THE INTERNATIONAL HERDS: PRESENT KNOWLEDGE OF THE FORTYMILE AND PORCUPINE CARIBOU HERDS

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ABSTRACT--Present knowledge of the two major caribou herds shared by Alaska and Canada is minimal despite recorded observations dating back to the 19th Century. Sizes of both herds have fluctuated from apparent 20th Century highs of over half a million to present numbers of 100,000 (Porcupine Herd) and less than 10,000 (Fortymile Herd). Interchange of animals with other herds has taken place, and changes in distribution have occurred several times in recorded history. Both herds have temporarily occupied much larger areas than at present. Although both herds are healthy at present, a return to former high numbers is unlikely in the future because of new land ownership and use patterns and increasing northern development.

Since 1950, studies of caribou (*Rangifer tarandus granti*) in Alaska have considered the animals in terms of 'herds', or groups of caribou sharing a common calving area in most years. Skoog (1968) formalized the concept, with his contention that all Alaskan caribou comprised one population (i.e., that interbreeding occurred between 'herds'), but could be considered as 13 separate herds. Hemming (1971) summarized the present state of general knowledge of the six major herds (commonly referred to as the Arctic, Porcupine, Fortymile, Nelchina, McKinley and Alaska Peninsula herds), five minor herds (Delta, Mentasta, Mulchatna, Beaver and Chisana) and two introduced herds (true biological populations) on Adak Island and the Kenai Peninsula (Fig. 1).

Two major groups, the Porcupine and Fortymile herds, winter predominately in Canada and calve in Alaska. Coincidentally, these two groups are, among Alaska's 13 herds, the most likely to be severely affected in the near future by increased human activity and changing land use-ownership patterns in the north. Both the direct effects of gas pipeline and road construction and the indirect impact of increased human presence and utilization may drastically change conditions for these caribou in the next few years.

Numbers, movements and distribution of both herds are still but sketchily known, although past work has defined them somewhat. Virtually nothing is known about population dynamics or habitat of these animals.

Any review of caribou in Alaska must draw heavily from Skoog's (1968) extensive treatment of historical material and Hemming's (1971) summary and updating of knowledge of movement patterns and distribution. Therefore I have begun by summarizing material presented by these two authors. Olson's (1957, 1958, 1959) work provided much of the background for discussion of the Fortymile Herd. All additional and more recent data, except when noted, are from Alaska Department of Fish and Game files (unpublished), notably those collected by L. Jennings and from my own studies currently underway.

PORCUPINE HERD

Knowledge Before 1970

Information concerning caribou associated with the present range of the Porcupine Herd (Figs. 1 and 2) dates from early explorations of the arctic coast (Franklin, 1826; Dease

