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CARIBOU



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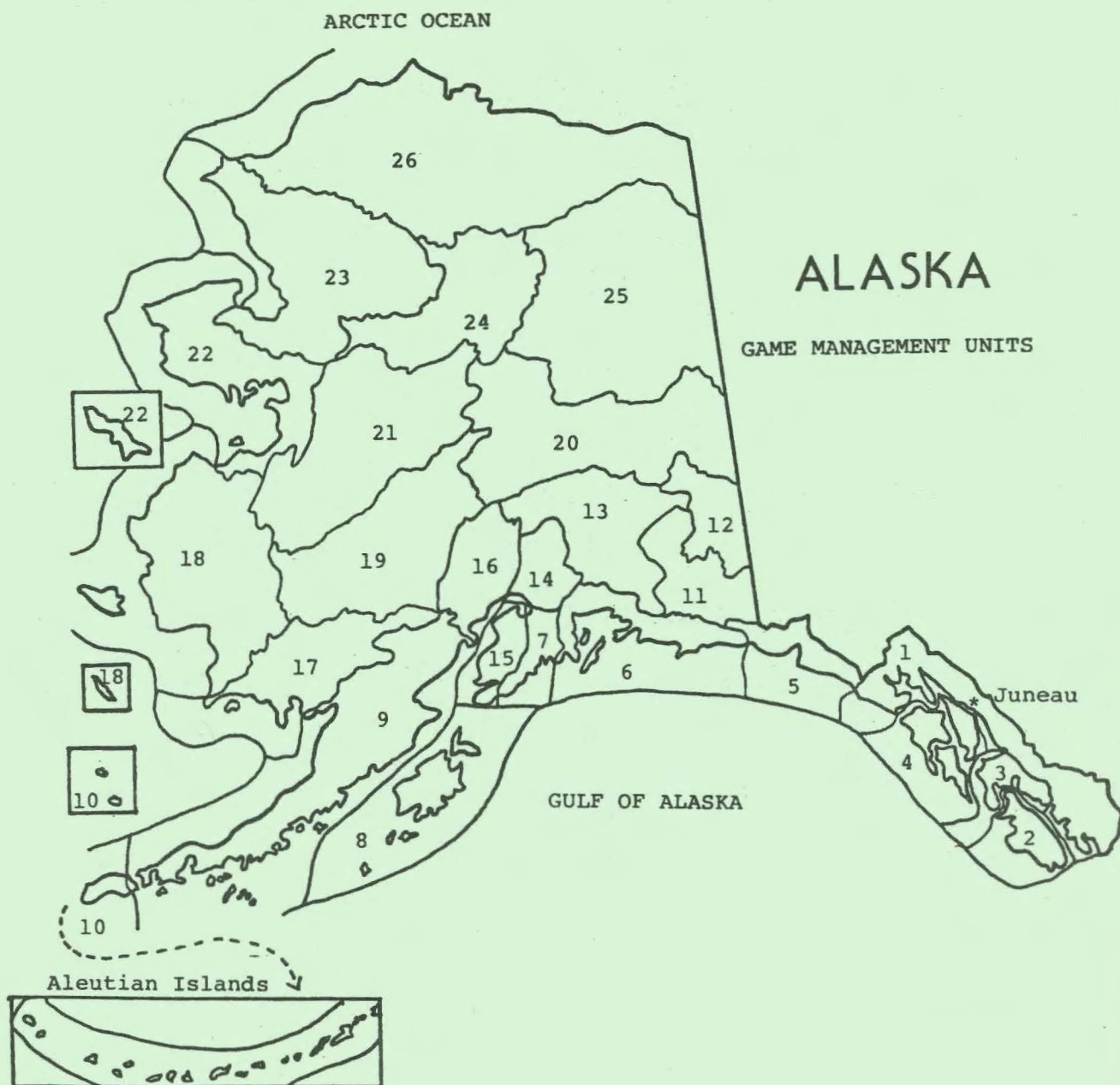
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STATEWIDE HARVEST AND POPULATION STATUS

Twenty-eight groups of caribou are identified in Alaska as "herds," but the size of these groups varies from a few hundred to nearly a quarter of a million animals. The total number of caribou estimated to be in the state is approximately 550,000 animals. Caribou numbers in the major herds (Mulchatna, Nelchina, Porcupine, Western Arctic) are presently at high numbers and are either increasing or stable. Most intermediate-sized herds (e.g., Northern Alaska Peninsula, Delta-Yanert, Fortymile, Central Arctic) are stable or increasing. Status of the smaller herds varies; some of the remnant herds in Units 19 and 21 appear to be declining. Statewide, caribou populations are relatively high and increasing, a decidedly more optimistic outlook than existed a decade ago.

The reported harvest of caribou in 1986-87 was 7,567, slightly lower than during the past year. However, the reported harvest is derived largely from hunter report cards and is still far below the actual harvest (14,214-24,241); compliance with reporting requirements is still a significant problem, particularly in rural areas. Herd status and reported harvest in 1986-87 are summarized on the following page.

Steven R. Peterson
Chief of Research

Herd	CMU	Population estimates	Population trend	Reported harvest	Estimated harvest
Kenai Mountains	7	400	Stable to increasing	50	--
Mulchatna	9A & B, 16, 17, 19	42,900	Increasing	993	1,985
N. AK Peninsula	9C & E	16,000-17,000	Stable to increasing	720	2,000
S. AK Peninsula	9D & Unimak	4,600	Decline	56	--
Adak	10	420-500	Stable to increasing	134	--
Mentasta	11	3,110	Stable	92	--
Chisana	12	1,100	Stable to increasing	41	--
Nelchina	13, 14B	27,528	Increasing	955	--
Kenai Lowlands	15A & B	79	Stable	0	--
Denali	13E, 20C	2,000-2,500	Stable	0	--
Kilbuck Mountains	18	300	Increasing	0	10-12
Andreafsky Mountains	18	94	Stable	--	--
Beaver Mountains	19, 21	1,600	Decline	5	10-15
Kuskokwim Mountains	19, 21	600	Decline	0	10
Sunshine Mountain	19	500-600	Decline	5	--
Big River	19	750	Decline	12	35-40
Rainy Pass	19	1,500	--	21	50-60
Tonzona	19	400	--	1	10-15
Delta and Yanert	20A	8,400	Slow increase	413	734
White Mountains	20B, 20F, 25C & D	1,000	Slow increase	2	--
Macomb	20D	700	Increasing	10	--
Fortymile	20E	16,000	Slow increase	223	370
Galena Mountain	20F, 21C & D, 24	250-300	Increasing	--	--
Wolf Mountain	20F, 21C & D, 24	150-200	Increasing	--	--
Ray Mountain	20F, 21C & D, 24	500-600	Stable	--	--
Western Arctic	21D, 22A & B, 23, 24, 26A	230,000	Increasing	3,398	6,000-15,000
Porcupine	25, 26C	180,000	Increasing	91	2,000-3,000 ^a
Central Arctic	26B	13,000+	Increasing	345	1,000
Statewide Totals		553,881-555,761		7,567	14,214 24,241

^a Includes Canadian harvest.

CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 7

HERD: Kenai Mountains

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The Kenai Mountains Caribou Herd (KMCH) was established through transplants of 44 animals from the Nelchina Caribou Herd in 1965 and 1966. The last survey, completed in October 1985, indicated the postseason population had reached the desired management level of 400 caribou.

Population Composition

No data are available for 1986-87. In October 1985, the classification of 401 caribou resulted in the following ratios: 25 calves:100 cows and 44 bulls:100 cows.

Mortality

Hunters reported harvesting 50 caribou during the 1986 fall season: 36 males and 14 females. Two hundred fifty permits were issued, and 37% (50) of those that actually hunted (134) were successful. Thirty-one (62%) of the successful hunters walked into the area they hunted, 15 (30%) used horses, 3 (6%) used aircraft, and 1 (2%) did not report the method of transportation. Thirty-four (68%) of the 50 successful hunters were Kenai Peninsula residents, ten (20%) were Alaskan residents from areas other than the Kenai Peninsula, and six (12%) were nonresidents. Means of transportation by unsuccessful hunters (84) followed the same pattern as those for successful hunters. One hundred sixteen (46%) of the permit holders reported not hunting in this area.

Management Summary and Recommendations

Postseason population estimates from 1978-1985 indicated the KMCH had steadily grown at a rate of about 14% per year. The most recent postseason estimate (winter of 1985-86) is 400

caribou. If calf recruitment remains similar to that observed in 1985, the current annual harvest of about 50 animals should drop or reverse the herd's growth.

Range conditions have not been thoroughly investigated; however, winter range appears to be heavily utilized when caribou are confined to windswept ridges in a small portion of their overall range. Before this herd is allowed to increase beyond the current management level of 400 caribou, range conditions should be evaluated or adjacent areas utilized.

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9A, 9B, 16, 17, and 19B

HERD: Mulchatna

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

No population estimates for the Mulchatna Herd were conducted during this reporting period. In 1985 minimum herd size was estimated at 42,900 caribou. Since 1981 herd estimates have increased approximately 20%/year.

Population Composition

Sex and age composition counts were conducted on 19 October 1986 near the mouth of Old Man Creek and in the Jack Rabbit Hills; 2,171 caribou were sampled. From this sample, the following ratios were established: 56 males:100 cows and 37 calves:100 cows. Calves, cows, and males represented 19.2%, 51.8%, and 29.0% of the herd, respectively. It was evident during the composition counts that caribou were not randomly mixed. The rut was apparently over, caribou were migrating towards their winter range, and greater percentages of males were found near the rear of the group.

The ratio of males to females has been above 50:100 in all counts since 1974, except in 1980 when it was 31:100. The ratio of calves:100 cows has steadily declined since 1978 when it was 65:100.

Mortality

No wolf predation was noted on caribou during the 1986-87 winter. Snow cover was light to nonexistent south of the Mulchatna and Koktuli Rivers, and caribou concentrated from there to Iliamna Lake for most of the winter. Wolf predation was concentrated on moose populations along the Nushagak River and at the headwaters of the Mulchatna River in the western Alaska Range.

Based on returned harvest tickets, hunters took 993 caribou from the Mulchatna herd during the 1986-87 season; however, based on interviews with village residents and air taxi operators, the reported harvest is substantially lower than the actual harvest. Table 1 compares the reported harvest/GMU with my estimates of the actual harvest/GMU.

