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Division of Game
Federal Aid in Wildlife Restoration
Research Progress Report

POPULATION STATUS OF THE
FORTYMILE CARIBOU HERD
AND IDENTIFICATION OF LIMITING FACTORS



by
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Projects W-22-5, W-22-6
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Job No.: 3.32R Job Title: Population Status of the Fortymile Caribou Herd and Identification of Limiting Factors

Period Covered: 1 July 1985-30 June 1986
(Includes data through 15 October 1986)

SUMMARY

Growth rate of the Fortymile Caribou Herd (FCH) apparently declined slightly from λ (finite rate of annual growth) = 1.10 from 1981 to 1984 to λ = 1.07 from 1984 to 1986. Reliability of population estimates is discussed. Natality of radio-collared female caribou (Rangifer tarandus) was 95% (20 pregnant out of 21) in May 1986. The major factor restricting growth of the FCH continues to be the high mortality (\bar{x} = 56% for 1973-83 and \bar{x} = 42% for 1984-86) of calves from birth until fall. Mean annual survival rate of adult female radio-collared caribou was 93% (6 of 32 females died during 994 collar-months) between 1980 and 1986. At least 2 of the 6 radio-collared female caribou that died were killed by wolves. Mean annual survival rate of adult male radio-collared caribou was 86% (3 of 13 males died during 242 collar-months). One male was killed by wolves. By inference from the calculated annual mortality rates of radio-collared caribou, it was found that wolf predation caused between 3.3% and 5.7% annual adult mortality in the FCH between 1980 and 1986. This low rate of predation by wolves may in part reflect the effects of the wolf control program in Game Management Subunit 20E in 1982 and 1983.

Key Words: caribou, Fortymile Herd, mortality, Rangifer, wolf.

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BACKGROUND

The Fortymile Caribou Herd (FCH) was probably the largest caribou (Rangifer tarandus granti) herd in Alaska and one of the largest in the world during the 1920's. The herd ranged from Rampart on the Yukon River to Whitehorse in the Yukon Territory, and provided much of the food needed by miners, Athapaskans, and other early residents (Murie 1935). Although the cause is unknown, the FCH declined from several hundred thousand in the late 1920's (Murie 1935) to 10,000-20,000 by the early 1940's (Skoog 1956). Factors that are thought to have contributed to the herd's decline include emigration, large subsistence harvests, and an increasing wolf (Canis lupus) population (Murie 1935, Skoog 1956, LeResche 1975, Davis et al. 1978).

The FCH began increasing concurrent with the initiation of wolf control by the Federal Bureau of Predator and Rodent Control in 1947. The herd numbered approximately 49,000 (pre-calving) from 1955 through 1960 (Davis et al. 1978). No censuses were conducted between 1961 and 1973, but by 1973 the population comprised approximately 6,500 caribou (Davis et al. 1978). The decline is attributed to high harvests in the late 1960's and early 1970's and an increasing wolf population (Davis et al. 1978).

In retrospect, it is clear that mismanagement of caribou contributed to the decline. Conventional wisdom of the time (and there was little evidence to refute it) was that predators generally did not control ungulate populations and that hunting mortality was often compensatory (i.e., hunters killed many animals that would have died anyway). In addition, the size of many ungulate populations was inadequately monitored; the FCH was no exception.

As a result of management based on the invalid conventional wisdom of the late 1960's and early 1970's, coupled with record severe winter weather, many Alaskan caribou and moose (Alces alces) populations declined. These declining herds included the Nelchina Caribou Herd, Western Arctic Caribou Herd, Delta Caribou Herd, and the FCH (Gasaway et al. 1983). The Denali (formerly McKinley) Caribou Herd also declined, though hunting was apparently not a major factor. The rapid recoveries of the Nelchina, Western Arctic, and Delta Herds during the mid-1970's and early 1980's coincided with intensive management including predator control and prohibition or restriction of hunting.

In contrast, the largely unmanaged Denali and Fortymile Herds did not recover rapidly. In the 3 intensively managed herds, harvest was greatly reduced or eliminated in the early or mid-1970's, and wolf populations were reduced after about 1976 or 1977 through control efforts by the Alaska Department of Fish and Game (ADF&G) (Delta Herd), high wolf harvests by the public (Nelchina and Western Arctic Herds), and/or natural processes such as disease in the wolf population (Western Arctic Herd). The Nelchina Herd may have begun increasing slowly prior to wolf reduction (Van Ballenberghe 1985). The FCH grew slowly from 1974 through 1981 during a period of apparent natural decline of wolf numbers. The Denali Herd apparently declined or was stable through the 1970's with a largely stable or declining wolf population. The trend in wolf numbers was unknown during the apparent growth of the Denali Herd in the 1980's.