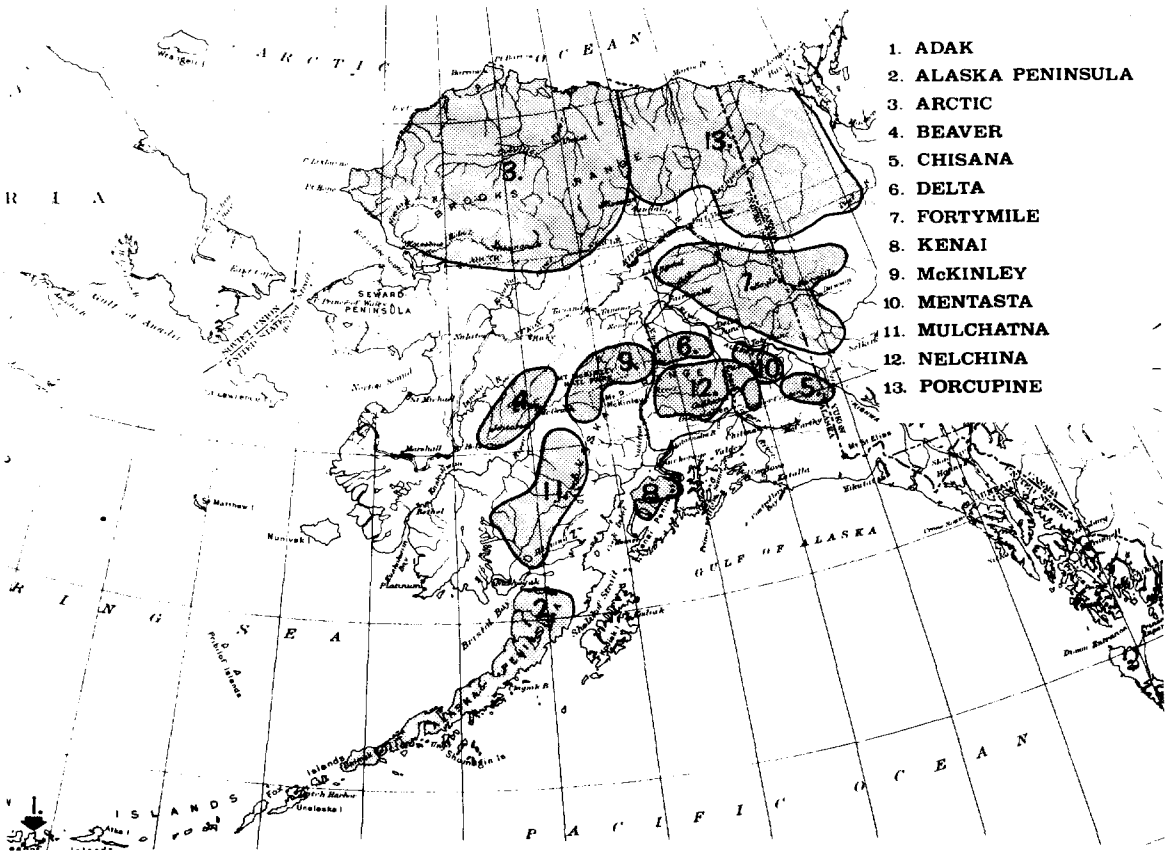

Fig. 1.——Alaska's caribou herds, showing approximate ranges of the Porcupine (13) and Fortymile (7) herds. From Hemming (1971).

and Simpson, 1838; Simpson, 1843; Isbister, 1845; Russell, 1898; Pike, 1892), when caribou were reported by whalers between Demarcation Bay and the MacKenzie River delta. Interesting reports indicated caribou were common year-around at Herschel Island, and that these animals intermixed with caribou east of the MacKenzie (Russell, 1898). Nineteenth Century reports from winter ranges (Funston, 1896; Russell, 1898) indicated distribution similar to today's, with semi-annual crossings at the lower Porcupine River and some animals wintering near Arctic Village.

From 1900 until about 1950, the herd apparently increased in numbers and expanded wintering areas westward into the central Brooks Range (Skoog, 1968; Hemming, 1971). Murie (1935) indicated caribou were common in the Koyukuk-Chandalar area from 1917-1930. He related a harvest occurred at Fort Yukon in 1925, for the first time in a hundred years. Porsild (1945) described a huge southward migration ('millions') in 1927 along the eastern Richardson Mountains; and, in the 1930's fall harvest increased steadily at

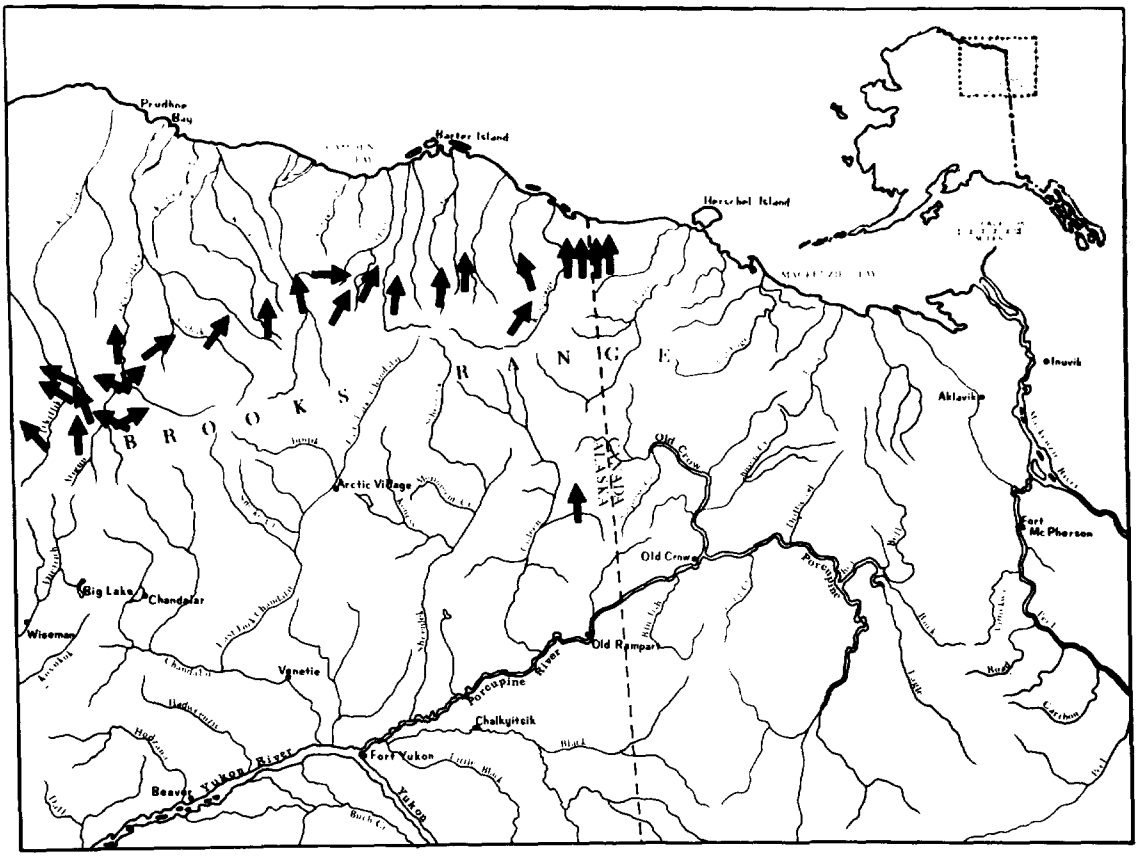

Fig. 2.—Present range of the Porcupine Herd, showing spring migration routes as observed 22-24 May, 1972. West-turning caribou probably are western Arctic Herd animals. Major Canadian migration routes are not shown.