Distribution and Movement

General movement patterns have changed considerably as this herd has grown. While the majority of the herd has continued to use the flats west of Iliamna through most of the winter, in recent years some have used the tundra slopes west of the Nushagak River in the Kemuk Mountain vicinity, and others have used the area between the Klutuspak and King Salmon Rivers. In January 1987 approximately 7,000 caribou crossed the Kvichak River and moved into the area between the Alagnak River and Kukaklek Lake, remaining there for several weeks. As they moved north in February, 1,500 to 2,000 caribou passed through the Tazimina Lakes area and crossed Lake Clark near to Port Alsworth where they have not been previously reported.

Calving occurred primarily in the Bonanza Hills-Summit Creek area and near Halfway Mountain. Small groups of caribou with calves were noted in the Jack Rabbit and Kaktuli Hills, Mosquito Creek, and the Kilbuk Mountains. Most of the herd left the main calving areas in late June and headed northwest towards Mosquito Creek and the upper Nushagak River, which is farther west than they had ever been observed in June.

Management Summary and Recommendations

The Mulchatna caribou herd has experienced exceptionally rapid growth since 1980. Mild winters, low predation rates, and low hunting mortality have all contributed to this growth. The postcalving population estimates have increased from 20,618 in 1981 to more than 42,900 in 1985; however, decreasing proportions of calves in the herd suggest that the rate of growth has decreased in recent years. Hunting mortality has been steadily increasing, and mortality due to predation is expected to increase when winter conditions become more severe and caribou winter in areas with significant numbers of wolves.

The cooperative effort between ADF&G and Lake Clark National Park personnel to monitor herd movements and range use continued through this reporting period. The majority of the work was done by Lake Clark NPS personnel. Increased use of the range west and north of the historic Mulchatna range was noted; atypical movements across the Kvichak River and past Port Alsworth during the winter months were also noted. The Board of Game adopted a proposal that closes the caribou

season in Subnits 17A and 17C to encourage increased use of the available habitat there.

Most of the radio collars that had been placed on caribou in this herd functioned for more than 5 years and, consequently, were either very weak or had ceased transmitting. Eleven caribou were radio-collared during April 1986. An additional 10 to 20 caribou should be collared during 1987-88 to monitor distribution and facilitate census attempts.

No change in season or bag limit is recommended.

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Table 1. Mulchatna caribou herd reported and estimated harvest by game management unit, 1985-86.

GMU	Reported Take	Estimated Take
9	497	725
16	8	10
17	359	1,000
19	129	250
Totals	993	1,985

CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9C and 9E

HERD: Northern Alaska Peninsula

PERIOD COVERED: 1 July 1986-30 June 1987 (additional data
from July 1987)

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The 1986 photocensus of the Northern Peninsula Caribou Herd resulted in a minimum estimate of 15,300 caribou (Table 1), but it was suspected that some were missed because 3 radio-collared animals had not been located. Nevertheless, it was believed that the population was no longer growing and may have declined slightly.

A photocensus was conducted on 2 July 1987 with coverage similar to that of the previous 5 years; 15,629 caribou were counted on the Bering Sea side of the Aleutian Mountains. At most, one of 28 radio-collared caribou was not located. Caribou on the Pacific side of the mountains were not counted, but observations by the U. S. Fish and Wildlife Service (R. Hood, pers. comm.) revealed no major concentrations in that area. This herd is now estimated at 16,000-17,000, down from the 19,000-20,000 estimated in 1984.

Population Composition

On 13 October 1986, a sample of 2,540 caribou was classified as follows: bulls 27%, cows 54%, and calves 19%. The calf:cow ratio was 34:100, and the bull:cow ratio was 51:100 (Table 1). Samples from the 1986 summer photocensus included an average presence of 28% calves. Except for 1983 and 1986, there has not been evidence of significant calf mortality between summer and fall (Table 1). Photos of caribou in several major aggregations during summer 1987 indicated an average presence of 30% calves (n=643).

Mortality

The total reported harvest was 720 animals (Table 2), including 603 males (84%) and 117 females (16%). As in past years, few local residents reported killing caribou. Based on surveys of all villages in Subunits 9C and 9E (J. M. Morris, unpubl. data), the unreported subsistence harvest is estimated at 900-1,000 caribou. The unreported sport harvest and crippling loss probably bring the total harvest to approximately 2,000 caribou.

The bag limit in August has varied over the past 4 years: 1 caribou prior to 1984, 4 caribou in 1984, and 2 caribou in 1985 and 1986. The reported harvest in August was 61, 167, 93, and 186 for 1983-86, respectively. For the entire 1986-87 season, 82%, 11%, 4%, and 3% of 555 successful hunters took 1, 2, 3, and 4 caribou, respectively. Although the reported harvest dropped slightly for 1986-87, it is believed that this was not actually the case for the unreported harvest. During October and November 1986, caribou were readily available along the Naknek River, and a herd of 1,500 animals crossed to the north side of the river and consequently were available along the road system for much of the winter. Therefore, the unreported local harvest was probably higher than usual. There was not a general brown bear season in Unit 9, so fewer nonresidents hunted in October.

Management Summary and Recommendations

The population objectives are to maintain (1) the herd at 15,000-20,000 caribou and (2) a bull:cow ratio of at least 40:100. The herd increased to 20,000 animals in 1984; the bull:cow ratio was 39:100. We sought to liberalize the season and thereby slightly increase the total harvest without concentrating all the additional take on bulls. In 1984 the Board of Game increased the bag limit in August to 4 caribou; they felt that because the bulls would be in velvet many sport hunters would not be attracted by the larger bag limit. However, with very little publicity about the increased bag limit, the August harvest increased to 167 animals. Had more urban Alaskan hunters been aware of the 4 caribou bag limit in August 1984, the harvest would likely have been much higher. The August bag limit was subsequently reduced to 2 caribou, and the August 1985 harvest dropped to 93; in 1987 it increased to 186. With the herd now showing a slight decline and the total harvest more accurately estimated at close to 2,000 (approximately 12% harvest rate), I recommend reducing the harvest slightly by returning the August bag limit to 1 caribou for all hunters and reducing the winter bag limit to 2 caribou for nonsubsistence hunters.

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Table 1. Summary of caribou population statistics for the Northern Alaska Peninsula Herd.

Year	Population estimate	Summer % calves	Fall % calves	Ratio bulls:100 cows	Ratio calves:100 cows
1981	16,000	28	23	34	39
1982	16,800	27	26	52	52
1983	18,000	29	16	39	27
1984	19,000	25	22	39	39
1985	19,000	27	--	--	--
1986	15,300+	28	18	51	34
1987	16,000	30	--	--	--

Table 2. Reported harvests for Northern Alaska Peninsula Caribou Herd.

Year	Fall Season			Winter Season			Total Reported Harvest		
	Male	Female	Total ^a	Male	Female	Total ^a	Male	Female	Total ^a
1977-78	418	59	480	219	78	297	683	150	854
1978-79	345	53	402	51	47	98	442	123	569
1979-80	--	--	443	--	--	135	--	--	612
1980-81	358	44	419	146	100	246	504	144	648
1981-82	447	36	490	118	93	216	565	129	706
1982-83	287	42	346	146	104	250	402	154	594
1983-84	351	47	402	129	78	211	493	128	639
1984-85 ^b	482	92	574	92	74	169	574	167	744
1985-86 ^c	488	53	544	124	80	207	612	133	751
1986-87 ^c	474	68	542	129	49	178	603	117	720

^a Totals include caribou of unknown sex.

^b August bag limit was 4 caribou.

^c August bag limit was 2 caribou.

CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9D and Unimak Island

HERD: Southern Alaska Peninsula

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27. (On 14 November 1986, the bag limit in Unit 9D was reduced by emergency regulation from 4 to 1 caribou.)

Population Status and Trend

This herd grew from the late 1970's to 1983; in 1983 the U.S. Fish and Wildlife Service (FWS) counted at least 10,200 caribou on the mainland (Table 1). In addition, there were approximately 300 caribou on Unimak Island. Despite several attempts by the FWS, a reliable estimate of population size was not obtained in 1984 or 1985. In April 1986, 10 caribou were radio-collared to aid in conducting a postcalving census. Unfortunately, the radios did not function properly and only 3,000 caribou were located. Concern over a possible major population decline heightened in October 1986 when a composition survey within the major rutting area located less than 4,000 caribou. The FWS completed a very intensive aerial survey (17.6 hours) from 30 October-3 November. This survey covered all caribou habitat from the Herendeen Bay-Nelson Lagoon area to Cold Bay. At this time, very few caribou were south of Cold Bay; 4,543 caribou were counted. This is considered the most reliable count since 1983.

During April 1987, 20 radio collars were put on caribou to facilitate a postcalving population estimate. On 26 June a cooperative ADF&G-FWS photocensus was completed; 4,067 caribou were counted. Despite a drastically reduced sport harvest in 1986-87, this herd appeared to be still declining; it is now below the population objective of 5,000-6,000 caribou.

Population Composition

Since 1981 this herd has had relatively poor calf recruitment, which has occurred even during the period of herd growth (Table 1). The FWS classified 2,594 caribou on 16 July 1986, including 17% calves. On 16 October 1986, 2,037 caribou were

classified from a helicopter, including 301 calves (13%); the calf:cow ratio was 20:100. During the June 1987 census, composition photos were taken of the major aggregations, and a total of 723 caribou were classified. This sample was weighted by herd size and had an average of 12% calves. On 9 July 1987 the FWS classified 1,689 caribou believed to be among those photographed on 26 June 1987; 12% were calves.

Of the 2,307 caribou classified on 16 October 1986, 12% were small bulls with cow-like antlers, 6% were medium-sized bulls, and 3% were fully mature bulls. The bull:cow ratio was 32:100.

Mortality

Because of the emergency reduction in the bag limit, the 1986-87 reported harvest was only 56 caribou (including 36 males and 18 females), the smallest ever recorded (Table 2). However, it is recognized that most of the harvest by local residents, particularly outside the town of Cold Bay, is not reported. Only 17 caribou (14 males and 3 females) were reported taken from 10 August-31 October (fall season) which was 85% lower than the average for the previous 5 years (49 caribou). From 1981-85, the fall harvest was 11-20% of the total reported harvest, and it was higher in odd-numbered years when there was a concurrent brown bear season. The 1986 fall harvest was not impacted by the emergency regulation; rather, it reflected the scarcity of caribou near the Cold Bay road system and the closed bear season.

