CARIBOU WINTER RANGE STUDY, 1950 - 51

by

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Introduction

During the winter of 1950 - 51, a caribou winter range study was carried out for the purpose of gathering new information to add to our knowledge of caribou and comparative information which could be used over a period of years for purposes of management. Intensive rather than extensive research was stressed. Since the personnel and finances allotted to this study were limited, it was decided to concentrate work as much as possible on caribou herds in the vicinity of Yellowknife. The Rae herd, believed to be one of the largest on the continent, was to have major attention, while the Great Bear, Radium and Yellowknife herds were to receive somewhat less intensive attention. Three major purposes were kept in mind when dealing with all of these herds:

(1) A census of each herd was desirable in order to ascertain actual numbers in herds.

(2) The calf ratio within the herd was to be determined as a very desirable bit of comparative knowledge.

(3) Predation by wolves was to be studied whenever and wherever possible.

In addition to the major purposes listed above, there were a number of minor purposes of varying importance in conducting the winter studies. Among these, the winter range itself was to be studied both from botanical and topographical aspects. Winter movements of herds and actions of caribou herds and individuals were to be studied and embryological matter was to be collected.

The project, as originally conceived, was not as successful as was hoped might be the case. This winter was a poor one for working on caribou from Yellowknife. Almost without exception, the various herds which were expected to be within easy range of Yellowknife, stayed just as far away as was possible in view of their various winter ranges. A great deal of time had to be spent simply locating the animals and, when located, much flying time was necessary just to get out to them and back.

A further complication was the establishing of the new Yellowknife office and laboratory, which took considerable time.

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Itinerary

From the date of my arrival in Yellowknife, December 4, 1950, to the end of the fiscal year, March 31, 1951, fifty days were spent in the field on work directly relating to the caribou winter range study. Map #2 shows the tracks of major survey flights made to the north and northwest of Yellowknife during this period. Field work was commenced by extensive exploratory trips covering the period December 9 - 19. During this period, I was able to accompany the Christmas mail and freight flights to the Arctic Coast through the courtesy of Yellowknife Airways. Two separate return trips were made between Yellowknife and Coppermine; points visited included Fort Rae, Hottah Lake, Contact Lake and Eldorado. From Coppermine, extensive flying was done eastward, largely along the Arctic Coast; points visited included Bathurst Inlet, Cambridge Bay, Perry River and Sherman Inlet (south of King William Island). The large Rae herd of caribou was not located during this flying, although it was ascertained from old trails that it must be somewhere west of the line between Eldorado and Yellowknife.

On December 30 and 31, a flight was made to Eldorado, Sawmill Bay, Grizzly Bear Mountain and south along the Johnny Ho River, over the Cartridge Mountains and south to Lac la Martre. Surprisingly, no sign of the Rae herd was found on this trip, and recent heavy snow had obliterated all old trails.

During the next ten days, enquiries were sent to wardens and others around the area where the herd was believed to be, and Yellowknife Airways diverted aircraft from scheduled flights over various parts of the area which had not been previously covered. The caribou were not found, but on January 10, by process of elimination and with the help of information forwarded by the Game Warden at Fort Simpson, part of the herd was located by aircraft only a few miles to the east of Fort Wrigley.

Between January 18 and 27 a most successful ground patrol was made among the Rae herd. The Yellowknife Game Warden, Earl Bulmer, his Indian and dog team, were flown with me to the herd on January 18 and returned to Yellowknife by aircraft on January 27.

Plans for further ground studies and, in particular, experimental predator control, had to be cancelled due to the unfortunate death of the Yellowknife Game Warden on February 6 in an aircraft crash.

Between February 10 and 17 flights were made to Eldorado and around Great Bear Lake for the purpose of locating the Great Bear herd of caribou.

Between March 1 and 9 and March 13 and 16, I participated in the musk-ox -- caribou survey with the Mammalogist for the Eastern Canadian Arctic. Some flying was done on each of the herds to which major attention was being given, and all of the flying was valuable as exploratory work for the caribou survey.

On March 19, a survey flight was made over a wintering herd of caribou in the Thubun Lakes area south of Great Slave Lake.

On March 22, a flight was made to the northwest of Lac la Martre for the purpose of noting any eastward movement of the Rae herd and laying down a cache of 86 octane aviation gasoline so that a smaller and less expensive aircraft could be used for further survey work.

On March 24, 25, and 26, very extensive flying was done on the Rae herd. Concentrations were located and a large number of photographs were taken. This completed the field investigations to the end of the fiscal year.

Winter Movements of the Rae Herd

When I arrived in Yellowknife early in December, the whereabouts of the Rae herd was a mystery. Even the bush pilots who were making regular flights from Yellowknife to the eastern portions of Great Bear Lake had seen no sign of the herd for a considerable time. It was known that this herd had moved through Indin Lake in great numbers during October. They had crossed a narrows in the lake by swimming, taking several days to go through. Following this, they must have moved very rapidly and passed to the westward of the chain of large lakes between Rae and Eldorado before the heavy winter snow set in. Early in December, the only signs of this herd were old, indistinct trails heading westward from the west sides of Faber and Rae Lakes. From then, until the herd was definitely located on January 10, their exact movements are not known. Certainly, they did not touch Lac la Martre for none of the Rae Indians had contacted them. It is thought, with reasonable certainty, that they moved westward through Lac Grandin and Lac Tache, north of the Cartridge Mountains. From there, it seems very possible that they split into several groups and continued westward until they struck the Mackenzie Mountains east of the Mackenzie River.