The FCH has the greatest potential of any relatively accessible big game herd in the state for supporting a significantly larger population, and subsequently, increased recreational opportunity. However, even with mild winters, insignificant harvest, and a relatively low wolf population, the FCH only grew at about 5% annually from 1973 through 1981. The FCH numbered 14,000 in 1984, only 25% of the ADF&G interim goal of 50,000 for a pre-calving herd size. ADF&G (unpublished) has proposed continuing a predator reduction program begun in February 1982 in portions of Game Management Unit (GMU) 12 and Subunit 20E to restore low moose and caribou numbers to higher levels. In part, this study was initiated to gather detailed information necessary to direct management actions and to determine the effects of predator reduction on the FCH.

GOAL

To determine the status, population trend, movements, distribution, range-use patterns, and limiting factors of the FCH from 1983 through 1987.

OBJECTIVES AND PROCEDURES

Five objectives are being addressed in this study. They are:

Objective 1. Ascertain the growth rate of the FCH. The herd was censused in 1983, 1984, and 1986 using the modified aerial photo-direct count-extrapolation technique (Davis et al. 1979). Another census is scheduled for 1987.

Objective 2. Measure natality of the FCH and compare with that of other herds with known demography.

The natality rate of FCH females was determined each year in late May from 1983 through 1986 by observing the proportion of radio-collared females with distended udders, hard antlers, and calves (Bergerud 1964). A helicopter and ground observers were used to conduct composition counts in late May 1984 and 1985. Results were compared with similar counts from the Delta and Western Arctic Herds.

Objective 3. Ascertain the mortality rates of calves and adults.

Composition counts were conducted 4 times a year from 1983 through 1986 (calving, post-calving, rut, late winter), except for a rut count in 1984, a post-calving count in 1986, and calving counts in 1983 and 1986.

The annual mortality rate of females was estimated from the measured mortality rate of 35 females radio-collared between 1980 and 1986 (Trent and Rongstad 1974).

The annual mortality rate of males was estimated from the measured mortality rate of 13 males radio-collared between 1982 and 1986.

Objective 4. To determine patterns of range use, habitat selection, and food habits of the FCH.

We presented a paper entitled, "Calving Distribution of Alaska's Steese-Fortymile Herd: A Case of Infidelity?" at the 4th International Reindeer/Caribou Symposium, Whitehorse, Yukon, in August 1985 (Valkenburg and Davis, in press).

During winters 1984-85 and 1985-86, we collected fecal samples for analysis to determine winter food habits of Fortymile caribou. Results will be presented in the final report.

Objective 5. To determine predator:caribou ratios in the range of the FCH.

Data on wolf numbers in the range of the FCH during winter 1984-85 came from 3 sources. D. Grangaard conducted wolf surveys that encompassed most of the FCH's winter range; S. Ulvi, National Park Service, Eagle, conducted wolf surveys on the northern portion of the FCH's winter range along the Charley and Yukon Rivers; and the concurrent ADF&G study (Boertje et al. 1985) of factors limiting low-density moose numbers contributed additional data on wolf numbers in the southern portion of the FCH's winter range. Wolves from the Mitchells Ranch and Gold Creek packs (Boertje et al. 1985) were radio-collared in May 1985 as part of another ADF&G study. All other previously radio-collared wolves either died or had inactive collars during winter 1984-85.

During winter 1985-86, wolf surveys were conducted only in the moose-grizzly bear (Ursus arctos) study area (Fortymile drainage) and most caribou wintered farther to the northwest where little information was gathered on wolf numbers. Wolf surveys over the entire caribou winter range will be a priority for winter 1986-87.

Twenty-two grizzly bears were radio-collared within the southern portion of the FCH's range as part of the ADF&G moose-grizzly bear study (Boertje et al. 1985). Preliminary estimates were extrapolated from the radio-collared bear data for (1) grizzly population density and (2) the grizzly bear:caribou ratio.