The results of the emergency regulation on subsistence harvest is difficult to assess. The staff of Izembek National Wildlife Refuge (NWR) intensified hunter checks at Cold Bay and documented over 80 caribou killed (M. Blendon, pers. comm.). This represents over twice the number of caribou reported from harvest ticket reports for the same time period. Although most of the villages that utilize this herd have not been systematically surveyed, a recent socioeconomic study of King Cove (Braund 1986) suggests that the caribou harvest for that village could have been as high as 400-500 caribou. If this harvest rate for King Cove is reasonably accurate and is applicable to other villages, the total unreported harvest would be much higher than previously recognized. The primary effect of the 1 caribou bag limit for the winter season was the reduced incentive for nonlocals to travel to Cold Bay for a caribou hunt.

Although specific data on natural mortality is lacking, both predation and nutritional status need to be evaluated. The reason for chronic low calf production is unknown, but it may involve one or both of these factors. Of the 16 adult caribou

radio-collared in early April 1987, four died of natural causes within the subsequent 4 months. Compared to cows from the Northern Alaska Peninsula Herd captured at the same time, these appeared in poorer physical condition. During the censuses of these herds on 25 and 26 June 1987, it was apparent that plant development south of Port Moller was well behind that occurring further north. This retarded plant growth may have placed additional nutritional stress on caribou that were already thin after a winter on relatively poor range. Predators include brown bears and wolves, but densities of these species and their impacts on the herd are unknown.

Management Summary and Recommendations

The population objective is to maintain this herd at 5,000-6,000 animals. When the herd exceeded 10,000 animals in 1983, there was concern that any further growth would cause range deterioration; however, further liberalization of the hunting season was deemed to be impractical. After several years of uncertain herd status, the results of the fall 1986 survey and 1987 summer photocensus verified that the herd had declined to less than 5,000 caribou. From 1983 through 1986, the herd had an average annual rate of decline of over 20%. Reasons for the decline are still poorly documented but possibly involved some or all of the following factors: (1) a higher human harvest than recognized, (2) poor nutrition, and (3) predation. Research should be initiated immediately to evaluate all these factors. Better monitoring of harvest is the first priority, and it should include a concerted effort to document subsistence take in the 5 villages that utilize this herd. In addition, hunter checks at Cold Bay should be conducted in such a manner that the reporting rate of those hunters that use the required harvest tickets can be evaluated.

The relationship between range and animal condition should be investigated to determine if caribou from this herd are in poor condition and, if so, the extent to which it is impacting survivorship and productivity. The role of predation on both neonates and adults should be documented.

For the immediate future, harvests must be severely restricted. The 1987-88 season was shortened to 10 August-31 October for nonlocal Alaska residents and 1 September-31 October for nonresidents; the bag limit was 1 caribou. Subsistence hunters (residents of Subunit 9D and False Pass) can harvest 2 caribou after November 1. In order to get more hunters to comply with this regulation or possibly even more restrictive ones in the future, it is important to (1) make village contacts, (2) explain the status of the

herd and our current management strategy and, (3) get feedback from local residents on options for regulating the harvest.

Literature Cited

Braund, S. 1986. Effects of renewable resource harvest disruptions on community socioeconomic and sociocultural systems: King Cove. Technical Report Number 123. Prepared by the U. S. Department of Interior, Minerals Management Service.

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Table 1. Summary of caribou population statistics for the Southern Peninsula Herd.

Year	Population estimate	% calves	Ratio bulls:100 cows	Ratio calves:100 cows
1981	6,000	12	--	--
1982	7,000	13	--	--
1983	10,203	15	--	--
1984	7,500+	15	--	--
1985	--	9	--	--
1986	4,543+	13	32	20
1987	4,067+	12	--	--

Table 2. Reported harvests for Southern Alaska Peninsula Caribou Herd.

Year	Fall Season			Winter Season			Total Reported Harvest			Number of successful hunters (nonres)
	Male	Female	Total ^a	Male	Female	Total ^a	Male	Female	Total ^b	
1977-78	47	4	52	40	9	49	91	21	122	
1978-79	26	5	31	36	10	46	86	17	103	
1979-80	--	--	57	--	--	110	--	--	169	
1980-81	--	--	51	--	--	192	--	--	251	
1981-82	65	6	72	233	124	360	298	130	432	216 (10)
1982-83	34	1	35	271	103	374	300	110	410	185 (19)
1983-84	39	6	45	128	74	206	168	81	254	126 (23)
1984-85	39	5	44	240	104	344	279	109	388	174
1985-86	43	5	48	137	157	297	180	162	345	151
1986-87	14	3	17	22	15	39	36	18	56	54 (11)

^a Totals include caribou of unspecified sex.

^b Totals include caribou reported without a specified data.

CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 10

HERD: Adak Island

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulation No. 27.

Population Status and Trend

No surveys of the Adak Caribou Herd were conducted during this reporting period. The last survey was conducted in August 1985. At that time, the herd was estimated to contain between 420 and 500 caribou (Sexton 1987). The U. S. Fish and Wildlife Service biologists stationed on Adak suspect that the herd has increased during this reporting period.

Mortality

Registration permits were issued to 388 hunters; 332 of these permittees actually hunted. The reported harvest was 134 caribou, including 58 males (43%) and 76 females (57%). No natural mortality was reported.

Management Summary and Recommendations

Although no survey data were available, it appeared that the number of caribou in the Adak herd continued to be substantially higher than the management goal of 150. The harvest during the 1986-1987 season was lower than the 2 previous reporting periods; however, it was equal to the average harvest of the previous 5 hunting seasons ($\bar{x}=134.4$). The percentage of females in the harvest was higher during this reporting period (57%) than that reported for the previous 5 seasons (49%). This level of harvest (assuming herd size <500 animals) should stabilize or even decrease herd size.

Management of the Adak Caribou Herd depends on continued cooperation between the U. S. Navy, U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game. Efforts to census the herd and encourage an adequate harvest must be

continued to ensure that caribou numbers do not increase beyond a controllable level.

No changes in seasons or bag limits are recommended.

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CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11

HERD: Mentasta

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The fall population was estimated at 3,140 for the Mentasta Caribou Herd (MCH) in 1985. No composition surveys were flown in 1986; therefore, no extrapolated fall population estimate could be made. The postcalving herd count of 3,032 made in 1986 suggested that herd size was approximately the same as in 1985 when 3,108 were counted. Herd size appeared slightly higher than in 1983 and 1984 when 2,766 and 2,700 were estimated, respectively.

Population Composition

No composition surveys were flown in 1986. From 1980 to 1985 there have been average ratios of 42 calves:100 cows (postcalving), 36 calves:100 cows (fall), and 40 bulls:100 cows (fall); no trends were apparent.

Mortality

During 1986 hunters reported killing 92 caribou, including 77 bulls and 15 cows. The reported harvest was down slightly from the 6-year (1980-85) average of 116 caribou. Unlike 1985 when all hunting of Mentasta caribou was permitted only as Tier-II subsistence hunting, in 1986 there were two hunts: (1) a subsistence registration hunt for local rural residents and (2) a sport hunt for Alaskan residents in general. In the subsistence hunt, 154 registrants harvested 29 caribou during a 40-day fall season. Sport hunters received 275 drawing permits and harvested 63 caribou during a 25-day fall season.

The methods of transportation used by successful subsistence hunters were aircraft (54%), highway vehicles (25%), off-road vehicles (11%), three- or four-wheelers (7%), and horses (4%).

Successful sport hunters used aircraft (74%), highway vehicles (8%), off-road vehicles (8%), three- or four-wheelers (8%), and boats (2%). Transportation use in 1986 was similar to that observed for 1980-85, except there apparently was a slight decline in highway vehicle use and a slight increase in three- or four-wheeler use.

During a 20-day fall season along the portion of the Nabesna Road in GMU 12, an additional 12 Mentasta caribou were taken on general hunt harvest tickets.

Seasonal Distribution and Movements

During the fall hunting season Mentasta caribou were primarily spread out along the lower slopes of the Wrangell Mountains from Drop Creek southwest to the Sanford River. Later in the fall during the rutting season, animals were still widespread; portions of the herd were shifting south of the Sanford River towards Klawasi Creek and northeast into the upper Copper River-Copper Lake area. In midwinter, most of the herd was located on the flats between Drop Creek and Copper Lake, while smaller numbers of caribou were found to the southwest in the lower Boulder Creek and Sanford River areas.

In conjunction with the beginning of the cooperative Mentasta caribou study in early spring, more caribou were radio-collared and the frequency of monitoring was increased. By late April, female caribou were moving off of the wintering flats and into the lower slopes of the Wrangell Mountains. By the beginning of calving, the herd was spread in a wide band from the Copper Lake area southwest across the Sanford River to the Chelle Lake area. Calving occurred primarily at mid-to upper-elevation sites along this band. A small number of cows calved in the timbered lowlands adjacent to the Sanford River. Postcalving aggregations began forming in early June adjacent to and below calving sites. With many noncalving caribou shifting over to the bench lands between Boulder Creek and the Sanford River, much of the herd was found in this area in early summer. Most of the use observed in 1986-87 was similar to that in prior years. The new Mentasta study has initially demonstrated a much wider distribution of calving sites and postcalving aggregation areas than previously recognized.

Management Summary and Recommendations

The MCH appears to show little trend in population growth. Minor fluctuations in annual population estimates may be a reflection of the impreciseness of the survey techniques as much as actual changes in herd size.

No major movement of Mentasta caribou across the Mentasta Mountains into the Nabesna-Chisana region was detected this past winter. The last such movement occurred in 1984-85.

A cooperative study with the National Park Service of MCH dynamics began this year. This study should provide us with information on productivity, mortality, distribution, and seasonal range use of this herd.

No changes in season dates and number of permits issued are recommended.

PREPARED BY:

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SUBMITTED BY:

Carl Grauvogel
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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12

HERD: Chisana

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The Chisana Herd is estimated to contain 1,100 caribou and occupies approximately 900-1,000 mi² in the Nutzotin and northern Wrangell Mountains. The herd has either stabilized or is increasing slowly. Suitable contiguous range exists in the Yukon Territory to support a significantly larger herd.