Aerial surveys during January and March showed that these animals occupied a very distinct and large winter range to the west of all winter ranges indicated by Banfield in the Report on the

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Barren Ground Caribou. Banfield indicated winter range extending as far west as Keller Lake. This past winter, except for two small pockets of caribou which remained to the eastward, all the animals wintered west of Keller Lake. (See Map #1.) The occupied range embraced a strip of country from the eastern slope of the Mackenzie Mountains eastward for 35 to 60 miles and from the Bear River in the north to the Willowlake River in the south. During the winter, caribou stayed almost exclusively in high country above 1,200 feet and moved frequently from one high spot to another. During a ten-day ground patrol in the latter part of January, we found one section of the herd at a 1,500 foot altitude and, at the time of the patrol, they were in the process of moving north to even higher country.

During extensive surveying from March 24 - 26, it was found that there was scarcely any high wooded country between the Willowlake and Bear Rivers which did not show signs of occupancy during the winter. In at least two places, just south of Wrigley airstrip and at Norman, the caribou moved through passes in the mountains and touched the Mackenzie River in some numbers. It is likely that they touched the river in other places as well.

During the March 24 - 26 survey, it was expected that caribou would be on their way eastward. They were, but the movement was not nearly as marked as had been anticipated. For all intents and purposes, they were still occupying their winter range area except for a few columns which had pushed to the east. However, their distribution had changed considerably. Instead of occupying the high country, they were moving to lower country and particularly along river valleys. (See Map #1, direction of movement indicated by arrows.) This movement was particularly noticeable in a large valley which extends in a southward curve from Blackwater Lake to Keller Lake. Movements, in general, were southeast, as would be expected, but frequently groups would be moving down valleys in almost any given direction. All these valleys, however, ultimately turn east or southeast.

The caribou at this time appeared to be split into two rather distinct groups. A large group was moving southeast from the vicinity of Bear River. A second group, which might be more accurately described as a loosely connected aggregation, occupied a large area to the south of this. (See Map #1.) There were good indications that rapid movement to the east or southeast could be expected during April. Three areas of marked concentration were noted in these two groups (see Map #1) and it is suspected that other concentrations were present.

Two small groups of caribou, presumably parts of the Rae herd, remained well to the east of

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the general wintering area. (See Map #1.) One of these wintered on the Johnny Ho River in the vicinigy of Lac Tache and had just started an eastward movement in March. The second group was first located early in January between Lac la Martre and the Willowlake River. By late in January it had moved southeast to Windflower Lake; by the last week in February, it had moved northeast to the south shore of Lac la Martre, around to the southeast corner of that lake, and presumably away from it in a northeasterly direction. Strangely, this herd of caribou passed through the Lac la Martre area without being contacted by the Rae Indians, who were desperately in need of caribou all during the winter.

Winter Movements of the Radium Herd

Sections of the Radium Herd moved into the winter range early this year. By the first week in November, caribou were numerous in the vicinity of Eldorado and a short time later they had reached Fort Franklin on the west end of Keith Arm, Great Bear Lake. Large numbers of them occupied their winter range well before freeze-up and various observers saw caribou swimming across unfrozen portions of rivers and lakes or crossing very thin ice under hazardous conditions. During the latter part of December, elements of this herd were still moving onto the winter range from the vicinity of Dease River, Dismal Lakes and the Big Bend in the Coppermine.

The Radium herd occupied a very large winter range including a strip 10 to 40 miles in depth completely around the southeast side of Great Bear Lake from Dease Arm to the Bear River. Over most of this large area, caribou were exceedingly scattered and in very small numbers. There were three areas of concentration. (See Map #1). The largest of these was found on the peninsula which lies between Dease Arm and McTavish Arm. The second largest concentration was in the vicinity of Fort Franklin. In this case, however, it is not known to what extent the Radium herd mixed with the Rae herd, as the majority of animals in this concentration might well have belonged to either herd. The third area of concentration was a narrow strip of forest country just south of McVicar Arm and the numbers of animals involved were no more than a few thousand at least.

Once the caribou were on this winter range, their movements appeared to be limited, although the herd was so thinly scattered over a large area that movements would not be readily noticeable anyway. It is emphasized that while the winter range occupied by these animals was very large, the numbers involved were not nearly so great as those involved in the Rae herd.

From the size of the winter range, the fact that there were three widely separated areas of concentration, and the fact that movement onto the range took place over a period of probably three months, it is thought likely that this herd is not a well-defined, separate unit. It is quite possible that there may be two or more minor herds involved instead of one large one. It is known, for instance, that the caribou which wintered just south of Dease Arm moved into that area from west of the Dismal Lakes and September Mountains and down the Dease River. In late March they had commenced a marked northward movement along the same route. The animals which wintered further to the south moved in from the direction of the Big Bend in the Coppermine, and it is thought that a good number of them came from east of the Coppermine River itself.

Winter Movements of the Great Bear Herd

Due to the fact that only two survey flights contacted the Great Bear Lake herd, their winter movements are more a matter of speculation than of fact. Since this herd had not been previously located during the course of the caribou survey, it would appear worthwhile to record the picture as it appeared.

The whereabouts of this herd during the winter of 1949 - 50 is not known. A survey flight during the middle of April, 1950, completely around the north end of Great Bear Lake, failed to show any signs of caribou occupation. On February 17, 1951, a flight was made from Fort Franklin around the whole north side of Great Bear Lake and the herd was located. On March 2, a further flight was made from Dease Arm to the northward and additional elements of the herd were noted.

