,300
*Deerpass Bay - estimate only								300
*Keller Lake and McVicar Arm - estimate on basis of 445 caribou seen in 5% coverage of area								8,900
TOTAL								80,900

* - animals were too thinly scattered to permit the drawing of limits around the areas which they occupied.

TITLE

DATE LOANED	BORROWER'S NAME