Currently, the management objective of providing the greatest opportunity to participate in hunting caribou is not being met in Unit 12. To prevent overharvest of Chisana (and Mentasta Herd caribou in Unit 12), harvest opportunity is restricted to a short, 20-day September season.

Population Composition

Composition surveys of the Chisana Herd were conducted during fall 1986 and spring 1987. During 14-15 October 1986, NPS and ADF&G personnel used a Hughes 500D helicopter to classify 507 caribou. Calves (94) composed 19% of the sample and cows (288) 57%. The observed calf:cow ratio was 33:100. The age distribution of classified bulls follows: small (19%), medium (51%), and large (30%).

On 20 June 1987 a spring postcalving survey was flown in a PA-18 Super Cub. Five hundred thirty caribou were classified; 94 were calves and 436 were adults (including yearlings). With calves composing 17% of the sample, calf survival to 4-5 weeks of age was comparable with that observed in recent years. Most caribou were located between the Chisana Glacier and Solo Mountain during both the fall and spring surveys.

Mortality

I think predation by wolves, grizzly bears, coyotes, and golden eagles is the primary mortality factor limiting growth of the Chisana Herd. Predation by wolves during winter is also suspected to be affecting other caribou in Unit 12.

Alaskan hunters reported taking 41 bull caribou (approximately a 4% harvest) from the Chisana Herd during September 1986, compared with reported harvests of 21, 28, 31, and 65 from 1982 to 1985, respectively. Only 45 hunters reported hunting for Chisana caribou in 1986 (91% success rate), compared with 90 hunters in 1985. Chisana caribou are also hunted in the Yukon Territory, and the Yukon Department of Renewable Resources estimated that about 12 bulls were harvested in 1986.

Hunters reported taking 15 bulls elsewhere in Unit 12 during 1986, compared with 31 in 1985. Of those 15 bulls, 12 were taken in the Nabesna Road area (Mentasta Herd), two in the Robertson River drainage (Macomb Herd), and one in the Dry Tok Creek drainage (Nelchina Herd). Caribou from the Macomb Herd have only recently expanded into Unit 12 in huntable numbers; this occurred after wolf control was conducted in eastern Subunit 20D. Sixty-four hunters reported hunting caribou outside the traditional range of the Chisana Herd in Unit 12. Their hunting success rate of 23% is comparable to the 27% success reported in 1985. Total harvest of non-Chisana caribou in Unit 12 declined 52% from the 31 caribou reported taken in 1985. An unknown number of Mentasta Herd caribou were killed illegally in the Northway-Tetlin Flats during winter 1986-87.

Management Summary and Recommendations

Estimated size of the Chisana Herd is 1,100. This estimate is based on a count of 883 caribou that was adjusted by a sightability factor (we assumed 75% of the caribou were seen). No clear trend is evident in data collected to date. Local residents share the impression that the herd may be increasing slowly, but predation is high. A joint ADF&G-NPS collaring project may allow a future photocensus, and it should facilitate location of sufficient numbers of caribou for adequate sampling during future composition surveys.

A few Mentasta Herd caribou continue to inhabit southwestern Unit 12 during all seasons and are available to hunters near the Nabesna Road area each fall. Macomb Herd caribou have been observed in northwestern Unit 12 in increasing numbers each fall since wolf control was conducted. Over 70 caribou were counted during November 1987 as far east as Yerrick Creek

along the north slopes of the Alaska Range. Substantially more caribou are needed in Unit 12 to meet the management objective of providing maximum opportunity to participate in caribou hunting. Temporary reductions in numbers of caribou predators and continued restriction of harvests to bulls only are deemed necessary to allow moderate rates of caribou population increase. No changes in caribou hunting regulations are recommended at this time.

PREPARED BY:

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CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13 and 14B

HERD: Nelchina

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The estimated fall population of the Nelchina Caribou Herd (NCH) in 1985 was 27,528. Beginning in 1986, the program to obtain management data for the NCH was modified so that herd censuses and postcalving-composition surveys could be conducted biennially rather than annually; thus the next census will be conducted in July 1987. From 1980 to 1985, the NCH grew at a mean annual rate of 8%.

Population Composition

A fall composition survey conducted on 7 and 8 October 1986 resulted in calf:cow and bull:cow ratios of 42:100 and 44:100, respectively. During the past 5 years (1981-1985), the mean cow:calf ratio in fall surveys was 41:100. A spring survey to estimate overwinter survival of calves was not conducted this year.

Mortality

In 1986, 1,659 sport and subsistence permittees reported harvesting 955 caribou: 765 (80%) males, 183 (19%) females, and 7 (1%) of unknown sex. Hunter success was 58%, down from a mean of 69% in 1982-85.

In 1985 hunting of NCH animals was permitted only as Tier-II subsistence hunting. In 1986, as in years prior to 1985, 2 hunts were held: (1) a subsistence hunt for local, rural residents and (2) a sports hunt for other Alaskan residents. The subsistence hunt had 1,132 registrants that harvested 275 caribou during a 25-day fall season. Because this hunt had an annual quota of 275 caribou, the January-February winter season was not held.

For the sport hunt, 1,300 drawing permits were issued, and 680 caribou were harvested during this 25-day fall season. During the past 5 years, the number of applicants in this hunt has continued to increase. In 1982-84, the mean number of applicants was 9,980; in 1986 there were 11,061.

The methods of transportation used by successful subsistence hunters were (1) highway vehicles, 52%; (2) aircraft, 14%; (3) off-road vehicle, 13%; (4) three- or four-wheeler, 12%; (5) boat, 7%; and (6) horse, 2%. Because no winter season was held, use of snowmachines did not occur. Normally, 15-25% of the successful hunters report use of snowmachines. In 1986 this mode of transportation was replaced by higher-than-normal use of aircraft, off-road vehicles, and three- or four-wheelers.

The methods of transportation most often used by successful sport hunters were (1) highway vehicle, 30%; (2) off-road vehicle, 21%; (3) three- or four-wheeler, 18%; (4) boat, 16%; (5) aircraft, 14%; and (6) horse, 1%. Comparing transportation use in 1986 with prior years, it appears that the decline in aircraft use that was apparent from 1980 through 1985 has leveled off, while the frequency of use of other forms of transportation has remained relatively constant. An additional source of recorded mortality was 27 road kills that occurred during 1 November 1986 to 31 March 1987 along the road system in the Copper River Basin.

Seasonal Distribution and Movements

With the end of the NCH study funded by the Susitna hydroelectric project in 1985, the frequency that this herd has been monitored to determine distribution and movements has declined substantially. A limited number of surveys were flown during 1986-87 at key periods of the year. During the fall hunting season, caribou were spread widely from the lower hills of the eastern Talkeetna Mountains across the Lake Louise Flats to the Chistochina River drainage. Major concentrations of caribou were along the west fork of the Gulkana River and in the middle-to-upper portions of the Gakona and Chistochina River drainages. Later in the fall during the rutting period, there was a major shift back to the west. While small numbers of caribou were found east of the Richardson Highway and on the Lake Louise Flat, most animals were in a band extending southeast to northwest along the hills of the eastern and northern Talkeetna Mountains to the Fog Creek drainage. During midwinter (February) the herd was spread widely across the Lake Louise Flat; small numbers of caribou also were spread east across the lowlands of the Gakona and the Copper River drainages to the Slana River area. A small portion of the herd was also found along the Susitna River in the

vicinity of the Fog, Deadman, and Watana Creek drainages. By early spring (April) most caribou south and east of the Copper River had shifted west into the Gakona and Gulkana River drainages. By the beginning of the calving period in late May, a large portion of the herd was found in the traditional calving areas along the midelevational hills from Oshetna River to upper Fog Creek drainages of the northeastern Talkeetna Mountains. Substantial numbers of caribou were spread out to the east of the calving grounds as far as Lake Louise. By the end of the calving period, most of the herd was in the eastern Talkeetna Mountains at midelevations. A small portion of the herd had by this time moved into the Nelchina River drainage near Eureka. Much of the range use and movements observed in 1986-87 are similar to those observed during the Susitna study. Range uses that appeared to be different this year included the substantial movement into the Gakona-Chistochina River area early in the fall during hunting season and the subsequent major shift back into the northeastern Talkeetna Mountains for the rut. There also appeared to be an increase in use of the main Nelchina River and eastern Matanuska River drainages over the past year or so.

Management Summary and Recommendations

Initiation of a new registration hunt for local, rural residents resulted in the number of subsistence permits increasing from 500 in 1984 to 1,132 in 1986. Because a substantial number of the registration permittees did not hunt this year, those who actually hunted only increased from 409 in 1984 to 613 in 1986.

Composition data indicate that a downward trend in bull:cow ratios has occurred, decreasing from approximately 60:100 in 1980 to 50:100 in 1985. This decline may have occurred because 85% of the caribou killed in past hunting seasons were bulls. Results of computer simulations using data from 1980-85 support a skewed sex ratio in the harvest as the reason for the decline in the bull:cow ratio. Maintaining a minimum postseason sex ratio of 40-45 bulls:100 cows is desired. To reverse the current downward trend in bull:cow ratios, I recommend that the bag limit in the winter hunt be changed from 1 antlerless caribou to only 1 caribou of either sex. Because only adult bulls are antlerless during January and February, this regulatory change should cause a decrease in the proportion of bulls in the harvest.

If survival of calves in 1986 was "normal," the NCH should continue to increase in the same manner that it has been increasing for the past 10 years. At its current rate of increase, the NCH should attain the population goal, which was

set by the Board of Game, of 30,000 adult caribou in 1990. By this time, herd size, including calves, should be approaching 40,000 caribou, and the harvest quota will have to be greatly increased. A number of potential problems are associated with this situation: (1) the possibility of exceeding annual sustained yield will increase because harvesting a large portion of the annual increment depends in part on accurately estimating that increment; (2) hunter success will probably change substantially; (3) determining estimates of the number of caribou that will be harvested in a given time period will not be as accurate; (4) crowded conditions may exist, causing a deterioration in the quality of the hunt; (5) caribou along the eastern half of the Denali Highway may be a subgroup that experiences appreciably higher hunting morality than the main herd; and (6) the use of ATV's can be expected to increase, resulting in increased habitat damage along popular access routes.

To help alleviate some of these potential problems, I recommend slowly increasing harvest so that impacts can be assessed and the herd's growth rate slowed. This will provide the opportunity to evaluate the feasibility of attaining increased harvest levels using our current drawing permit system and to evaluate the potentially adverse side effects of increased hunting pressure and harvest levels.