RESULTS AND DISCUSSION

Growth Rate of the Fortymile Caribou Herd

Five censuses of the FCH were accomplished between 1973 and 1986 (Table 1). However, it is probable that the 1981 census was an underestimate because a 1.25 annual finite rate of growth (λ) would have been necessary for the herd to grow from 7,914 caribou in 1981 to 12,350 in 1983. A λ of 1.25 exceeds the mean λ possible (1.20) for 1982 and 1983 based on fall composition data (Table 2), even assuming no overwinter mortality of adults and calves.

Based on the above circumstantial evidence and uncertainty about the accuracy of the 1981 census, we believe the FCH contained about 9,500 caribou in 1981. Therefore, growth from

6,600 in 1973 to 9,500 in 1981 implies that $\lambda = 1.05$ annually during the period. From 1981 to 1984, λ would then have been about 1.12, and from 1984 to 1986 about 1.07. The planned 1987 census should confirm whether or not the rate of increase is slowing.

It is also possible that the 1986 census underestimated the population. We first attempted the census with 4 aircraft (a Beaver, 2 Super Cubs, and a Bellanca Scout) on 29 June and photographed the post-calving aggregations with a Fairchild T-11 aerial mapping camera using 23 cm x 23 cm format. Upon unloading the film, we discovered that the camera had not been functioning correctly. We repeated the census on 2 July with a 2-man crew in the Bellanca using a 35 mm SLR camera. All radio-collared caribou were still in the same general area on 2 July as on 29 June, but the area was not covered as thoroughly. Also, 1 radio-collared caribou (Y94) was not found until late in the day in a large group containing at least 10 previously found radio collars. We were therefore uncertain if the large group had mixed with a smaller group that originally included Y94 during the census, or if Y94 had not been accounted for earlier because of human error.

The apparently reduced growth rate of the FCH (from $\lambda = 1.12$ for 1981 to 1984, to $\lambda = 1.07$ from 1984 to 1986) may be due to increased adult mortality from wolf predation on the winter range. The herd wintered largely outside the 1982-83 wolf reduction area during 1984-85 and 1985-86 and wolves in the northern portion of the Fortymile drainage and in the Charley River drainage appear to feed more on caribou than on moose (Gasaway et al. 1986). However, our small cohort of radio-collared caribou has not experienced increased predation by wolves since 1984.

Natality

Mean natality was 94% (SD = 6.6) for radio-collared FCH cows from 1984 through 1986. Based on information from the radio-collared caribou and from composition counts done in late May 1984, natality of FCH cows >24 months has probably averaged about 80%, which is comparable to the Delta and Western Arctic Herds (Table 3) and other North American caribou herds (Bergerud 1978).

Mortality

Calf Mortality:

High calf mortality between birth (late May) and early October continues to be the primary factor limiting growth of the FCH. Between 1974 and 1983, calf mortality averaged 56% from the

birth peak (80 calves:100 cows in late May) until calves were 2-3 weeks of age (\bar{x} = 35 calves:100 cows; SD = 6.7, n = 5). After 1983, the May-June calf mortality rate declined to 42% (SD = 2.8, n = 2) (Table 2). The decline was significant (\bar{x} = 52.54, df = 1).

By early October, comparable pre- and post-1983 calf mortality was as follows: 1973-83, \bar{x} = 28.8 calves:100 cows, SD = 8.9, n = 8; 1984-86, \bar{x} = 33 calves:100 cows, SD = 4.2, n = 2). Late-winter herd composition counts were begun in 1983 and through 1986 there has been no significant change in calf:cow ratios from fall to late winter (χ^2 = 0.03, df = 1) (Table 2). The mean calf:cow ratio in fall averaged 31.8:100 (SD = 4.0, n = 5), and the mean ratio in late winter was 31.0:100 (SD = 6.7, n = 4). Therefore, mortality rates of calves and cows between fall and late winter were similar.

Adult Mortality and Population Modeling:

Between 1 October 1980 and 30 September 1986, 6 of 32 radio-collared adult female caribou died (2 killed by wolves, 1 by a grizzly bear, and 3 from unknown causes); the mean annual total mortality rate was 7% (994 collar-months). Between 1 October 1985 and 30 September 1986, 3 radio-collared adult female caribou died (1 killed by a wolf, 1 by a grizzly bear, and 1 from unknown causes); the annual total mortality rate was 13% (264 collar-months).