It appeared that this herd moved to Great Bear Lake largely from the vicinity of the Haldane River and the headwaters of the Horton River. On reaching Great Bear Lake, they moved westward to the west end of Smith Arm and south in the direction of Bear River. (See Map #1.) The total area occupied by this herd is not known but it is suspected that it is very large. A strip 150 miles long on the north side of Great Bear Lake contained wintering caribou and from Dease Arm the animals extended northward for at least 100 miles. (See Map #1.) No areas of concentration were noted but animals were well distributed in small numbers, and in small groups, over the whole area covered.

From the indications noted on the two survey flights, it is very possible that this herd is a very large one. Information on it is almost entirely lacking since it has little contact with human beings, less, in fact, than any other major

herd. Fort Good Hope Indians contact it some winters on Lac des Bois and a few trappers usually see part of it on Smith Arm in the Good Hope Bay area. Other than the possibility of a few Eskimos from Paulatuk meeting it, these are its only regular human contacts.

Caribou Wintering on the Barrens

During the past winter, as during the previous winter, a very considerable number of caribou wintered on the Arctic Coast. Caribou are well known to winter in the barrens occasionally and during the time of Hoar's investigation, major herds were found wintering in the inland barren country. During the past two winters, the numbers of caribou on the Arctic Coast have been large and, if Banfield's assessment of caribou distribution is essentially correct, then major portions of several of his herds must have stayed in the north.

During this past winter, caribou were found wintering along the Coppermine River from the Big Bend to Coppermine itself and from the west end of Coronation Gulf at least 450 miles to the east to Adelaide Peninsula. Some portions of the Coronation Gulf, Kent Peninsula and Bathurst Inlet areas in particular, were covered several times during the winter and scattered herds of five to 250 animals were always seen. Eskimos have reported caribou as being very numerous at Kent Peninsula, Gordon Bay and inland from Coppermine, throughout the winter. They have reported herds numbering in the thousands of animals from the Coppermine area in particular.

The proper assessment of numbers of animals involved is not practicable since most of my trips were courtesy flights and not proper surveys and the total area occupied by the caribou is not known. It is reasonably certain, however, that these caribou were pretty well confined to coastal areas or the valleys of larger rivers. Flights between Bathurst Inlet and Yellowknife, Bathurst Inlet and Reliance, and Yellowknife and Cambridge Bay, as well as the reports of barren ground trappers, have failed to give any indication of caribou wintering on the inland barrens. Both in the vicinity of the Upper Back River and Contwayto Lake, Eskimos suffered great hardships during the winter due to a lack of caribou.

Some idea of the numbers involved was obtained last year at Bathurst Inlet. Early in May, an estimated 50,000 caribou crossed the Inlet from the northeast. Late in May, a group, counted at 46,000, came on the heels of the first migration. These were followed by straggling animals numbering at least 5,000. In addition, two other migrations are known to have crossed the Inlet, one well to the south and another within range of our observation point but too far away

to count. These migrations included a minimum of 25,000 animals and possibly as many as 50,000 or 75,000. It is felt that all these animals wintered on the coast and very likely represented the majority of animals which did so. It is reasonably certain that these animals did not winter within tree line since by the middle of May, the major herds going north were still in the vicinity of Contwayto Lake. I have no hesitation in stating that during the winter 1949 - 50, between 126,000 and 176,000 caribou wintered on the Arctic Coast in the Coronation Gulf and Queen Maud Gulf areas. Almost certainly, an equivalent number, if not more, have wintered in the same area this year.

The Yellowknife Herd

Efforts were made, largely through the interrogation of bush pilots, to locate the Yellowknife caribou herd referred to in the report "The Barren-ground Caribou". No significant number of caribou wintered on the northeast shore of Great Slave Lake or crossed the east Arm of the lake via the many islands. A few caribou were present in the general area mentioned above but they were so scarce as to be obviously strays.

A herd of caribou was found wintering in a rather limited area which would be enclosed by lines between Thubun, Rutledge and O'Connor Lakes. These caribou were in the one area all winter and did not leave it until well on in March. Flights were made over them on March 9 and March 19. On the latter date a number of aerial photographs were taken and a census was made.

This herd is thought to be a fairly well established entity. Its presence in, or near, the same general area has been a matter of record by various persons for some years. It has been known to cross Great Slave Lake on occasion on both its southward and northward treks. This year it moved in from the extreme east end of the lake and did not even touch Reliance or Snowdrift although it followed the lake shore a relatively few miles south of the latter point. Apparently, it moved out in the same general direction in the spring although a very few individual animals crossed Great Slave Lake. From both the numbers involved and the past history of this group of caribou, it is thought that it is the Yellowknife herd.

The winter grounds chosen by this herd differend somewhat from those of other herds mentioned in that the forest cover was predominantly jackpine (Pinus Banksina).

General Characteristics of the Winter Range

Almost without exception the caribou herds under observation during the past winter confined their activities to areas of heavy forest cover. The exceptions, of course, were those caribou which wintered on the Arctic Coast. The Great Bear, Radium and Rae herds wintered in a heavy spruce-lichen association. The small herd south of Great Slave Lake, which was surveyed in March, wintered in a jackpine - spruce - lichen association. All these winter areas where characterized by a heavy growth of spruce (Picea sp.) up to sixty feet in height, with trees often growing so close together that in many places a man would have difficulty in forcing his way through. Open areas, such as small lakes, creeks and swamps, were used extensively for travel but during January and February, the great majority of caribou were to be found actually in the forests.