Fort Yukon. Hemming (1971) cites a resident of Anaktuvuk Pass, in the central Brooks Range, as saying caribou migrating through this pass turned eastward (i.e., to the calving grounds of the Porcupine Herd) from about 1900-1920. Animals using the pass since have headed predominately westward, toward the Arctic Herd's calving grounds. Skoog (1968) suggested that the herd was actually two herds during this period: a northeast group and a central Brooks Range group. No good estimate exists of the total number reached. In any event, a 'drastic' (Skoog, 1968) decline in numbers occurred following a population peak in the mid-1940's. Skoog attributed the decline to migration to the Arctic Herd and across the MacKenzie into the Northwest Territories.

Scott (1953) was the first to consider animals wintering from the Chandalar River to the Richardson Mountains as one herd. Since that time the Porcupine Herd has increased in numbers and established the patterns of distribution and movements we are currently observing.

Two occurrences in the 1950-1970 period merit special note here: (1) repeated ingress of animals from the Fortymile Herd and, (2) occasional wintering and rutting in the east-central Brooks Range. In 1957 and again in 1964, substantial numbers of Fortymile Herd caribou migrated north from the northwestern Ogilvie Mountains with the Porcupine Herd (Olson, 1958; Skoog, 1964). The latter interchange was well documented and involved about 20,000 animals. It is unknown whether any of these animals rejoined the Fortymile

Herd in succeeding springs. Olson (1957, 1959) reported that, in 1956 and 1958, many caribou migrated southward past the headwaters of the Ivishak and Sagavanirktok Rivers to winter in the Big Lake-Chandalar area. This may have been an atavistic distribution from days of more westerly distribution, or it might continue to occur periodically.

RECENT KNOWLEDGE (1971-1972)

Distribution and Movements

Studies over the past one and a half years (Calef and Lortie, 1971; Thayer *vive voce*; LeResche, unpub.) show the Porcupine Herd is distributed generally as described by Hemming (1971). Calving occurs on the north coastal foothills east of the Canning River and west of the Babbage, and post-calving concentration occurs on the arctic coastal plain or eastward and southward into the northern British Mountains. Fall migration generally proceeds east of the Kongakut River, and most animals occupy winter ranges in the northern Ogilvie Mountains and the head of the Porcupine River, with a few wintering in Alaska in the Arctic Village-Chandalar area. Calef and Lortie (1971) have followed the Porcupine Herd since April, 1971, and the Alaska Department of Fish and Game, with cooperation from U. S. Bureau of Land Management, initiated studies in May, 1972. The following information is based on these studies. In addition, Renewable Resources, Ltd. has spent considerable effort since April 1971 (Yukon Territory) and March 1972 (Alaska) in extensive aerial surveys, and the Canadian Wildlife Service began a major study in April 1972.

Calef and Lortie reported spring migration was apparently two months delayed in 1971, but that it followed the ridges of the Richardson and Keele Mountains, with animals probably also moving through the Babbage, Firth and Kongakut River drainages. In 1972, migration was similarly timed, with most cows not reaching the coastal plain until late May, and many bulls not arriving until July. We documented movement through mountain passes in Alaska and onto the coastal plain from 22 to 24 May, 1972 (Fig. 3), and demonstrated that the line of separation between the Arctic (west-turning) and Porcupine (east-turning) herds occurred at the Sagavanirktok River and Atigun River drainages. All passes and drainages from the international border to the Chandler River (where our survey ended) were used by caribou. Nevertheless, the majority of the calving herd of approximately 60,000 reached the coastal plain inside Canada, with only an estimated 10,000 moving northward in Alaska. In early July, 20,000 to 25,000 bulls descended onto the coastal plain from the foothills down the Kongakut, Egaksrak, Aichillik, Jago, Okpilak and Hulahula Rivers, and 5,000 to 10,000 more were first observed in the northern foothills of the Sadlerochit Mountains, near Katakturak River. Many of these animals were probably present in the large bull groups observed in the foothills of the British Mountains in mid-June, and moved westward in mountainous terrain.

Some calving occurred in northern Yukon Territory in 1971, almost exactly as it had in 1952 (Alaska Fish and Game files). In 1972, calving occurred in the north-sloping foothills from the Blow River on the east to the Hulahula River on the west, with large concentrations occurring south of Herschel Island and between the Okerokovik and Hulahula Rivers, south of Barter Island. With the exception of a few hundred animals in the Prudhoe Bay-Kavik area, virtually no calving occurred between this group and the calving grounds of the Arctic herd, 600 km to the west. Peak of calving probably occurred between 8 and 13 June, for our classification counts on 8 June between the Okerokovik and Hulahula Rivers indicated 55 calves:100 adults (n=2525) with only 28 per cent of adults antlerless and an antlerless:calf proportion of 0.51 (460/896). Calef (*vive voce*) reported