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Carl Grauvogel
Survey-Inventory Coordinator

CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 13E and 20C

HERD: Denali

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27 (no open season).

Population Status and Trend

National Park Service (NPS) personnel attempted to census the Denali Herd in September 1986 but were unsuccessful; a 2nd attempt in late June 1987 was successful. The June census was based on locating about 35 radio-collared adult female caribou and should produce reliable results, which will be available in late 1987.

The Denali Herd apparently decreased from about 8,000 in the 1950's and early 1960's to about 1,200 by the early 1970's. The herd apparently began increasing about 1980 (Singer 1986) and probably now numbers about 2,000 caribou (not including the Tonzona Herd that ranges in the western part of the park).

Population Composition

Three sex and age composition counts were conducted by NPS personnel (i.e., L. Adams and B. Dale) during the reporting period (Table 1). Fall calf:cow ratios in the Denali Herd have been similar to those of the Delta and Fortymile Herds. In recent years, these other herds have been growing despite open hunting seasons.

Mortality

A NPS study of the causes of neonatal mortality is in its 4th year (Table 2). Monitoring radio-collared females will permit a calculation of adult female mortality rates within a few years. There was no reported harvest and no indication of any unreported harvest during this reporting period.

Management Summary and Recommendations

The Denali Herd is unhunted and unmanaged. No recommendations are offered at this time.

Literature Cited

Singer, F. 1986. Dynamics of caribou and wolves in Denali National Park, 1898-1985. National Park Service, 2525 Gambell St., Anchorage, Alaska. 47pp. Unpubl. Manuscript.

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Table 1. Composition counts of Denali Herd caribou, 1 July 1986-30 June 1987.

Date	Bulls: 100 cows	Calves: 100 cows	Total caribou counted
9/27/86	56	38	1,062
4/14/87	10	46	595
5/29-30/87	5	43	1,670

Table 2. Results of National Park Service calf mortality study, Denali Caribou Herd, 1984-87.

Year	Calves collared	Calves dying by 30 June (%)	Cause of death			
			Wolves	Grizzly bears	Other predation	Unknown
1984	43	13(30)	--	12	--	1
1985	59	33(57)	10	14	8	1
1986	58	29(50)	11	9	6	3
1987	75 ^a	27(37) ^b	9	13	3	--

^a Two calves were abandoned by their mothers and subsequently died.

^b Results are through the end of May only.

CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 15

HERD: Kenai Lowlands

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27 (no open season).

Population Status and Trend

The Kenai Lowlands Caribou Herd was established through transplants by the Department of Fish and Game from the Nelchina herd in 1965 and 1966 and ranges over portions of Subunits 15A and 15B. On 5 June 1987, 98 caribou were observed during an aerial (Cessna 180) survey of the herd's summer range. The potential caribou range available to this herd is not suspected to be a limiting factor at current herd size; however, population growth since the mid 1970's has been slow.

Population Composition

Using a Bell 206-B Jet Ranger helicopter, 79 caribou were classified according to sex and age categories on 5 June 1987: 42 cows, 21 calves, and 16 bulls. Ratios were 50 calves:100 cows, 38 bulls:100 cows; calves comprised 27% of the total.

Mortality

Hunting of this herd has not been allowed since 1981. It is suspected that predation on young calves from free-ranging dogs and wild carnivores is controlling this herd's growth.

Management Summary and Recommendations

Low recruitment has been the primary management concern for this herd for the past decade. It is suspected by Department and U. S. Fish and Wildlife Service biologists that predation by free-ranging dogs and wild carnivores is limiting this herd's ability to grow. However, until key mortality causes are conclusively identified, appropriate management actions cannot be initiated. A study involving radio-collared neonate

caribou calves is recommended to determine specific causes of calf mortality.

Since one of the purposes of reestablishing caribou on the Kenai was for hunting, the Department should propose a limited permit hunt for 1988. In addition to allowing a limited harvest, it would demonstrate to the nonhunting public that this highly visible wildlife resource can support a controlled harvest. A season from 15 September to 15 October, and an allocation of 5 (or less) permits for bulls would be appropriate if a sufficient number of animals are observed in the 1987 fall survey.

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 18

HERD: Kilbuck Mountains and Andreafsky Mountains

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

Substantial progress was made during the reporting period in evaluating the population status and distribution of the Kilbuck caribou herd. The Kilbuck herd was estimated to number at least 300 animals residing year-round in the west-central Kilbuck Mountains southeast of Bethel. A cooperative ADF&G and U. S. Fish and Wildlife Service (USFWS) study of the Kilbuck herd was begun in April 1987; 9 radio collars were placed on cow caribou in the upper Kisaralik River drainage. In addition, aerial surveys were continued in the Kilbucks on a biweekly basis for the 2nd consecutive year. An additional calving area was located, and summering and wintering areas have been identified. This herd was observed to calve for the 2nd consecutive year in the upper Crooked Creek drainage and on peaks above the Swift, Akoswift, and Little Swift Creeks southwest of Kisaralik Lake. An additional calving area was discovered in May 1987 in the upper Kisaralik valley immediately north of Kisaralik Lake. In comparison with 1986, I believe that calf production increased during 1987 and the population is probably growing. The herd remains quite small in absolute numbers, but it appears to be responding favorably to management.

Population Composition and Distribution

USFWS and ADF&G staff conducted aerial surveys of Kilbuck caribou monthly during July, August, and September 1986 and on a biweekly basis from February to June 1987. When possible, caribou were also classified according to sex and age. Locations were verified by Loran C and subsequently mapped.

USFWS staff observed 22 calves in the calving area southwest of Kisaralik Lake during mid-May 1986. In mid-June 1986 only 11 calves were observed in a group of 56 caribou, and in late July 1986 only 7 calves were observed in a group of 62

caribou. USFWS observers subsequently counted 108 unclassified caribou on the west side of the Kilbucks on 20-21 August 1986. On 16 September 1986, observers were able to classify 188 caribou, including 61 bulls and 15 calves in 5 large bands and many small groups. This was the largest number of caribou observed in 1 flight since February 1986.

When survey flights in the Kilbucks were resumed on 4 February 1987, USFWS observers counted 154 caribou in 3 bands. Most bulls, however, had shed their antlers, and only two were positively identified. On 9 February 1987 caribou were found, but again only 1 bull was identified. On 2 March, 120 caribou were counted, but all were unclassified.

During April 1987 intensive ADF&G-USFWS surveys were conducted as part of the Kilbuck caribou radio-collaring project, and 250 cows and short yearlings were located near Kisaralik Lake. An additional 20 bull caribou were located farther west near Quicksilver Creek. Nine cow caribou were radio-collared by 14 April in the upper Kisaralik drainage.

All 9 radio-collared cows were relocated with 45 other caribou on the west side of the Kilbuck range near their capture areas in the upper Kisaralik drainage on 24 April 1987. These caribou have since remained on the west side of the Kilbuck range and were relocated on 7 May, 15 May, and 10 June. Significantly, some radio-collared caribou moved a few linear miles east, ascended into the peaks and high ridges north and south of Kisaralik Lake, and calved on 15 May. Four calves were observed among the 9 radio-collared cows and 44 other caribou. On 10 June, 93 caribou were observed, including a minimum of 30 calves. Calves were still small and difficult to observe among the adults, and some undoubtedly were missed. Adult caribou were primarily females, and only 1 known bull was observed.

Mortality

The season has remained closed on Kilbuck caribou during the reporting period. Regular aerial patrols by ADF&G and USFWS staff were publicized through the media, and local residents were reasonably well informed of the closure. Some snowmachines have been observed trailing caribou in the Kilbuck mountains during the past winter, but no caribou kill sites were observed, although moose poaching continued in the area. The only other suspected source of human-caused mortality is believed to have been associated with the construction of a skin boat used by villagers to float down the Kwethluk River in spring 1987.

Few wolves are found in the area. Grizzly bears, however, are relatively abundant and may account for some calf losses. The selection of calving areas in steep mountainous terrain suggests predator avoidance by parturient females.

Three caribou immobilized by carfentinil in the initial stages of the radio-collaring project subsequently died. In order to reduce physiological stress and subsequent mortality, it is strongly suggested that (1) caribou should be minimally pursued before darting, (2) relatively high doses of naloxone should be administered as soon as the animal goes down, and (3) researchers should work with all due speed and release the animal as soon as possible. We encountered no further mortality with carfentinil when these procedures were followed.

Management Summary and Recommendations

Previous management decisions were predicated on the assumption that caribou inhabiting the Kilbuck Mountains were a separate herd and not wandering Mulchatna Herd caribou that calve hundreds of miles to the east. Considerable public debate accompanied the 1986 enforcement efforts that followed a regulatory hunting closure on Kilbuck caribou. It was claimed that special protection of these animals was unnecessary because Kilbuck caribou were simply wanderers from the large and expanding Mulchatna herd. While we believe Mulchatna caribou approach the east-central Kilbuck Mountains near the Tikchik Lakes and may indeed overlap the range of the Kilbuck herd, our recent survey-inventory work has confirmed previous assumptions about the separate nature of the Kilbuck herd.

Additional survey-inventory work is needed to better define the range of Mulchatna caribou because this herd expands its range northwest into the Kilbucks. For instance, approximately 1,000 caribou believed to be part of the Mulchatna herd were observed and photographed by private pilots on 4 July 1986 near the north shore of Nishlik Lake in Subunit 17B. This is only a few miles from the GMU 18 border and within 15 miles of the known range of Kilbuck caribou. However, no other caribou were observed in this vicinity at the same time in 1987. The overlap between these herds poses interesting theoretical and management concerns because the Mulchatna herd is continuing to grow rapidly. The growing Mulchatna herd may eventually "absorb" the Kilbuck herd and resume the status of the very large herd reported to occupy southwest Alaska in the late 1800's. I recommend that the caribou hunting season south of the Yukon River remain closed until the Kilbuck population numbers approximately 1,000 animals. At that time,

a limited harvest could be sustained by the herd; hunting should be regulated by a permit system.