While these forests had large trees growing close together, they had, nevertheless, heavy lichen ground cover with associations of bearberry (Arctostaphylos Vra-ursi), billberry and rock cranberry (Vaccinium sp.), and shrubs such as glandular birch (Betula glandulosa). Pure strands of white birch (Betula papyrifera) and poplar (Populus sp.) could be found here and there but these were not used by the caribou. The winter snow cover in these forests averaged about three feet in depth with local areas having considerably more snow. In all cases, the snow remained relatively light and fluffy throughout the winter and the caribou had little difficulty in digging for feed or in travelling. In some local areas, extensive willow - alder - sedge associations were to be found and these were heavily utilized by caribou. Sedges (Carex sp.) were decidedly preferred foods in some areas.

For the most part, the winter ranges were on relatively high ground. This is not thought to be due to the fact that the caribou were preferring higher ground itself but rather because the heavier forests in which they were wintering were found largely on the higher ground. Along the north shore of Great Bear Lake, for instance, the low shore is relatively barren and few caribou were noted. Inland hills, however, have heavy forest cover and this is where the caribou were found. The winter range of the Rae herd was in an area seldom less than a thousand feet above sea level and frequently as high as two or three thousand feet. It was noted that they had fed heavily on the Mackenzie Mountains, right up to the tree line in many places. The average altitude of the best spruce forests in this area, however, is about 1,500 feet. The two pockets of caribou left by the Rae herd during their westward passage wintered in relatively low country. However, this country also was characterized by heavy forest growth.

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The range used by the Rae herd, in particular, was subject to intensive utilization. Throughout the winter, the animals usually moved in very large groups from utilized to unutilized areas until the whole range area had been covered at some time or other. The condition of the forest area, immediately after the caribou had left it, was remarkable. Trails were so numerous and so hard-packed that a man with moccasins could walk anywhere through it with no difficulty. Small creeks and lakes in such an area would provide excellent roadways. From the air, it was very noticeable that extensive feeding had been carried on. The characteristic crater-like holes left by feeding caribou were even more apparent from the air than from the ground. Feeding holes were uniformly found over any given part of the range, generally speaking, although there seemed to be some areas which were used so much by travelling or resting caribou that they were not used for feeding. The larger lakes within the winter ranges were scarcely used at all except immediately along the shores. This condition was most noticeable from the air. To an observer who was used to seeing caribou travelling in great numbers along larger waterways in the spring or early winter, the condition in January and February was quite reversed. When caribou did come to a fairly large lake, they might stop on it and rest if the sun was shining and the day was calm; but if there was any breeze blowing, they would walk rapidly in single file directly across the lake into the wind, resting after they had reached the forest on the far shore.

Lakes with dimensions of a mile or more were avoided although the forests along their shores might be heavily used. It was extremely difficult to locate major concentrations of caribou from the air for this reason. A large lake, which could be seen for many miles, might be quite devoid of caribou but when the aircraft was brought down to within 1,000 feet, or less, directly above the shore, the forest was seen to be full of animals. The pocket of caribou which wintered southeast of McVicar Arm on Great Bear Lake, is an excellent example of this. A number of flights were made over this area during the winter. On each occasion, very fresh trails were seen crossing ponds and other open areas, which indicated the presence of fair numbers of caribou, but on no occasion were any great numbers of animals actually seen. Another excellent example is the south shore of Great Bear Lake where a strip flight over 150 miles long was made but less than 300 caribou were seen. There had been heavy snowfalls on the previous few days and fresh trails were clearly evident through the whole strip. Almost certainly, if the forest cover could have been temporarily rolled back, thousands of animals would have been seen.

Aerial census methods based on strip counts simply would not work in areas such as this. The only way in which caribou could be spotted readily was by flying three or four hundred feet from the tree tops and looking as straight down as was possible. When caribou were seen, they showed up readily enough, but counts, even of very small groups, could not be made.

Winter Feeding Habits

During the ground patrol in January, excellent opportunity was afforded to discover what the caribou were feeding on and how they were going about it. It was not possible to make extensive observations on caribou actually feeding since the animals with which we were in contact were changing their range at the time and not stopping to eat. However, great numbers of caribou had obviously fed in the area a short time previous, and since no snow had fallen recently, tracks and other signs were very plain. The manner in which caribou gathered their food was remarkably consistent. Almost invariably a crater-like hole would be dug which ranged in depth from two to three and one-half feet depending on the snow depth. A hole would be approximately three and one-half to four feet wide at its upper margin and six inches to one foot wide at the bottom. There was seldom any evidence that the animals ever attempted to enlarge individual holes. The procedure apparently was to dig a hole, feed on the six to twelve-inch exposed area at the bottom, then move on and dig another hole. Individual holes did not frequently overlap although they were very often placed immediately adjacent to each other. As a consequence, only a fraction of the ground cover would be utilized in any given area. This was thought remarkable, particularly in view of the heavy concentration of animals. Occasionally along the river banks or in swampy areas, feeding craters would be dug into the side of a bank at an oblique angle, rather than straight down to a horizontal surface.

A most remarkable aspect of these feeding holes was that very little effort was wasted in finding food. Of hundreds of food holes which were observed, not one was found which did not have suitable food at the bottom. The ability of the caribou to strike paydirt in digging for food along river margins was particularly marked. Sedges in this country very frequently grow in thick, individual clumps rather than in a continuous carpet, and it was noted that the feeding holes struck these large clumps with uncanny accuracy. It was obvious that the caribou have some sense or intuition which enable them to know where they will find food before they start digging.