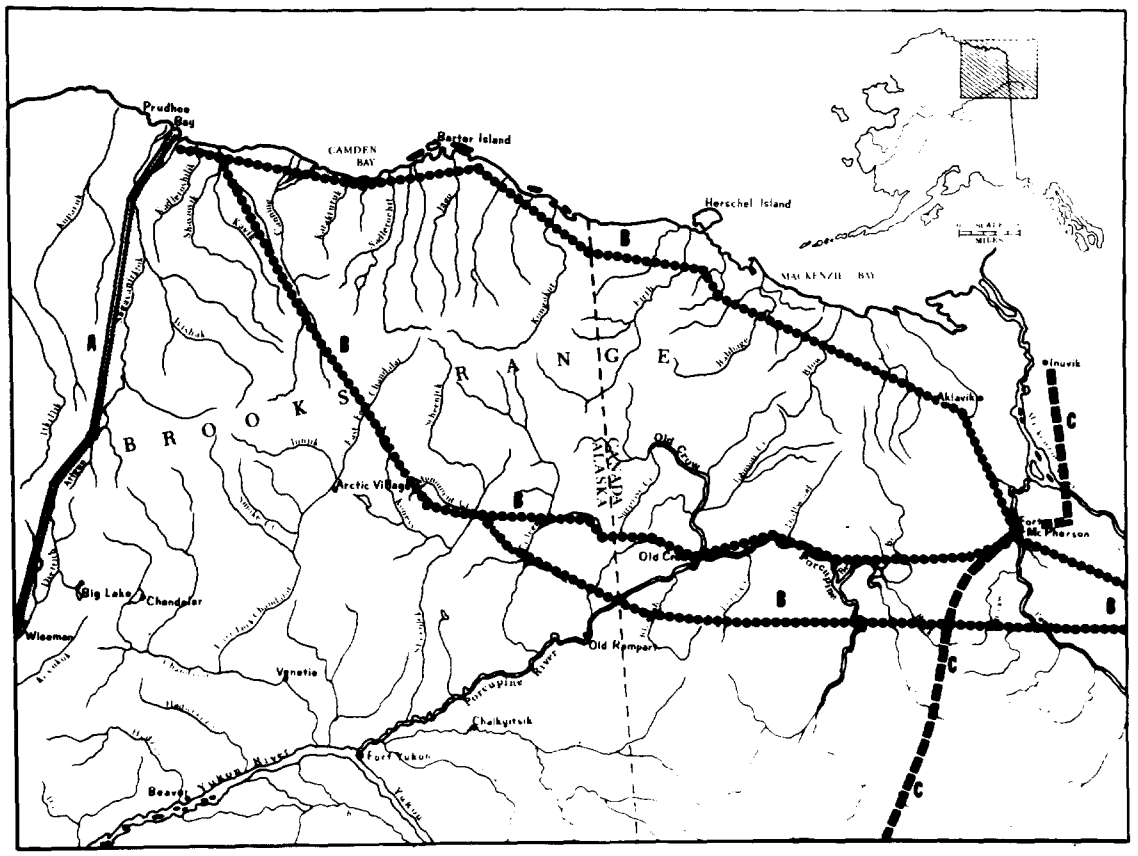

Fig. 3.—Present range of the Porcupine Herd, showing locations of (A) the proposed TransAlaska oil pipeline, (B) alternate routes of the proposed Prudhoe-MacKenzie gas pipeline and (C) the Dempster Highway.

calf:adult proportion peaked at 43:100 (n=5376) on 13 and 14 June, between Herschel Island and Okerokovik River.

A post-calving aggregation of approximately 60,000 animals was observed by Calef and Lortie (1971) in the southeast British Mountains on 20 to 26 July, 1971. The Alaska coastal plain was not surveyed that year. On 30 June, 1972, we located a concentration of approximately 30,000 animals in the foothills between the Okpilak and Hulahula Rivers and another 40,000 to 60,000 in the foothills of the Katakturuk River. On 2 July both groups had moved to the Arctic Ocean, aggregated more closely and begun to move eastward. This closely aggregated group of about 90,000 animals occupied the coastal plain between Camden Bay and the Aichillik River for at least 10 days before dispersing and moving eastward into the British Mountains and southward into the Brooks Range. Reportedly a group of 40,000 caribou crossed the international border eastward at Clarence River on 10 July. During the entire month of July, coastal areas were very important to the insect-harrassed animals, which were observed wading in tidal flats as much as 1.5 km from shore, and congregating on shore fast-ice.

Calef and Lortie (1971) reported that most animals from the Porcupine Herd wintered in 1970-71 in the northeast Ogilvie Mountains and south of the Peel River. Fall migrations tended to follow spring migration routes. Winter distribution in 1971-72 was similar, and several hundred animals, at least, wintered in the Junjik Valley near Arctic Village in Alaska

(Thayer, *vive voce*).

Productivity

Calef and Lortie estimated spring and fall calf proportions in the herd of 16 per cent, and remarked that this was midway between Skoog's (1968) estimates for the increasing Nelchina Herd and Kelsall's (1968) for declining Canadian Arctic Herds. Lent (1966) reported a similar 17 per cent calves for the Arctic Herd in July, 1961, when it was probably increasing.