Between 1 October 1982 and 30 September 1986, 3 of 13 adult male radio-collared caribou died (one was killed by wolves, one died of unknown causes shortly after the rut, and one was killed by a hunter), for a mean annual total mortality rate of 14% (242 collar-months). Between 1 October 1985 and 30 September 1986, 1 radio-collared adult male caribou died (from unknown causes shortly after the rut), for an annual rate of 14% (82 collar-months).

Based on fall composition data, adult Fortymile caribou are composed of about two-thirds cows and one-third bulls. Therefore, the mean annual adult mortality rate between 1982 and 1986 for radio-collared caribou was 9.3%.

Incorporating calculated mortality rates and indices of recruitment (i.e., the percentage of calves in the herd in late winter) into a simple arithmetic model of the FCH's population dynamics can be instructive in cross-checking the credibility of calculated growth rates for the herd. We start with a theoretical pre-calving population composed of 100 females and 50 males. The following year we have a pre-calving population composed of 100 females, 50 males, and 30 short yearlings; the herd will have increased by a finite rate

(λ) of 1.2 (100 females + 50 males + 30 calves divided by 100 females + 50 males). The pre-calving proportions of females, males, and short yearlings in the FCH since 1983 are similar to the theoretical population. We would have a finite annual growth rate of 1.20 if the FCH experienced no adult mortality and no over-winter calf mortality occurred. If we subtract the calculated mean annual adult mortality rate from the pre-mortality recruitment rate ($1.20 - 0.093$), this results in an λ of 1.107 (or 10.7%). This rate is similar to the mean annual rate of growth since 1981 of about 9-10% calculated for the FCH. However, since there is some calf mortality over the 8 months between September, when the fall counts are done in the Fortymile Herd, and June, when the population is censused, the rate of increase of the theoretical model should be reduced by another 1%. This brings the theoretical model into even closer agreement with the observed rate of increase in the FCH.

Range Use, Habitat Selection, and Food Habits

A manuscript on the historical and recent distribution of the FCH during calving (Valkenburg and Davis, in press) was presented in the last Progress Report and has been accepted for publication during this reporting period. Information on recent movements and distribution, FCH habitat selection, and food habits of the FCH will be presented in the final report.

Predator:Caribou Ratios

Little information was obtained to improve or update our estimate of wolf numbers on the winter range of the FCH. The herd wintered primarily in the Slate Creek, Copper Creek, Crescent Creek, Birch Creek, and Salcha River drainages during 1985-86. A good estimate of wolf numbers on the winter range of the FCH will be sought during 1986-87.

Based on 2 years of intensive study using radio-collared bears, Boertje (pers. commun., 1986) has estimated the grizzly bear density in the ADF&G moose-grizzly study area in Subunit 20E to be approximately 1 grizzly bear/65 km². If this density is similar to that in the entire summer range of the FCH (13,300 km²), about 205 grizzly bears occur in the range of the FCH. The grizzly bear:caribou ratio in summer, then, would be about 1:75.

MANAGEMENT IMPLICATIONS

The 2 major sources of mortality of adult FCH caribou are harvest by humans and predation by wolves. Harvest has not significantly influenced growth of the FCH since 1973 (Table 4). The net effect of harvest on population growth

should be only about 1%. Even if up to 100 females are killed illegally annually, as area biologist Dave Kelleyhouse suspects, and about 400 males are harvested legally, the 500 caribou killed by hunters would have a negligible effect on population growth because the number of breeding females would be reduced by a very small number (100 harvested out of about 7,500 females). The influence of harvest on the wolf:caribou ratio would also be small. We use the fall 1984 data to illustrate: the wolf:caribou ratio before harvest was 135:12,732 (1:94), and the ratio after harvest was 135 wolves:12,232 caribou or 1:91.

Since 1980, wolves have annually killed 2.5% to 6% of the radio-collared females and 5% of the radio-collared males. If we infer that wolf-induced mortality on the FCH was the same as on the radio-collared sample, and weight the mean mortality rate of adult males and females based on their proportions in the herd, we estimate 3.3-5.7% of adult caribou have been killed annually by wolves. The implication is that major reductions of wolf numbers on the caribou winter range would increase survival of caribou (both calves and adults) by only about 4-5%. One important consideration is that summer and winter ranges of FCH caribou overlap considerably, and wolf reduction on caribou winter range could also increase summer calf survival.