It is interesting to note that I have been informed by several reliable sources in the North that some Eskimos can do the same thing. If an Eskimo wishes to find Arctic heather in the winter, he can go out, choose a spot, dig down through two to six feet of snow and almost invariably he will have his heather even though that plant may make up a very small percentage of local ground cover.

Caribou were noted to be feeding heavily in three rather different types of ecological unit. (1) The heaviest feeding was done in typical spruce - lichen associations. Spruce - lichen associations were dominant ecological units in the area. (2) Caribou were feeding heavily on sedge - willow - alder associations, where they were present, along stream banks, lake margins and in forest swamps. (3) In some instances, local intensive feeding was carried on in willow - sedge associations in burned over areas. Many of the burns have quite thick sedge and willow (Salix sp.) growth in early steps of recovery. Burns, in which feeding had been carried on, were thought to be mostly eight to twenty years old.

In forested areas, feeding was carried on almost exclusively in open areas between spruce trees. In places where spruces were so thick that they touched one another, little or no feeding was done. The obviously preferred food was fruticose lichens of various species although considerable amounts of associated plants were gathered as well. Only in rare instances was spruce itself found in the food craters and in no cases did spruce show signs of having been eaten. There was no evidence of browsing above the snow in forested areas.

Along river margins and the like, sedges were often utilized very heavily. In most cases, there were some number of shrubs included in the food craters and where these shrubs were birch, willow or alder (Alnus sp.), they usually showed minor signs of having been browsed. The following table lists the utilized species found in 42 food craters along the river margins:

(1)	sedge alone	- 18
(2)	sedge - willow	- 18
(3)	sedge - birch	- 4
(4)	sedge - willow - alder	- 1
(5)	sedge - birch - alder	- 1

Occasionally, areas such as these showed some signs of browsing on willows above the snow, but these were only minor occurrences.

Willow grows very heavily along stream margins in this country and most of it had not been touched.

In burned over areas the search for food followed much the same pattern as it had along the water margins with the exception that more browsing above the snow was evident. Still, this was of minor occurrence when compared to the large amounts of browse which were available; nevertheless, it was carried on quite intensively in small local areas. In one place in particular, two or three acres of chest-high willow shrubs were found, probably three-quarters of which had been browsed and some of which had been chewed down to a twig thickness of nearly one-half inch. There is no apparent explanation for this. Possibly some palatability or dietary factor is involved, and yet this does not seem possible since such browsing was of minor occurence.

In connection with feeding habits, it might also be well to mention the chewing of antlers. During May and June of 1950, this observer witnessed at Bathurst Inlet migrations involving more than 100,000 caribou, many of which were young animals and females which were shedding their antlers. Several hundred of these antlers were noted and collected, and, with only one or two exceptions, they showed evidence of chewing. In some cases, only an inch or two inches would be left of antlers a foot or more in length. The chewing occurred immediately after the antlers were shed, although, unfortunately, it was not possible to determine whether the antlers were chewed by the caribou which shed them or by other animals. The same phenomena was noted during the January patrol. In this instance, relatively few antlers were being shed and these were chiefly very large antlers from older male animals. None were seen that did not show evidence of chewing, and, as in the case of those noted the previous spring, chewing was often carried on so persistently that caribou bled freely from the mouth before they ceased their efforts.

Predation

There is no doubt that wolves are very common animals throughout the range of the barren ground caribou. In the course of the considerable amount of flying during the past winter, more wolves were seen than any other animal excepting caribou. Wolves were reported as being abundant in all areas in which caribou were seen during the past winter, with the exception of the eastern end of Queen Maud Gulf in the vicinity of Sherman Inlet.

At Coppermine, wolf stories were particularly numerous during the winter. This observer was told quite seriously of wolf packs so large that when they moved through a valley it was like watching the waves on the ocean. Several Eskimos reported having been

followed from time to time by large packs of wolves and, needless to say, these stories became highly coloured in the retelling. Packs of 100 and more wolves were reported as common, although this observer was unable to speak first hand to any of the persons reporting such packs and is most doubtful about such reports.

In the course of 12,542 miles of aerial travel during the winter, a total of 60 wolves was seen. Three additional wolves were seen during our ten-day ground patrol in January and packs of wolves were heard howling on several occasions during this ground patrol. The total of 60 wolves is thought to indicate a relatively large population on caribou wintering ground. This year, due to the fact that the caribou wintered in very thick spruce forest, one would expect relatively few wolves to be seen from the air. In almost every case where wolves were seen, they were heading as fast as possible for the nearest cover and, undoubtedly, many wolves must have reached cover before they were observed. A fine example of evasive action in open country was noted on March 6. A white wolf, only slightly darker than the snow cover, was seen on the open barrens near the Hood River. When first seen, this wolf was running rapidly for a small rock outcrop where light and shadows provided some contrast to the straight snow cover. Immediately on reaching the rock, it stood motionless and remained in that position, even though the aircraft passed within two or three hundred feet. On another occasion, however, a pack of nine wolves was seen on a very small lake. These wolves first dashed into the heavy timber, and then, as the aircraft circled, dashed out on to the lake again and frolicked about.