On 4 July, 1972, we classified 12,921 caribou in post-calving concentration. Of these, 3,052 were calves and 6,357 were adult cows, indicating a calf:adult cow ratio of 0.48. Extrapolating on the assumption that cows represent 50 per cent of the adult-yearling herd (Pegau and Hemming, 1972, estimated this for the Arctic Herd in 1970), calves represented 24 per cent of the herd three weeks after calving, suggesting a healthy herd in terms of productivity.

Numbers

Skoog (1961) estimated that the Porcupine Herd numbered between 110,000 and 117,000. Lentfer (1965) estimated 140,000 in 1964. In July 1972, we initiated an aerial photo-direct count – extrapolation census (Pegau and Hemming, 1972) of the herd, and the current estimate, based on analysis of these photographs, indicates the population contains a minimum of 101,000 individuals.

Human Impact on the Herd

Hunter use of the Porcupine Herd has to this time been insignificant although residents of Old Crow, Arctic Village, Kaktovik, Inuvik and Aklavik depend upon the animals for subsistence in most years. Northern extension of the Dempster Highway to Fort McPherson (Fig. 3) has caused some concern for increased use of the wintering herd by sport hunters, but restrictive regulation by the Yukon Territorial government promises to keep harvest far below production. Current harvest is about 300 at Old Crow and 'slightly more' on the Dempster Highway (Sinclair, pers. comm.). There is practically no sport hunting use of the Porcupine Herd in Alaska.

Three major projects, the TransAlaska Oil Pipeline, the Prudhoe Bay-MacKenzie River gas pipeline and the Dempster Highway, have great potential for altering the present environment of the Porcupine Caribou Herd (Fig. 3). No one can predict the eventual effects of habitat alteration on caribou distribution, movements and population dynamics (c.f. Klein, 1971), but potential areas of conflict are apparent. Fortuitously, the present ranges of the Porcupine and Arctic herds meet at the Sagavanirktok, Atigun, Dieterich River pass, the route of the proposed oil pipeline. With the exception of the small, rather isolated group (probably fewer than 5,000) that uses the Prudhoe Bay area, very few animals calve along the pipeline route, and few (in relation to total numbers) have crossed it during spring and fall migrations in most recent years (Hemming and Pegau, 1970). However, were the pipeline to present any sort of barrier, it could preclude any future westward expansion of the Porcupine Herd into areas utilized in the 1900 to 1930 period, or any exchange with the Arctic Herd.

The proposed gas pipeline routes coincide considerably with areas of habitat critical to caribou. The coastal alternative, which would pass through the Arctic National Wildlife Range, would cross areas used for calving and post-calving concentration in 1971 and 1972.

If it presented a summer barrier, it could restrict use of the Arctic coast, so important during insect season. The southern alternatives both cut across spring-fall migration routes along their entire distance west of the MacKenzie River. They cross wintering areas from the Chandalar to the Peel Rivers. Were a gas line along either southern route to restrict free movement of caribou, the Porcupine Herd would doubtless be drastically reduced in numbers, despite vast areas of unaltered range north of the lines.

Similarly, the Dempster Highway crosses current wintering areas in the upper Porcupine and Eagle River drainages. In addition, it lies between eastern winter ranges and calving/summer areas. Both the Nelchina and Fortymile herds in Alaska have coexisted with lightly-traveled highways for as long as 30 years. In recent years, however, both herds have declined in numbers and shifted in distribution concurrently with increased highway travel. A multitude of factors are involved, and most may have no relation to the roads. Nonetheless, the fate of these herds gives cause for somber reflection on the ultimate influence of the Dempster Highway on the Porcupine Herd.

FORTYMILE HERD

Knowledge Before 1965

Very few records of the Fortymile Herd before 1950 exist, but enough are extant to establish that caribou have inhabited the area between the Yukon and Tanana Rivers and the White Mountains (Figs. 1 and 4) for 100 years. Skoog (1956) summarized all printed