We suspect that the major factor limiting growth of the FCH, then, is low calf survival from the time of birth through August. The next logical question then becomes, what factor(s) is/are responsible? This question can best be answered by radio-collaring calves for several years and then assessing specific causes of calf mortality. Clearly, increasing survival of calves from birth until fall (Table 2) would be a more effective way to increase herd growth than increasing the survival of caribou in winter. By reducing calf mortality in summer, concurrent with reducing wolf numbers on winter range, we should facilitate a rapid growth of the FCH.

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Table 1. Population estimates for the Fortymile Caribou Herd, 1973-86.

Date of census	Summer population (including calves)	Fall population (including calves)	Remarks
6/6/73	6,624 ^a	5,312	Extrapolated from "cow base" and fall composition counts
6/10/81	7,914 ^b	7,914 ^c	Photo and visual counts of post-calving aggregations
6/18/83	12,350	11,980 ^d	Photo and visual counts of post-calving aggregations
6/18/84	13,073-13,731	12,732 ^e	Photo and visual counts of post-calving aggregations
7/2/86	15,303	14,538 ^f	Photo and visual counts of post-calving aggregations located largely through radio tracking

^a The fall (September) population estimate of 5,312 has been widely used in previous reports. For comparison here, we converted it to a "summer" population estimate. See remarks.

^b Due to problems with the census, this figure may be an underestimate. The actual population may have been closer to 9,500.

^c Composition counts indicated that there was little calf mortality between June and October.

^d Summer population estimate was reduced by 3% to account for calf loss (see Table 2).

^e Median summer population estimate was reduced by 5% to account for calf loss (see Table 2).

^f Summer population estimate was reduced by 5% to account for calf loss.

Table 2. Sex and age composition of the Fortymile Caribou Herd, 1953-85.

Date	Bulls: 100 cows	Yrlgs: 100 cows	Calves: 100 cows	Yrlg % in herd	Total yrlgs counted	Calf % in herd	Total calves counted	Cow % in herd	Total cows counted	Bull % in herd	Total bulls counted	Total caribou counted
11/53	--	--	--	--	--	29	66	--	--	--	--	228
10/54	78	--	64	--	--	26	50	41	78	32	61	189
10/55	--	--	--	--	--	16	268	--	--	--	--	1,659
10/56	--	--	--	--	--	5	34	--	--	--	--	737
10/57	--	--	--	--	--	5	26	--	--	--	--	576
8/58	--	--	--	--	--	33	40	--	--	--	--	127
10/59	--	--	--	--	--	36	164	--	--	--	--	124
1960	No data											
10/61	75	30	45	12	133	18	200	40	444	30	333	1,110
10-11/62	--	--	--	--	--	11	85	--	--	--	--	743
1963-71	No data											
10/72	31	17	21	10	66	13	84	60	400	18	122	672
6/6/73	--	--	57	--	--	--	638	--	1,120	--	--	1,758
9-10/73	43	9	16	5	170	10	318	60	1,974	26	845	3,307
6/4/74	0	0	50	0	6	33	502	67	1,011	0	0	1,519
6/6/74	0	0	55	0	0	36	183	64	330	0	0	513
6/28/74	18	3	24	2	37	17	276	69	1,148	13	211	1,672
9/20/74	32	6	20	4	35	12	108	63	553	20	176	872
9/21/74	35	9	21	5	46	13	110	61	525	21	185	866
9/74	33	8	20	5	81	13	218	62	1,078	21	361	1,738
1975	No data											
9/23-24/76	42	11	35	6	54	18	164	53	476	22	202	896
6/13/77	--	--	39	--	--	39	631	--	1,621	--	--	2,252
9/27-28/77	52	14	45	7	75	21	245	47	543	25	287	1150
6/14/78	--	--	35	--	--	26	123	74	356	--	--	479
10/19-20/78	39	14	26	8	59	15	109	56	417	22	163	748
1979	No data											
6/11/80	25	10	41	6	132	23	559	57	1,371	14	338	2,400
10/14-15/80 ^a	109	--	61	--	--	23	222	37	364	40	396	928 ^a

Table 2. Continued.