The caribou population in the Andreafsky Mountains of northern GMU 18 is less well understood. A USFWS survey flight on 19 May 1987 identified 86 caribou with a minimum of 8 neonate calves immediately north of Needle Mountain. The calving date appears to be within the range described for caribou, not feral reindeer. Domesticated reindeer from the village of Stebbins are frequently lost to caribou populations in the vicinity, and ear-tagged reindeer have been taken by caribou hunters in the northern Andreafsky Mountains. Logistically, this herd is difficult to manage because it requires the conducting of long-range aerial surveys and has, therefore, received little attention to date. Since the Andreafsky caribou herd requires considerably more definition, especially in relation to the Western Arctic Herd, I recommend no changes in season or bag limit in the northern portion of GMU 18 until we have better information at hand.

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SUBMITTED BY:

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 19 and 21

HERD: Beaver Mountains, Kuskokwim Mountains, Sunshine Mountain, Big River, Rainy Pass, and Tonzona

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

No data have been collected since June 1985 when some of these herds were censused (Pegau 1986); most information about these herds was gathered between 1982 and 1985 (Table 1). Some caribou from the Big River, Beaver Mountains, and Sunshine Mountain Herds were radio-collared in 1982, and information is therefore more complete for these herds.

A segment of the Big River Herd apparently moved south to the Swift River in 1983. Two radio-collared caribou were with this group, and neither had returned to the Big River as of June 1985. Censuses of the Beaver Mountains and Sunshine Mountain Herds in June 1985 indicated that these herds were declining. Population trends of the Big River, Kuskokwim Mountains, Rainy Pass, and Tonzona Herds are unknown.

Population Composition

The most up-to-date information on population composition for these herds was reported by Pegau (1986). No data have been collected since June 1985.

Mortality

Winter 1986 was quite severe, with deep, lingering snow; incidental observations indicated that predation was especially heavy on the Sunshine Mountain and Beaver Mountains Herds. We found many partially fed-upon carcasses of caribou that had been killed by wolves. A summary of harvest ticket returns for Units 19 and 21 appears in Table 2.

Management Summary and Recommendations

The Beaver Mountains and Sunshine Mountain Caribou Herds were formerly substantially larger than they are now, and they

provided significantly greater opportunities for harvest in the past. Both herds now remain largely inaccessible to hunters. These herds are almost certainly limited by periodically heavy predation, and they cannot be expected to provide for a significant human harvest unless predation declines. The Kuskokwim Mountains and Tonzona Herds are small and inaccessible; and the population size and trend of both are unknown.

Of the 6 small herds in Units 19 and 21, the Big River and Rainy Pass Herds are most accessible and most heavily hunted. As a minimum, the Department should conduct periodic censuses and composition counts on these herds to ensure that the current either-sex season does not result in significant overharvests.

Literature Cited

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PREPARED BY:

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SUBMITTED BY:

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Table 1. Population size of caribou herds in Game Management Units 19 and 21, 1982-87.

Herd	Year of estimate or census	Population size	Trend	Data source
Beaver Mountains	1985	1,600	Decreasing	R. Pegau - census
Big River	1984	750	Decreasing	R. Pegau - census in 1982 and dispersal in 1984
Kilbuck Mountains	1985	75	Unknown	S. Patten - visual count in late winter
Kuskokwim Mountains	1983	600	Unknown	R. Pegau - may be part of Beaver Mountains Herd
Mulchatna	1987	45,000	Increasing	K. Taylor
Rainy Pass	1982	1,500	Unknown	R. Pegau - visual estimate
Sunshine Mountain	1985	500-600	Decreasing	R. Pegau
Tonzona	1986	400	Unknown	L. Adams

Table 2. Caribou harvest ticket returns for Game Management Units 19 and 21 for regulatory year 1986-87.

Herd	No. of returns	No. harvested	
		bull	cow
Beaver Mountains	6	5	0
Big River	19	10	2
Kilbuck Mountains	1	0	1
Kuskokwim Mountains	0		
Mulchatna	11	9	0
Rainy Pass	20	12	9
Sunshine Mountain	3	2	1
Tonzona	2	1	0
Unit 19 unspecified	4	1	0

CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20A

HERD: Delta and Yanert

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

On 3 July 1987, 8,380 caribou were counted in a photocensus that included both the Delta and Yanert Herds. Caribou numbers in Subunit 20A have doubled since 1979. Recent population estimates for the combined Delta and Yanert Herds (8,083, 7,804, and 8,380 for 1985-87, respectively) indicate that the rapid population growth occurring from 1979 to 1982 has now slowed.

The Yanert Herd has not been adequately censused since 1983 because the Delta and Yanert Herds have overlapped during spring and summer, the time when photo-censusing usually occurs. The count of 570 caribou in the Yanert River drainage during composition surveys in October 1986 is the best recent estimate of minimum population size for the Yanert Herd; at the time of the survey, all but 1 radio-collared Yanert caribou were present and no Delta radio-collared animals were present. Davis et al. (1987) found no strong evidence that the Yanert Herd ever numbered more than 600 caribou.

Population Composition

Aerial helicopter and helicopter-assisted ground composition counts were conducted on the ranges of the Delta and Yanert Caribou Herds on 6 and 22 October 1986, respectively (Tables 1 and 2). Despite a reported harvest of 82% bulls in 1985 and 77% in 1986, the Yanert composition survey revealed 70 bulls:100 cows. The calf:cow ratio of 38:100 was similar to previous years.

In 1986 the bull:cow ratio in the Delta Herd was 43:100, similar to those for the previous 2 years. However, the observed bull:cow ratio appears to have declined after 1982, probably because of increased harvests, selective hunting of

bulls, and reduced recruitment. The calf:cow ratio (29:100) and percent calves in the herd (17%) were both lower than those for the previous 3 years, but they were within the range of values from the late 1970's and early 1980's, a period of rapid herd growth.

Spring composition counts were conducted on 30 May and 2 June 1987. The 30 May survey was conducted in the upper Wood River and Dick Creek and included both Delta and Yanert caribou; the sample of 2,066 caribou contained 30 yearlings:100 cows and 60 calves:100 cows. The 27 June survey conducted near the Delta Herd's traditional calving ground included only Delta caribou, and a ratio of 58 calves:100 cows ($\underline{n} = 923$) was observed.

Mortality

In the general hunting season in Subunit 20A, 592 hunters reported killing 413 caribou. In addition, 107 caribou were taken by 200 permittees in drawing permit hunt #570 in the southwestern section of Subunit 20A. Total reported harvest from the Delta Herd consisted of 350 males, 94 females, and four of undetermined sex. Reported harvest from the Yanert River drainage (presumably from the Yanert Herd) consisted of 54 males, 16 females, and two of undetermined sex.

It has been suspected that reported caribou harvests have significantly underrepresented actual harvests. To estimate actual harvests during the 1986-87 caribou season in Subunit 20A, hunters were interviewed in the field, and each harvest ticket number was copied from their hunting licenses. To reduce possible reporting bias caused by the interview, interviewers did not ask to see harvest tickets or harvest report cards and were instructed to not discuss harvest reporting with interviewed hunters.

Interviews were conducted from a check station at a trailhead in the Yanert River drainage, at hunting camps in the foothills of the Alaska Range between Delta Creek and the Parks Highway, and along the Ferry Trail in western Subunit 20A. Between 5 and 15 September, a sample size of 178 interviews was gathered; 104 and 74 hunters were in the range of the Delta and Yanert Herds, respectively. Caribou harvest tickets received from 1 September to 15 June were then compared with harvest tickets recorded during field interviews. Of the 178 hunters interviewed, only 62 returned harvest reports: a 35% overall reporting rate. Twenty-seven of the 48 successful hunters interviewed returned harvest reports: a 56% reporting rate.

To estimate actual harvest, the interview and returned harvest report data were treated as a mark-recapture sample.

Confidence limits were determined for the estimates using a binomial confidence limit computer program (J. Venable, ADF&G, Fairbanks, 1987). The marked sample consisted of interviewed hunters; the harvest reports were considered the recapture sample. Therefore, an estimate for total hunters was derived using a minimum bias mark-recapture formula:

$$N = \left[\frac{(n_1 + 1)(n_2 + 1)}{m_2 + 1} \right] - 1$$

where n_1 = interviewed hunters (i.e., marked sample), n_2 = total harvest reports returned, and m_2 = interviewed hunters who also returned harvest reports (i.e., recaptured markers).

Similarly, the number of successful hunters (i.e., harvest) was calculated using n_1 = interviewed successful hunters, n_2 = total successful harvest reports returned, and m_2 = successful interviewed hunters who also returned a harvest report.

Total caribou harvest in Subunit 20A was estimated at 734 caribou; these were taken by an estimated 1,684 hunters. Harvest estimates by herd, confidence limits, and reporting rates are summarized in Table 3.

It is not possible to calculate the reporting rate of unsuccessful hunters that were interviewed, because those hunters subsequently could have taken caribou and failed to return a harvest report. Therefore, using the estimates of successful hunters and total hunters derived from hunter interviews, unsuccessful hunter reporting rate was calculated as:

$$\frac{\text{Total reporting hunters} - \text{Reporting successful hunters}}{\text{Total estimated hunters} - \text{Total estimated successful hunters}} \times 100 = \frac{179}{966} = 19\%.$$

This estimate is further compromised because some hunters interviewed in Subunit 20A may have subsequently hunted in other locations and then returned harvest reports documenting success or failure only on the last hunt.

Davis et al. (1987) documented an increase in natural mortality among 47-55 radio-collared female caribou beginning in October 1985. From 1 October 1982 to 30 September 1985, annual natural mortalities among collared females were 7%, 4%, and 4%, respectively. During the last comparable year (1 Oct 1985-30 Sep 1986), 16% of the collared females died of natural causes; 11% percent were killed by wolves, and 5% died from undetermined causes.

During 1986, 17% of the harvest in Subunit 20A was reported from the Wood River drainage, 40% from east of the Wood River drainage, 8% from west of the Wood River drainage, 14% from the Yanert River drainage, and 21% from the permit area west of the Totatlanika River. The chronology of the harvest in the extended season (1 Sep-19 Feb) in the Yanert drainage follows: 1-15 September, 40%; 16-30 September, 23%; October-January, 16%; and February, 21%. The season in the Yanert River drainage was scheduled to end 28 February but was closed by emergency order on 19 February to prevent additional harvest.

Management Summary and Recommendations

The rapid population growth of caribou in Subunit 20A in the early 1980's has slowed. Total numbers now appear stable or are increasing slowly. Radio-collar data suggest that natural mortality, particularly from wolf predation, increased in 1986.