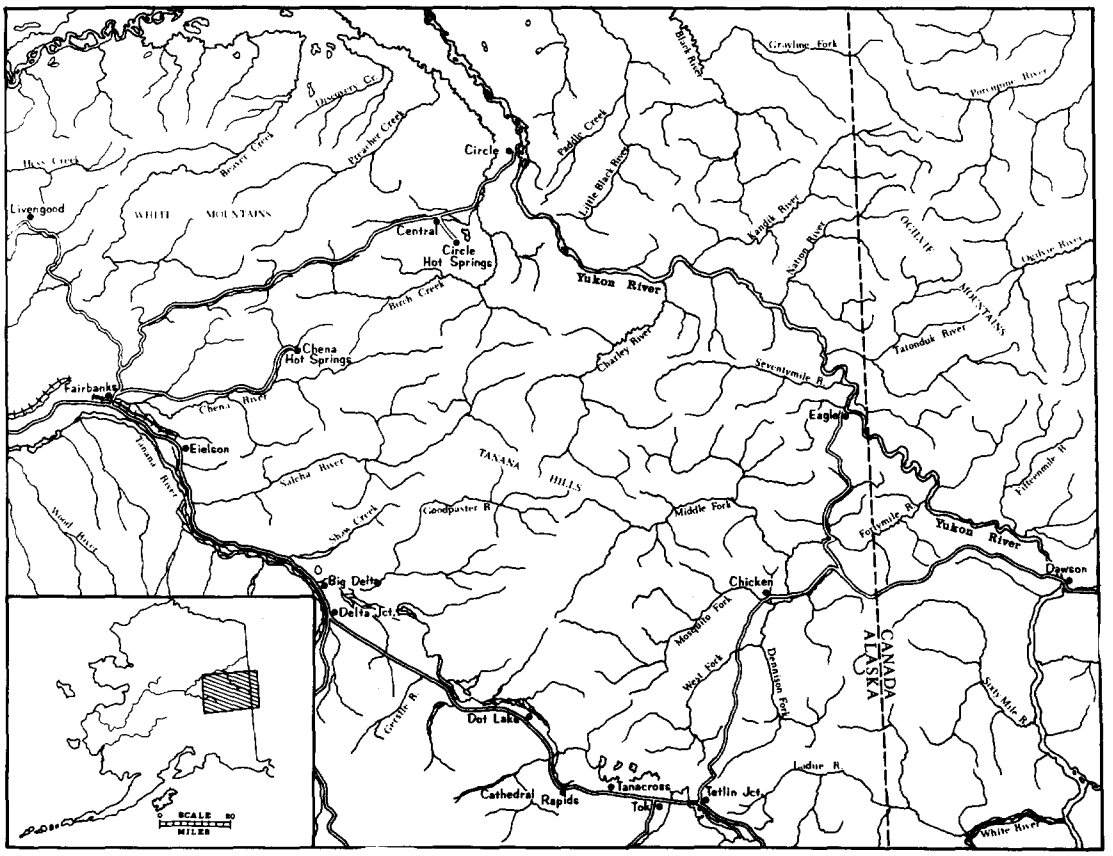

Fig. 4.——Present range of the Fortymile Herd.

and many verbal records from this period. The earliest indicate distribution before 1900 was further east than at present, and caribou were abundant throughout the Klondike country. Crossings of the Yukon River near the international border, however, have occurred regularly since the first records.

Murie (1935) summarizes the herd's increase to a tremendous population peak in the mid-1920's, when he estimated it numbered over one-half million caribou (Table 1). During

TABLE 1.--Estimated numbers of Fortymile Caribou Herd, 1920-1972.

Year	Population estimate	Source
1920	568,000	Murie 1935
Early 1940's	10-20,000	Skoog 1956
1953 *	40,000	Skoog 1956
1963 *	30,000	Skoog 1968
1964	20,000	Lentfer 1965
1969	20,000 (8-10,000 post-calving)	Alaska Dept. of Fish and Game files
1970	10,000 maximum	Jennings (unpubl.)ADF&G files
1972	10,000 maximum	Jennings (unpubl.)ADF&G files

*Suspected egress to Porcupine Herd.

the period of increased population, the herd's range expanded in all directions. Large fall migrations occurred in the Fairbanks-Circle region between 1906-1913 (Palmer, 1941). In the early 1900's many caribou wintered near Dawson (Sheldon, 1911), and in 1918 there were 'unprecedented numbers' in the Fairbanks area (Riggs, 1919). Perhaps the most significant result of this expansion of range was the winter movement of caribou across the Tanana River southwest to the head of the Delta River, where they may have added significant numbers to what we now call the Delta and Nelchina Herds. Murie (1935) suggests these movements persisted at least until the late 1920's, when more northeasterly movements became the rule. During the same period (1924), many caribou wintered near Whitehorse (Murie, 1935), and a spring-fall migration occurred for about 10 years through Nenana, west of Fairbanks.

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From 1930 to 1965, the Fortymile Herd decreased in numbers (Table 1) and extent of range (Skoog, 1968; Hemming, 1971). The herd became generally confined in its present range between the Yukon and Tanana Rivers and decreased in numbers to between 30,000 and 40,000 in 1960 and to 20,000 in 1965 (Table 1). From 1950 to 1965 the calving area of the herd shifted progressively east and south, across the Steese Highway (Hemming, 1971). Also during this period, egress of animals to the Porcupine Herd occurred twice (1957 and 1964).

PRESENT KNOWLEDGE (1966-1972)

Distribution

Present distribution of the Fortymile Herd is well illustrated by Hemming (1971). The major wintering area is between Dawson on the east and the Taylor Highway on the west,

and extends northward into the Ogilvie Mountains, where the animals may mix with Porcupine Herd caribou. A few caribou remain in the vicinity of the Taylor Highway into late winter (300 observed on February 12, 1969), and a few range as far south as the Alaska Highway (250 at Tetlin-Northway in winter, 1971).

Calving has occurred since 1966 in the Tanana Hills in the area of the headwaters of the Salcha, Goodpaster, Charley and Middle Fork Fortymile Rivers, and post-calving concentrations were observed in 1969 through 1972 between the heads of the Chena and Charley Rivers (Fig. 4).