Wolves were seen on 12 out of 31 flying days. In comparison, caribou were seen on 27 out of 31 flying days. The majority of the wolves were single animals or in small groups. Single animals were seen on eleven occasions; 2 animals on six occasions; 3, twice; 4, once; 6, once; 9, once; and 12, once. In the case of the pack of twelve, additional scattered animals, totalling seven, were seen in the vicinity and they might very well have formed a pack of nineteen. This, incidentally, is the largest wolf pack seen in the north by this observer and truly authentic reports of larger ones are seldom heard. Of the animals observed, six were black in colour; eight, white; eighteen, grey . Colour was not noted specifically in the case of twenty-eight but it is thought that the great majority would be varying shades of grey since black or white animals are most noticeable. The majority of wolves were seen in timber country on, or close to, occupied caribou winter range.

Seven wolves were seen on the barrens along the Arctic Coast where caribou were wintering. With few exceptions, wolves were either within large associations of caribou or within easy travelling distance of them. Often wolves would be seen in country through which large numbers of caribou had recently passed and in which a few individuals still remained. On March 26, a very large group of caribou was seen in an area of about 10 x 20 miles south of the Bear River. A great many thousands of caribou were lying down in this area and, in the single strip flight which our gasoline supply allowed, nineteen wolves were noted even though major attention was being given to the photographing of caribou. These wolves were apparently moving freely throughout the resting herds and were certainly present in sufficient numbers to do considerable damage if they wished. On another occasion, a pack of six wolves was caught on the open ice of Keller Lake. These animals were following the plain and recent trail of a group of about 75 caribou which was four miles ahead of them on the ice.

It is thought most remarkable that, despite all the flight observations of wolves and caribou during the winter, not a single wolf-killed caribou was seen. Wolf-killed caribou show up very plainly from the air when the carcasses are lying on open lakes or other bare country. Fresh kills are usually unmistakable. Old kills can usually be seen because of a large circle of dark fur, blood and debris on the white snow or ice surface. The latter condition was noted on one occasion only and since no landing was made, there is no reason for stating that the animal had been killed by wolves. Certainly, wolves were killing caribou and it is probably safe to say that they were living almost entirely on caribou, but evidences of wanton slaughter were not present. Very possibly the wolves were pulling down animals in the thick forest where kills would not be readily observable. On one occasion, a large grey wolf was seen chasing a lone caribou in thick forest cover. From the depth of the snow, it was thought that the wolf would have a long, hard chase before it was successful.

It was hoped at the start of the winter that opportunities would be found to get on the ground with large herds of caribou for sufficient lengths of time to undertake experimental wolf control. However, time and the great distance between the caribou and Yellowknife, interfered. The observations very clearly indicate, however, that the possibility of killing a considerable number of wolves would be good under certain circumstances. Since the caribou were mobile all winter, a man killing wolves would have to be mobile also. Sets for wolves would have to be extensive if any worthwhile results were to be gained. The aid of a light aircraft would be invaluable for spotting caribou concentrations, making extensive sets

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for wolves and visiting the sets. One or two men, with a light aircraft frequently at their disposal, could probably kill more wolves during the winter than a great number of men working solely on the ground by dog-team. This observer would very much like to see procedure such as this tried for the course of one winter. It would, of course, have to be a full-time job for the man or men involved.

Statistics

Efforts were made during the winter to determine the numbers of animals involved in each of the major caribou herds to which attention was being given. A great deal more difficulty was encountered in this than had been anticipated, largely due to the virtual impossibility of running successful aerial transects during January, February and early March. During these months, the caribou remained for the most part in heavy spruce forest and, as has been noted elsewhere, were nearly impossible to count. However, it is felt that some worth-while data can be presented.

A successful survey was flown on the Rae herd during March 24, 25, 26. The areas occupied by the herd at that time were defined with considerable accuracy and strip counts were possible. During the days mentioned, the Rae herd was found to be occupying a range 4,900 square miles in extent. Within this area, 552 survey miles were flown and it is felt that this represents approximately 552 square miles surveyed. In this mileage, 14,909 caribou were counted or photographed giving a density of 27 caribou per square mile. The wintering population is, therefore, calculated at 122,300 caribou plus about 3,000 animals which wintered away from the main herd, as indicated previously. It will be noted that this figure is considerably less than the 210,000 population estimated by Banfield. While the figure 125,300 is admittedly subject to considerable error, it is not felt that there were appreciably more caribou than estimated. The size of the utilized winter range alone would not permit the presence of many more animals. The whole winter range must have carried about 15 caribou per square mile. I do not feel that this figure represents a decrease in the Rae herd. As has been noted elsewhere, caribou numbering well in excess of 100,00 have wintered on the Arctic Coast and very likely elements of the Rae herd were involved in this population.

A rather thorough survey was flown over the presumed Yellowknife herd on March 19. The area then occupied by the caribou was calculated at 1,102 square miles and 136 miles were flown within this area. A total of 544 caribou were seen. The caribou population was calculated at 4 per square mile giving a total wintering population of 4,408 animals. This population figure is quite in line with that of 4,000 presented by Banfield and it is thought to add

weight to the assumption that this group was indeed the Yellowknife herd.

No properly calculated estimation of numbers for the Great Bear herd can be given. On the two flights which touched this herd, caribou were noted in a density approximating 2 or 3 per square mile. The total area being utilized by these caribou is not known. It is thought, however, from the scattered distribution of animals over a very large area, that possibly they were utilizing as much as 8,000 or 10,000 square miles of winter range. In this event, Banfield's figure of 30,000 is quite reasonable and I can see no reason for modifying it at the present time.