Predation by wolves on Delta caribou has apparently been a significant mortality factor throughout the documented history of the herd. Following wolf removal programs beginning in 1954 and again in 1976, caribou numbers increased rapidly for 5-8 years and then stabilized. During the mid-1970's, wolf predation had a significant impact on calf survival during summer.

Wolf numbers recovered following cessation of predator control. Wolves are now near precontrol levels; however, there is no evidence that caribou recruitment has declined in recent years (Davis et al. 1987). Recruitment rates are sufficient to maintain the current population level if total population mortality rates do not increase.

Field interviews of hunters showed that the actual caribou harvest in Subunit 20A during 1986 exceeded the reported harvest by at least 40%. Hunter harvest during 1986 removed approximately 10% of the estimated standing crop of caribou.

To reduce mortality among female caribou, the Department supported a public proposal to change from an either-sex to bulls-only season in 1987. That proposal and a proposal reducing the season length in the Yanert River drainage were implemented in 1987; those regulations should reduce overall harvest.

The most recent draft management plan for the Delta Caribou Herd calls for maximum sustained opportunity for interested individuals to participate in hunting caribou. That objective is being met through regulations that provide a general hunting season for caribou in most of Subunit 20A. The 1984

draft management plan also called for a population goal of 6,000 caribou. There is no indication that the current population of >8,000 caribou has exceeded the capacity of its range. Furthermore, no movements suggesting caribou are vacating the traditional ranges of the Delta and Yanert Herds have been observed. Therefore, continued growth of the caribou population in Subunit 20A should be encouraged.

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Proj. W-22-5 and W-22-6. Juneau. 54pp.

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Table 1. Delta Caribou Herd sex and age composition, fall surveys 1982-86.

Year	Bulls: 100 cows	Calves: 100 cows	Percent calves in herd	Percent cows in herd	Percent bulls in herd	Sample size
1982	54	29	16	55	30	1,349
1983	54	46	23	50	39	1,333
1984	42	36	20	56	24	1,093
1985	49	36	20	54	26	1,164
1986	43	29	17	58	25	2,098

Table 2. Yanert Caribou Herd sex and age composition, fall surveys 1982-86.

Year	Bulls: 100 cows	Calves: 100 cows	Percent calves in herd	Percent cows in herd	Percent bulls in herd	Sample size
1982	59	36	18	51	30	304
1985	65	40	19	49	32	787 ^a
1986	70	38	18	48	34	570

^a Some Delta Herd caribou were present.

Table 3. Reported harvests and harvests estimated from mark-recapture method using hunter field interviews, Delta and Yanert Caribou Herds, Subunit 20A, 1986.

Harvest components	Herd		Total 20A general season ^a
	Delta	Yanert	
<u>Harvest and participation based on harvest reports</u>			
Reported bull harvest	260	54	314
Reported cow harvest	77	16	93
Reported total harvest ^b	341	72	413
Reported % bulls in harvest	77	77	77
Reported unsuccessful hunters	109	70	179
Reported total hunters	450	142	592
Reported % success	76	51	70

<u>Harvest and participation based on field interviews and harvest ticket returns</u>			
Estimated harvest	621	103	734 ^c
90% CI on harvest	446-938	57-244	539-1,032
70% CI on harvest	449-811	68-180	597-909
Estimated hunters	1,154	465	1,684 ^c
90% CI on hunters	911-1,534	346-690	1,393-2,101
70% CI on hunters	991-1,388	384-603	1,491-1,943
Estimated total reporting rate(TRR)	38%	30%	35%
90% CI on TRR	24-49	21-41	28-42%
70% CI on TRR	32-45	24-37	30-40%
Estimated successful reporting rate(SRR)	54%	67%	56%
90% CI on SRR	36-76	29-100	40-77%
70% CI on SRR	42-68	40-100	45-69%
Estimated reporting of bulls	61%	- ^d	64%
Estimated reporting of cows	54%	- ^d	57%
Estimated success rate	54%	22%	44%
Estimated % bulls in harvest	75	83	75
Estimated unsuccessful reporting	20%	19%	19%

^a An additional 107 caribou, 90 bulls and 17 cows, were taken under drawing permit hunt #570 in western Subunit 20A.

^b Includes animals for which sex was not reported.

^c Estimates for each of 3 samples (Delta, Yanert, Total 20A) were calculated independently because ratio of m_2/n_2 is different for each sample. Delta + Yanert estimates will not necessarily equal the Total 20A estimate.

^d Insufficient sample size.

CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 20B, 20F, 25C, 25D

HERD: White Mountains

PERIOD COVERED: 1 July 1986-30 June 1987 (Also includes all previously collected data for this herd)

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

During the late 1970's, reports from the public and incidental observations by biologists confirmed the year-round presence of caribou in the White Mountains. The implication of these observations was that a small resident herd existed. This was in contrast to the common understanding that the area was used seasonally by a portion of the adjacent Fortymile Herd. Historically, the Fortymile Herd calved in the White Mountains until 1963 and small numbers of caribou crossed the Steese Highway during fall until the late 1960's and early 1970's. Until the mid-to-late 1970's, caribou observed in the White Mountains were assumed to belong to the Fortymile Herd. In retrospect, it is likely that a small herd has existed in the White Mountains for many years. A caribou "herd" is defined as a group of caribou that reliably uses a distinct calving area.

In 1982 the Bureau of Land Management (BLM), in cooperation with the Department of Fish and Game, began a collaring program to determine the identity and distribution of the White Mountains Caribou Herd. Twenty-five cow caribou and 1 bull were collared and monitored through 30 June 1987.

The White Mountains Herd has not mingled with other caribou herds for over 5 years, and it maintains a discrete calving area in the higher mountains east of Beaver Creek. During fall the herd moved west across Beaver Creek and wintered in the Beaver Creek, Victoria Creek, Hess Creek, and Tolovana River drainages (B. Durtsche, pers. comm., BLM, Fairbanks). It appears the herd has increased considerably since 1980. Durtsche (unpubl. data, BLM files) estimates its current size at about 1,000 animals. Interest in hunting caribou along the

Steese Highway has increased concurrently with increases in the sizes of the Fortymile and White Mountains Herds.

One radio-collared bull caribou from the Fortymile Herd wintered west of Birch Creek in 1985-86 and 1986-87 and apparently summered near Mastodon Dome in 1987. This may indicate increasing use of the Birch Creek drainage by Fortymile caribou. This trend should continue as herd size increases and may eventually lead to mixing of these caribou with the White Mountains Herd.

Population Composition

There have only been 3 composition surveys of White Mountains caribou. The percentages of calves in the herd have been similar to those of other slowly growing caribou herds in Interior Alaska (Table 1).

Mortality

In 1986, 8 people reported hunting for White Mountains caribou; two were successful and six were unsuccessful. Mortality of radio-collared caribou was less than 2%/year between 1982 and 1986. In 1987, 3 radio-collared caribou died; the causes were not determined. As the radio-collared cohort ages, higher mortality is expected.

Management Summary and Recommendations

The current 10 August-20 September, bulls-only season should be maintained until the herd is substantially larger and/or better data on herd status are obtained. This herd will probably not receive major management attention because of its small size, low annual harvest, and relative inaccessibility during the hunting season. However, an acceptable, low-cost minimum population estimate could be obtained using 2 aircraft to simultaneously search the herd's range and track collared animals in early winter after the 1st snow. This should be done in 1987 before the existing radio collars stop operating and a proposed new access road into the area is constructed.

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Table 1. Sex and age composition data of the White Mountains Caribou Herd, 1984-85.

Date	Bulls: 100 cows	Calves: 100 cows.	Total Caribou counted
Fall 1984	44	31	135
June 1985	31	39	105
Fall 1985	35	30	65

CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20D

HERD: Macomb

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The Macomb Caribou Herd was estimated at more than 700 animals in fall 1985. Although no population estimates have been made since that time, I think the herd is slowly increasing in size.

Population Composition

No composition data were collected during fall 1986. A spring composition count was done on 11 June 1987. Caribou were located by fixed-wing aircraft, and observers with binoculars and spotting scopes were placed near the caribou by helicopter. One hundred fifty-eight caribou were classified, and a ratio of 48 calves:100 cows was observed. This ratio is among the higher calf:cow ratios observed in this herd for this time of year.

Movements

Substantial numbers (about 200) of what were believed to be Macomb caribou were observed again in the Granite Mountains during winter 1986-87. Actual herd identity was not verified by marked caribou, as was done the previous year. In addition, caribou were again observed east of the Robertson River. These movements are consistent with what was observed the previous year and suggest the herd may be increasing its range in response to a larger herd size.

Mortality

One hundred eighty-four applications were received for the 100 Macomb caribou drawing permits available in 1986. In addition, subsistence hunters from Dot Lake received 15 registration permits. Unlike preceding years, the season was split in

1986: the registration permit hunt was held from 10 August to 30 September; the drawing hunt lasted from 6 to 30 September. Thirty-eight of the drawing permittees and 8 of the registration permittees reported hunting. Ten caribou were harvested: nine by drawing permit hunters and one by a registration permit holder.

Ninety percent of the hunters were Alaska residents, and most of these (69%) were residents of Subunit 20D. As in past years, most (54%) hunters walked in, but unlike past years, 21% reported flying to where they had begun walking. Motorized access to the Macomb Plateau Controlled Use Area is prohibited, except by float planes on Fish Lake. An equal number (21%) reported having been transported on horseback. Most (60%) successful hunters walked in, compared with the 3 previous years when most of them were transported on horseback.

Successful hunters have expended less time to harvest caribou in recent years. From 1981 through 1986, the average time afield reported by successful hunters was 2.9 days. In 1986 these hunters reported spending an average of 1.9 days afield. While caribou movements, weather, season length, and timing all affect this statistic, the declining trend in time spent afield is consistent with the postulated increasing population size.

The number of permittees actually hunting has generally been declining since 1978, which suggests, among other possibilities, reduced interest in this caribou hunting opportunity. This decline may have resulted from increased caribou hunting opportunities in the Delta, Fortymile, and Arctic Herds.

No mortalities, other than those induced by hunters, were quantified; however, 3-5 wolf packs are known to occupy the Macomb Herd's range. Predation by grizzly bears is also suspected because hunters commonly observe bears on the Macomb Plateau.