Fall migration has occurred regularly in September and November, with most animals moving eastward across the Taylor Highway in October.

Productivity

In 1960 and 1961 Skoog (1961) estimated June productivity of 68 calves:100 adults (n=8524) and 66 calves:100 adults (n=1976) (adults include 12-month-old animals in this comparison), or 78:100 adult females and 74:100, respectively. Previous estimates (1954-1959) (Skoog, 1961) had varied from 38:100 (1957) to 78:100 (1954) and indicated good productivity at that time.

Numbers

The Fortymile Herd probably numbers fewer than 10,000 animals at present, although no census has been accomplished since 1964, and the best available enumeration (1953; Skoog, 1956) was made from ground observations. More recent estimates derive from extrapolation from estimates of numbers of animals in post-calving concentrations (3,000 to 5,000 in 1970, 4,000 to 6,000 in 1971, 3,000 to 5,000 in 1972).

Human Impact on the Herd

The Fortymile Herd has been hunted regularly since gold rush days and, unlike the Porcupine Herd, may have been altered in numbers or composition by human utilization. Skoog (1956) cited an estimated (Alaska Game Commission 1934, 1935) harvest of at least 10,000 annually for dog food by trappers in the Fort Yukon district in the 1930's. Skoog concluded that a harvest of such magnitude alone could not have initiated the decline in number from more than half a million animals; however, he believed subsistence hunting might have become a 'serious factor' once the decline began.

From the early 1950's until the present, the Fortymile Herd has been an important recreational hunting resource in Alaska (Table 2). Through 1966 animals were killed as they migrated near the Steese Highway in August and September. Since that time, caribou crossing the Steese have been too few to attract a significant number of hunters. Hunting on the Taylor Highway has increased in recent years and, depending upon timing of the migration and closing of the road by weather, harvest has varied from 500 to 2,500 annually. In addition, a small harvest of Fortymile Herd animals occurs some years in the Yukon Territory.

Skoog (1956) calculated a minimum annual increment of 10 per cent for this herd and believed it did not exceed 15 per cent. His calculations were based on a spring herd size averaging 44,500 and included average hunting harvest of 1,500 over a three-year period (1953-1955). Using his method of calculation (1956; Table 10), which includes calf to yearling survival of 50 per cent, initial calf production of 60:100 cows (1954-1960 mean), wolf predation of 2 per cent and miscellaneous mortality of 1 per cent, and assumes 46 per

cent of the herd are cows; annual increment of a herd presently estimated at 10,000 maximum is 1,080 animals before hunting. Thus, a harvest of 1,386 in Alaska (1970) likely exceeds the maximum allowable harvest for herd maintenance, and the 1971 harvest of 2,363 possibly doubles it. I emphasize that this calculation is based on a patchwork of data most of which are 10 years out-dated, and on an estimate of total numbers that is little more than a guess at present. However, there is little current information to add optimism to the picture.

TABLE 2.--Human harvest of Fortymile Caribou Herd in Alaska, 1935-1970. (Based on Alaska Dept. of Fish and Game files)

Year	Male	Female	Total[1]
1935			10,000[7]
1954	462	467	984[6]
1955	816	747	1,624[6]
1956	316	241	607[6]
1957	257	143	403[6]
1960	670	564	1,234[6]
1961	790	854	1,648[6]
1962	(170)[2]	(120)[2]	640[3]
1963			335[4]
1967			503[4]
1968	191	96	579[4]
1969	260	79	492[5]
1970	601	275	1,386[5]
1971			2,500[8]

[1]Includes sex unknown animals.

[2]Taylor Highway only.

[3]Includes 35 on Steese Highway, 315 in Yukon Territory.

[4]Estimated from harvest tickets.

[5]Estimated from harvest tickets, extrapolated to non-returned tickets.

[6]Checked at check station.

[7]Estimated (Skoog, 1956) subsistence kill.

[8]Alaska harvest of 2,363 estimated from harvest tickets extrapolated to non-returned tickets and estimated Yukon harvest (slightly more than 300 from Dempster Highway).

The decline in numbers since 1956 to the present level cannot be attributed to hunting any more than could the initial share of the decline in the 1930's and 1940's. Skoog (1956) described the declining condition of the Fortymile Herd's range after 1930 and laid the blame on fires and settlement (chiefly mining). Fires continue to be an almost annual cause of habitat destruction.

Development and human habitation in the remote portions in the range of the Fortymile Herd is perhaps less intense than during the 1930's, 1940's and 1950's. However,

settlements on the peripheries of the range have persisted, and some have become towns. Trails have become highways. The Dempster Highway is the newest addition, cutting across the northeast corner of the herd's winter range.

CONCLUSIONS

Land use decisions being made today will determine whether huge herds of caribou will exist in the future. Present trends suggest the days of tremendously large herds are past in eastern Alaska and western Canada. Further, the days of moderately large herds of 100,000 or more appear numbered. Little by little, development and civilization have restricted movements of the Porcupine and Fortymile Herds, and the potential exists for rapidly accelerated increase in such disruption.