Date	Bulls: 100 cows	Yrlgs: 100 cows	Calves: 100 cows	Yrlg % in herd	Total yrlgs counted	Calf % in herd	Total calves counted	Cow % in herd	Total cows counted	Bull % in herd	Total bulls counted	Total caribou counted
6/10/81	22	--	31	--	--	20	600	65	1,928	14	427	2,956
9/26/81	52	--	31	--	--	17	171	54	547	29	286	1,004
9/29/82	54	--	27	--	--	15	241	55	901	30	483	1,625
4/19/83	35	--	25	--	--	18	68	61	236	21	83	387
6/8/83	6	7	35	5	142	24	743	67	2,097	4	136	3,118
6/19/83	22	9	38	6	70	22	279	59	741	13	162	1,252
9/20/83	44	--	30	--	--	17	166	58	560	25	247	973
10/7/83	61	--	36	--	--	18	180	51	498	31	302	980
3/22/84	16	--	27	--	--	19	206	70	754	11	123	1,083
5/30-6/1/84	1	2	72	1	29	41	1,072	57	1,478	1	10	2,589
6/20/84	42	--	45	--	--	24	954	53	2,098	23	888	3,940
4/27/85	16	--	32	--	--	22	190	68	593	11	93	876
5/25/85 ^a	8	70	39	32	135	18	75	46	193	4	15	418
6/19/85	18	--	48	--	--	29	1,103	60	2,285	11	415	3,803
10/16/85	50	--	36	--	--	19	208	54	574	27	285	1,067
4/29/86	14	--	40	--	--	26	153	65	380	9	53	586
10/13/86	36	--	30	--	--	17	235	61	842	22	304	1,381

^a These counts were probably not representative of the herd.

Table 3. Natality of Delta, Western Arctic (WAH), and Fortymile Caribou Herds based on counts of calves and cows and proportion of pregnant radio-collared females 3 years old and older, 1981-86.

Herd and year	Calf counts (late May or early June)			Radio-collared caribou 36 months and older		
	No. calves counted	No. cows counted	Calves: 100 cows	No. pregnant	Total	Natality rate (%)
Delta 1981	--	--	--	10	13	77
Delta 1982	108	151	72	7	10	70
Delta 1983	1,629	2,052	79	17	22	77
Delta 1984	395	482 ^a	82	28	31	90
Delta 1985	--	--	--	38	41	93
Delta 1986	--	--	--	33 ^b	40	83
WAH 1981	885	1,079	82	31	37	84
WAH 1982	1,380	1,764	78	24	29	83
Fortymile						
1984	1,072	1,478	73	20	23	87
1985	--	--	--	19	19	100
1986	--	--	--	20 ^c	21	95

^a Includes some yearlings.

^b Twenty-six had distended udders, 7 had hard antlers (indicates pregnancy but udder was not seen), 5 had no distended udder, and 2 were antlerless (udder was not seen, but neither one was a naturally antlerless animal).

^c Sixteen had distended udders, 3 had hard antlers during calving, and 1 was seen in August and September with a calf at heel.

Table 4. Harvest of Fortymile Herd caribou, 1973-85.

Year	Harvest			Total ^b
	Male	Female	Unknown ^a	
1973	37	8	1	46
1974	22	5	2	29
1975	22	12	0	34
1976	26	5	2	33
1977	12	5	43	60
1978	10	6	16	32
1979	9	0	15-20	24-29
1980	10	0	20-50	30-60
1981	48	0	52	100
1982	110	0	55	165
1983	200	0	50-100	250-300
1984	245 ^c	0	40-60	285-305
1985	261	0	100	361

^a Includes estimated illegal harvest which is composed of mostly females killed throughout the winter.

^b There may have been an additional 10-30 caribou killed in the Yukon Territory each year.

^c Based upon an independent field survey of hunters, the Area Biologist estimated that only about 62% of harvested caribou were reported.