The Radium herd was found to be thinly scattered over a wide area with three points of marked concentration. Various portions of winter range were touched on a number of flights but in no case was a thorough survey possible. The flight strips were scattered as to time and place and, many were flown under such poor conditions that it is not thought desirable to apply mathematical calculations to determine the population. Banfield stated that there were 5,000 caribou in this herd. This figure is certainly too low. The tracks and trails noted on the east end of Dease Arm on February 17 indicated a minimum of 10,000 caribou wintering on the peninsula south of Dease Arm. There were at least between 4,000 and 5,000 animals in addition wintering from Radium around the south side of Great Bear Lake to Fort Franklin.

On nearly all survey flights throughout the winter, aerial photographs were taken of groups of caribou in an effort to determine calf ratios. This was thought of particular importance since in nearly all areas under investigation Indians, Eskimos and white men reported very few calves. Personal investigations have also indicated a very low calf crop during the summer of 1950.

Unfortunately, at the time of writing, all photographic data are not available and they will not be available in time for inclusion in this report. However, the following table gives various calf determinations for consideration.

Herd	Date	Method	Total Segregated	Total Calves	% Calves
Rae (?)	July 1950	Ground survey	4,600	414	9%
Rae	Jan. 1951	Ground survey	567	50	8.8%
Rae	March 1951	Aerial photos	545	36	6.6%
Yellowknife	March 1951	Aerial photos	273	13	4.8%
Radium	March 1951	Aerial photos	118	9	7.5%

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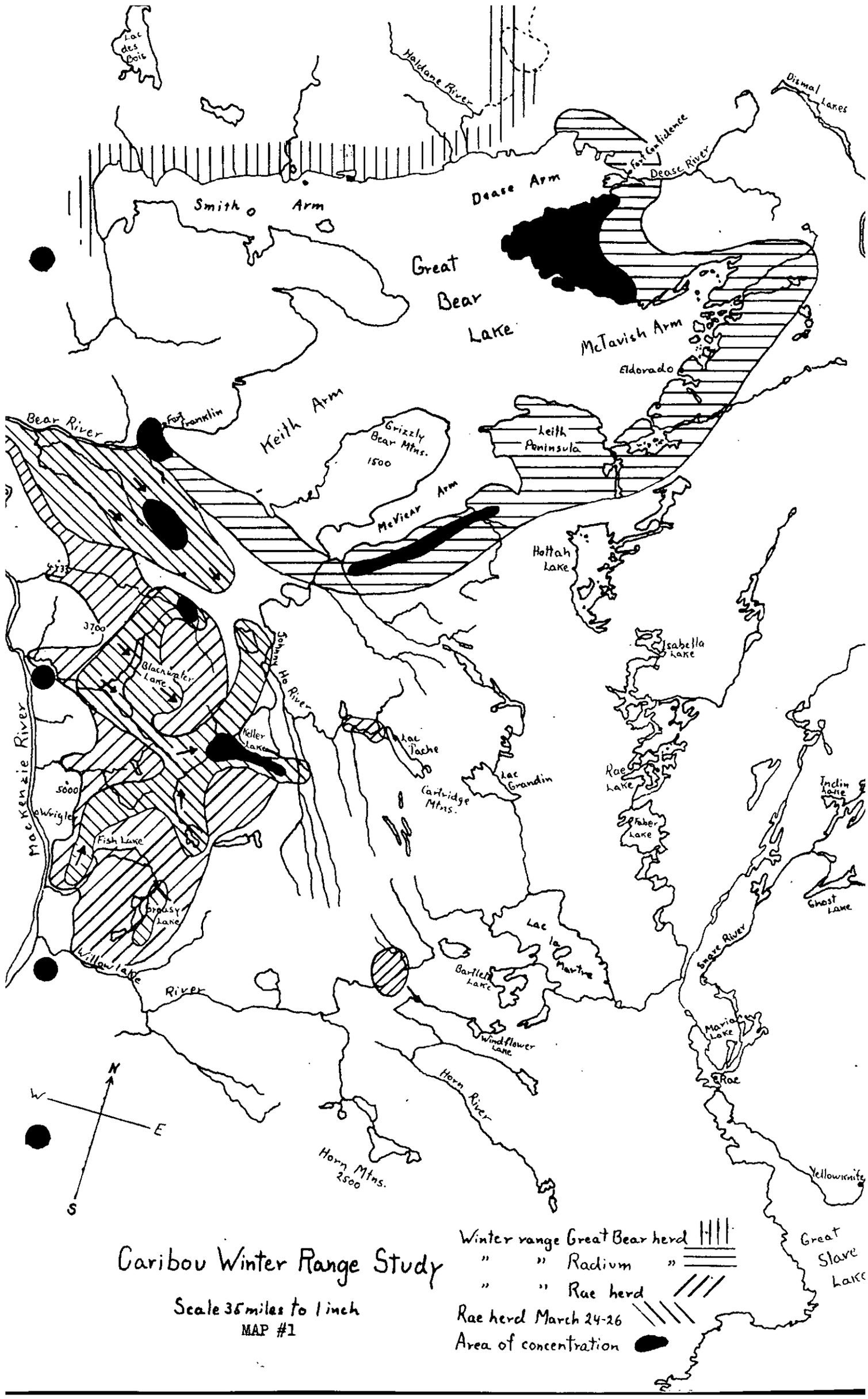
The calf percentages given above are almost incredibly low and it would be felt that the data were inadequate if it were not for the fact that general observations over a wide area and reports from others confirm them.