Changing patterns of land ownership are the bases for the fate of these herds. Implementation of the Alaska Native Claims Settlement Act will partition vast areas of land into small parcels under private, state and federal ownership. Such partitioning will almost inevitably result in increased development of resources for human use and decreased land available for caribou use through projects such as roads and pipelines that may cause shifts in caribou movement patterns. This will also result in increased demands on caribou as a recreational resource. Caribou will survive these changes, but, since uninhibited movement and interchange seem a prerequisite to attaining extremely high numbers, they will probably never again achieve the numbers reached periodically in the past.

No biologist concerned with caribou has failed to wonder at the vast areas covered by the animals in their annual movements, and at the much vaster expanses utilized over a century of population growth, interchange and decline. Skoog (1968) felt all the caribou in Alaska were one population and recognized that (1956: 136): "The erratic and continued movements of caribou are difficult to understand." Hemming (1971: 3) stressed,"They visit some areas annually, and may utilize others only once in a decade. Even preferred areas are used only a few weeks each year." Individual subpopulations (herds) have never been stable in terms of numbers or range. Yet in the past,recovery of range from overuse and of caribou from population lows has occurred repeatedly, largely because other habitat was available.

The range of the Fortymile Herd at its most recent zenith (1920-1930) was probably in excess of 256,000 km^2 (100,000 $miles^2$). The Porcupine Herd presently utilizes almost 358,000 km^2 (140,000 $miles^2$) of Alaska and Canada. Reservation of such large areas for the exclusive use of caribou is not likely to occur in the future. Yet, without this much land, peaks in numbers equivalent to past highs are not possible.

Extremely high caribou populations are not needed to maintain a closely managed consumptive or nonconsumptive recreational resource. Properly managed sport hunting does not contribute to the decline of herds, but maintains them relatively constant at highly productive levels which are well below maximum size. Allowing herds to reach peaks is profligate use of the range compared to a closely managed annual sustained-yield herd.

It is unlikely the TransAlaska oil pipeline, the Prudhoe-MacKenzie gas pipeline, the Dempster Highway or any similar project, properly constructed, will pose an absolute barrier to caribou movement. Nevertheless, every human development presents a barrier of some order to potential caribou movement. Some (highways, railroads, elevated pipelines) may be high-order barriers; others (settlements, roads, buried pipelines), low-order barriers. All affect movement and distribution at least slightly (Klein, 1971), and all new human constructs restrict potential caribou expansion somewhat. Skoog (1956: 3) believed it was "doubtful whether [caribou] can, or will, exist alongside of populated areas."

If Alaskan caribou are one population, restricting some subpopulations will affect others eventually. Large populations have repeatedly led to exchange with and nurturing of

adjoining herds. The Porcupine Herd gained more than 20,000 animals from the Fortymile Herd in 1957 through 1964 and could potentially add several thousand to the Fortymile Herd some winter in the future. The modern Nelchina Herd, which for several years provided more recreational days of hunting than any other single resource in Alaska, likely received impetus from an abnormal movement of part of the Fortymile Herd through the Alaska Range in 1920 to 1925 (Scott *et al.*, 1950). Such exchanges would likely never have occurred were these subpopulations restricted in numbers and movements as they promise to be in the near future.

The status of the international herds is reasonably healthy in 1972, but they both require closer scrutiny in the next decade than they have ever received in the past. Proper stewardship of the Porcupine Herd requires description and evaluation of botanical aspects of its present range, mapping present and past migration routes and careful analysis of the potential effects of pipeline construction. Priorities for management of the Fortymile Herd include close control of harvest, censuses, determination of productivity and a qualitative analysis of the productivity of its range.

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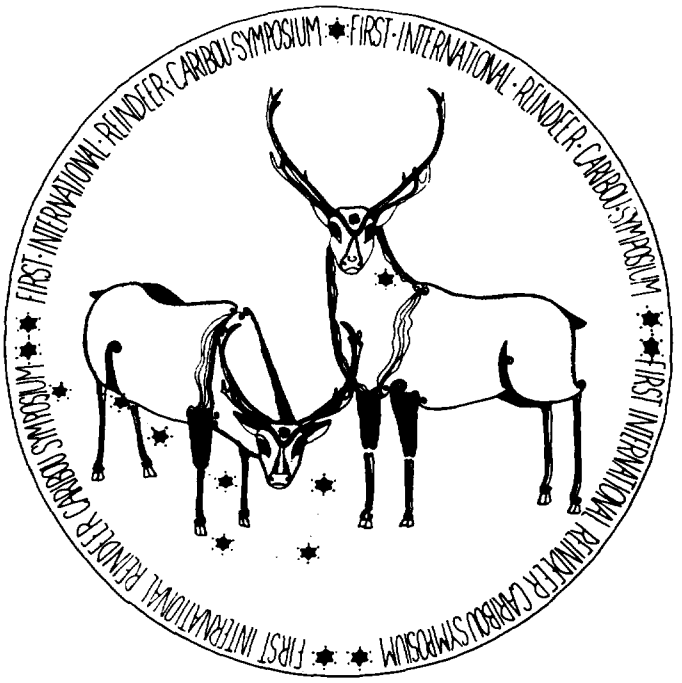

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