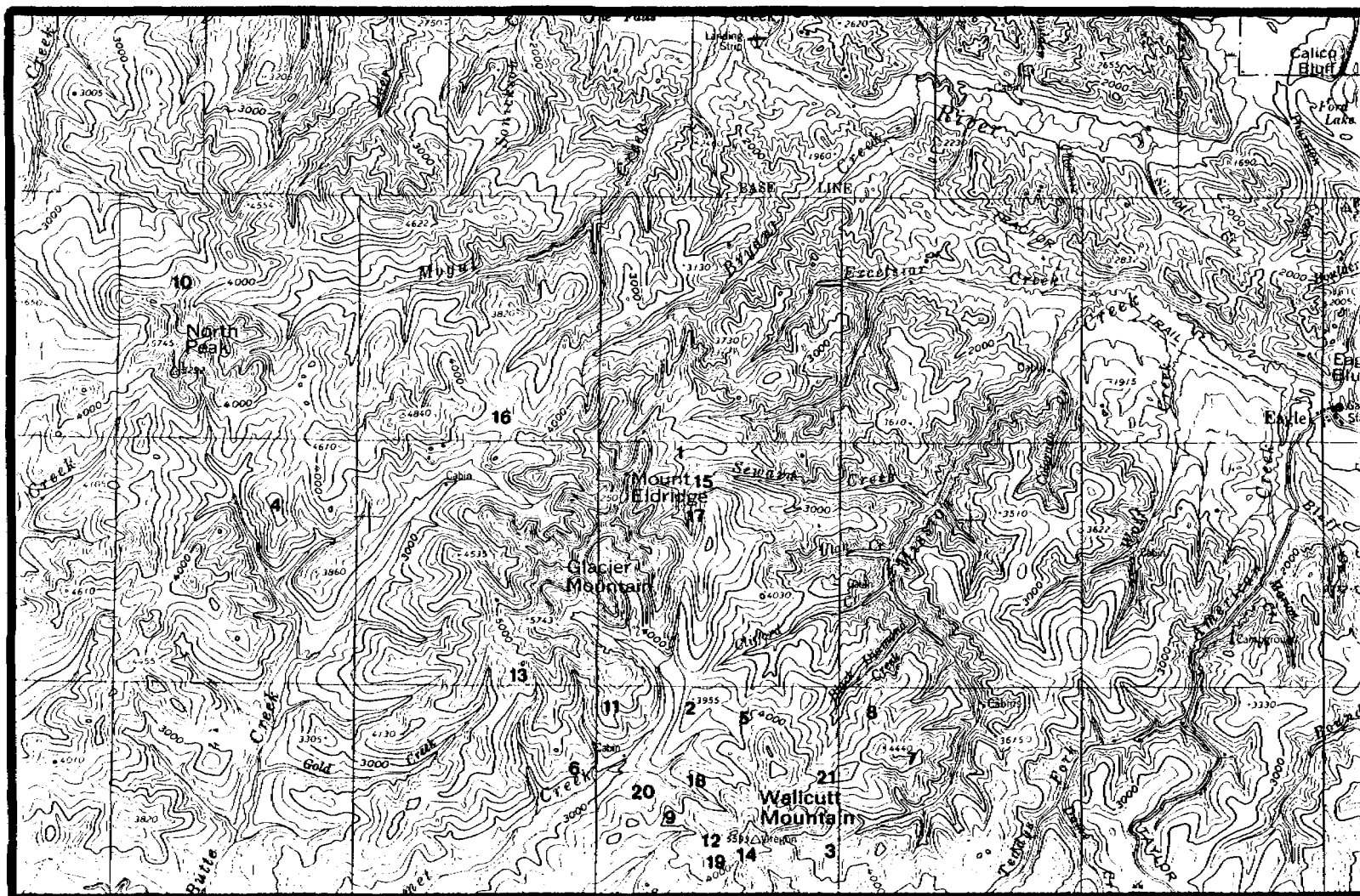
Appendix A. Summary of group sizes and distribution of radio-collared caribou during the 2 July 1986 Fortymile Herd census.

Group No. ^a	Group size	No. radio-collared caribou in group
1	4,360	6 ^b
2	2,249	4 ^b
3	1,210	0
4	1,157	2
5	741	1
6	702	2
7	506	0
8	447	1
9	433	1
10	420	1
11	368	2
12	355	1
13	348	1
14	340	1
15	303	0
16	265	1
17	236	1
18	208	0
19	207	1
20	177	1
21	117	1
22	<100 ^c	1
	15,303	29

^a Location of each group, during the census, appears in Appendix B.

^b Includes Y94 which was not adequately accounted for but was probably in this group.

^c This group was on Mt. Veta and is not shown on Appendix B.



Appendix B. Distribution of groups of Fortymile Herd caribou during the census, 2 July 1986.