In July 1950 a nine percent calf ratio was determined among 4,600 caribou at Bathurst Inlet. These were believed to be part of the Rae herd and the count was taken at a time when the calves were only two or three weeks old. A ground count on 567 animals of the Rae herd in January 1951 gave a calf ratio of 8.8% and this percentage was thought at the time to be high since very few male animals were present among those segregated.

The determinations made from the aerial photographs speak for themselves. That made in regard to the Yellowknife herd in particular is thought to be especially indicative. The segregated animals number better than 5% of the entire herd and the photographs were taken of many small groups over the entire winter range. The figures for the Radium herd are from photographs taken only over the concentration of the peninsula south of Dease Arm.

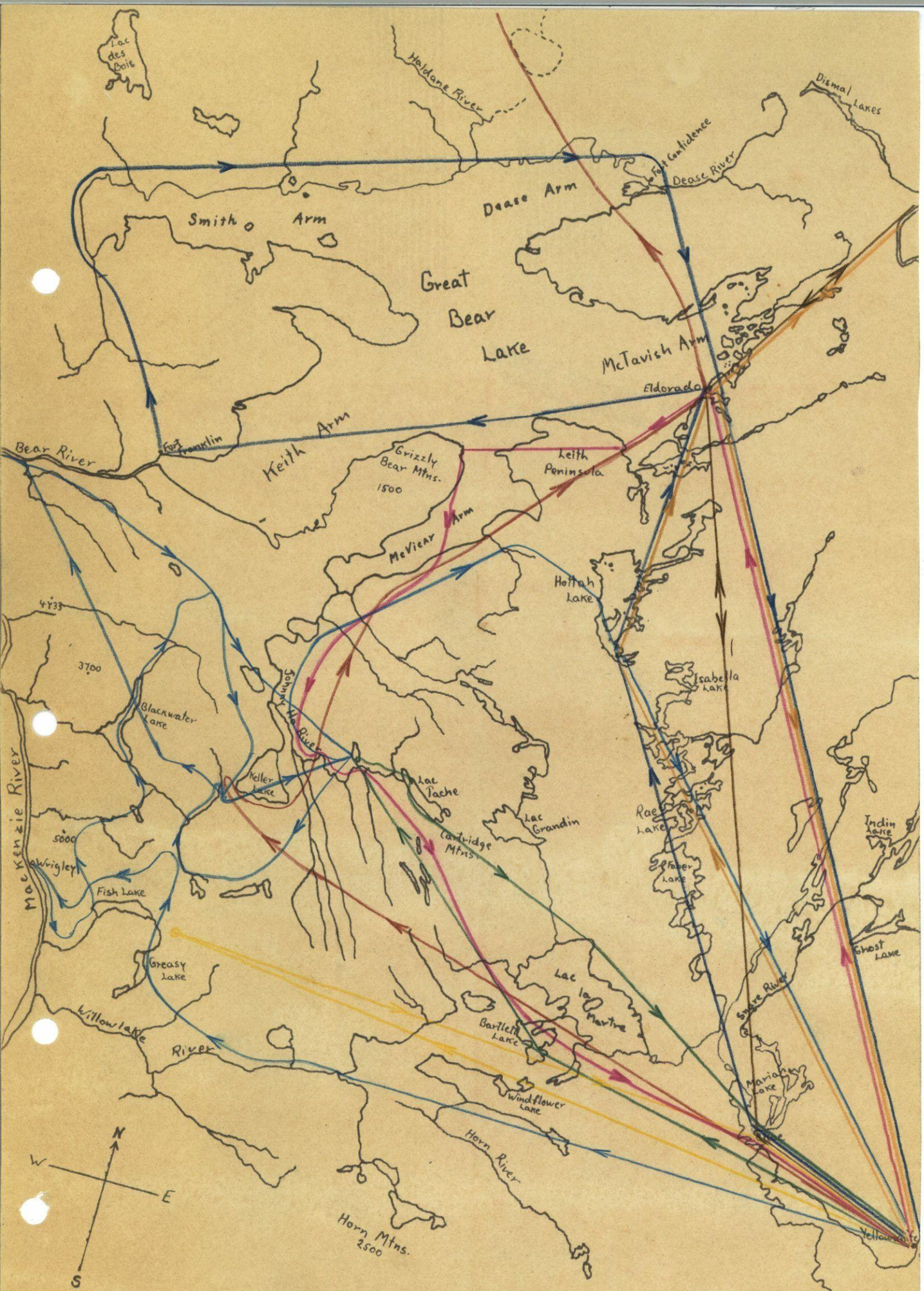
There can be no doubt that the calf crop in the areas under investigation was exceedingly poor during 1950. The figures indicate a crop of less than half of what might be considered normal. If this year were to be followed by similar low reproductive years, the caribou population would be expected to fall off in a most critical manner. It is considered imperative that every effort be made to confirm the above figures and to gather comparative data for the calf crop in 1952.



Caribou Winter Range Study

Scale 35 miles to 1 inch

MAP #1



Caribou Winter Range Study

Scale 35 miles to 1 inch

Map #2

DEC. 9 + 12, 1950
DEC. 10 + 19, 1950
DEC. 30 + 31, 1950
JAN 10 + 18, 1951
FEB 9 to 17, 1951
MARCH 1 + 2, 1951
MARCH 22, 1951
MARCH 24 to 26, 1951

DATE DUE	BORROWER'S NAME
22 Feb 78	Gildea - Scab
5/14	Pete Borowsky