Management Summary and Recommendations

Although available data suggest that herd size is increasing, a conservative harvest and regular survey regime should be continued in the immediate future. Specific objectives should include the following:

1. Conduct a fall photocensus and sex and age composition count.

2. Mark 4-8 caribou with radio collars to monitor herd movements and aid in survey work.
3. Maintain the current Macomb Plateau Controlled Use Area.
4. Seek public support for elimination of the lottery permit regulation for the Macomb Herd. Mean number of applicants for the Macomb lottery permits has averaged less than 150 for the last 2 years, and harvest has been less than 2% of the herd (if it numbers 700 caribou). These factors suggest that replacement of this lottery hunt with an alternate system of limiting harvest would be safe and economically warranted.
5. Draft the hunting regulations to manage the Macomb Herd as its range expands, rather than limiting access to and harvest from the herd on the basis of game management unit only.

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CARIBOU
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20E

HERD: Fortymile

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

Although no photocensus was conducted during summer 1987, photos taken in June 1986 revealed a minimum herd size of 15,300. As the herd increased at a rate of about 7% annually from 1984 through 1986, the herd probably numbered about 16,000 in June 1987. Present herd size remains significantly below the estimated 500,000 caribou present in the 1920's and 40,000-60,000 in the late 1950's, but it has increased from the low of about 6,500 in the mid-1970's. Calf mortality rates of approximately 60% were the major factor restricting herd growth from 1983 through 1987 (Valkenburg and Davis 1987).

Because the population size is only about one-third of the 50,000 goal in the draft Fortymile Caribou Management Plan, the management objectives of providing for maximum opportunities to participate in subsistence and recreational hunting are not being met.

Population Composition

Sex and age composition surveys were conducted on 13 October 1986 and 26 June 1987. During the fall survey, 1,381 caribou were classified: 235 calves (17%), 842 cows (61%), and 304 bulls (32%). The calf:cow and the bull:cow ratios were 30:100 and 36:100, respectively; however, distribution of radio-collared bulls during the composition surveys suggested that these ratios were biased, resulting in an underestimate of the actual ratios.

In the June survey, 3,596 caribou were classified: 883 calves (25%), 1,860 cows (52%), and 853 bulls (24%). The calf:cow ratio was 47:100. Between 1977 and 1981 the mean number of calves:100 cows in late June was 36.5 ± 2.2 SE ($n = 4$). After

1983 the mean number of calves:100 cows in late June increased: $44.5 \pm 2.3 \text{ SE}$, $n = 4$, $P < 0.05$.

Mortality

Since 1973 calf mortality (birth to 4 months) to predation (Sep/Oct) has been the major factor limiting the growth of the Fortymile Herd (Valkenburg and Davis 1987). Mortality rates of radio-collared adult caribou ranged from 3.3% to 5.7% annually from 1982 to 1986.

Harvest reports were submitted by 582 hunters, indicating that they hunted Fortymile caribou in Unit 12 and Subunits 20B, 20D, 20E, and 25C. Of these hunters, 223 reported taking a bull caribou: a 40% hunter success rate. Because the herd was unavailable to local hunters on the Taylor Highway during the winter subsistence season, all bulls, except two, were harvested during the 42-day fall season. A survey conducted in the area during 1984 (Kelleyhouse 1986) indicated only a 63% reporting rate by successful hunters, so the actual harvest is estimated to have been approximately 370 bulls. Hunter pressure declined 16% from the 692 hunters reporting in 1985, and the reported harvest of 232 bulls is comparable to the 200, 245, and 251 bulls harvested in 1983-1985, respectively.

Of the 232 bulls reported killed, 118 were taken by fly-in hunters (68 at Molly Creek) and 114 were taken by hunters in the vicinity of the Taylor and Steese Highways. Of the 114 successful road system hunters, 84 used some type of off-road vehicle for access to caribou concentration areas. Therefore, using a 1.37 correction factor for nonreporting (Kelleyhouse 1986), approximately 156 bull caribou were harvested in the vicinity of the road system. The total estimated harvest represented about 2% of the herd.

There continues to be a high level of interest in hunting caribou along the Steese Highway. In 1986, 14 caribou were reported taken from the Steese Highway, but the actual harvest was probably around 20. As the herd grows, it is likely that more caribou will be taken near the Steese Highway.

Management Summary and Recommendations

The Fortymile Herd probably continued to increase by about 7% during this reporting period and provided a bulls-only harvest of 2%. A significantly higher annual rate of harvest or a significant cow harvest would delay attainment of the current population management objective of 50,000 adult caribou. The Board of Game provided for a 10-day extension of the fall season to satisfy local subsistence hunters in late September

1987. However, it appears that many large bulls are not palatable during that period. If a late-September subsistence season is to continue, I recommend that an either-sex bag limit be considered, provided that the overall harvest is not allowed to exceed 3% of the herd, cows do not compose more than 25% of the total harvest, and herd growth continues at or near current levels.

I further recommend that a study be conducted to determine methods through which early calf survival can be improved. A substantially larger herd with a high rate of production would be of immense value both ecologically and economically. Current allowable harvests are a small fraction of what they could be if herd size were larger and calf survival were better. The Fortymile Herd is becoming increasingly important to local-resident, state resident, and nonresident hunters and to local businesses catering to hunters. Additionally, at the low population level that has prevailed for the last 15 years, Fortymile caribou have not been available for use by Canadian residents in the Yukon Territory. Furthermore, continued herd growth will benefit other wildlife, particularly the carnivores that depend upon ungulates for food.

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 20F, 21C, 21D, and 24

HERD: Galena Mountain, Wolf Mountain, Ray Mountains

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

Caribou are distributed throughout the mountains north of the Yukon River from the Dalton Highway to the lowlands west of Galena Mountain. There is speculation that these caribou are surviving feral reindeer from a commercial reindeer operation in the Kokrine Hills that ended about 1935. Some animals have pale coloration during summer, but the average calving dates indicate that the animals are caribou, because reindeer typically calve earlier.

Caribou in Subunits 20F, 21C, 21D, and Unit 24 are thought to be in 3 distinct herds, or calving aggregations, and are named after the mountains where these aggregations occur. The western herd, composed of approximately 250-300 animals, usually calves east and winters northwest of Galena Mountain. The middle herd calves on Wolf Mountain and winters in the Melozitna and Little Melozitna River drainages; it contains approximately 150-200 animals. The eastern herd calves and winters in the Ray Mountains; the 1984 population estimate was 500-600 animals. Caribou have also been sighted on Moran Dome and in the Kokrine Hills, but their calving locations are unknown.

The Galena Mountain and Wolf Mountain Caribou Herds appear to be increasing in size, but poor survey conditions in recent years have hampered obtaining accurate population estimates. During winter the Wolf Mountain and Galena Mountain Herds make extensive use of black spruce forest, so they are difficult to see and count during aerial surveys. The size of the Ray Mountains Herd appears stable; harvest and predation rates remain low (Robinson 1985). Clouds, fog, and winds have frequently limited the Ray Mountains surveys. Large groups are rare in all 3 herds and normally range from 1 to 20 widely scattered animals.

Population Composition

Composition data were obtained from the Galena Mountain and Ray Mountain Herds only. All October population composition surveys of the Galena Mountain Herd have been conducted in upper Holtnakatna Creek. In 1986 the herd was widely scattered during October, and snow conditions were too poor to track groups. Even with radio collars on 4 animals, only 47 caribou were found during the survey, including 18 bulls and 8 calves. Almost all the caribou were lying in thick, black spruce, and none could have been found without the radio collars.

In the Ray Mountains, S. Robinson (BLM) attempted to classify caribou on 4 separate surveys during October and November 1986. Weather conditions precluded data gathering during the first 3 attempts. In November, on the 4th survey, he found 167 caribou, including 11% calves.

Mortality

Some hunting for these caribou occurs along the Dalton Highway, but hunters are rarely successful there. Two unsuccessful harvest report cards were returned from Subunit 25C north of the Yukon River. No caribou harvest was reported from the area; however in 1985 and 1986, 1-2 and 3-5 caribou, respectively, were taken along the Yukon River near Ruby and Rampart-Tanana. Usually these bulls are taken opportunistically when they wander to the river during September. In addition, 5-7 caribou are typically taken during winter by hunters from Tanana and the Tozitna River settlements. These hunters use snow machines for access. Poor hunting access during the open season severely limits the harvest. The Galena Mountain Herd is most accessible for hunting during winter when it crosses the Galena-Huslia winter trail. The Wolf Mountain Herd is virtually never accessible, and the Ray Mountains Herd is accessible during summer by aircraft and during winter by snow machine and aircraft when they are north of Tanana.

Except for the Ray Mountains Herd (Robinson 1985), natural mortality among these caribou may be high because the montane areas where they summer contain numerous grizzly bears; in addition, there are 50-60 wolves in 4-6 packs in Subunit 21C.

Movements

Six caribou from the Galena Mountain Herd were radio-collared during April 1986, and 6 additional caribou were collared during April 1987. One animal died from handling in 1986, and two were accidentally killed in 1987.

There have been 9 tracking flights since the initial caribou were collared. Not all collared caribou were located during every flight. The preliminary movement data indicate that the Galena Mountain caribou winter (Nov-Mar) in the lowland black spruce-lake country area between Galena and Hozatka Lake. The bulls range farther west, and most cows, especially those with calves, remain near the Holtnakatna Creek drainage. In April caribou begin migrating toward Galena Mountain. During May 1987 the radio-collared cows without calves were in lowland black spruce habitats, while those with calves were in alpine areas. All caribou were in the alpine areas from June to September 1986. During October, caribou were migrating from the alpine areas east of Galena Mountain toward Holtnakatna Creek. In June 1987 a collared female with a calf from the Galena Mountain Herd was found among a group of 100 caribou on Wolf Mountain, 75 miles east of her last radio location.

There are no radio collars on Wolf Mountain or Ray Mountains caribou. However, a rough migration pattern for the Wolf Mountain Herd can be surmised, based upon tracks encountered during surveys. The herd calves on Wolf Mountain and summers in the adjoining alpine habitat. During October the herd moves north toward Lost Lake on the Melozitna River. The herd has not been tracked recently during midwinter, but in 1978 caribou were seen on the mountains north of the Melozitna River. During May 1987 caribou were distributed along a trail from Gold Hill toward the calving areas on Wolf Mountain, and old tracks were seen leading from the middle Little Melozitna River toward Gold Hill. Movements of the Ray Mountains Herd are unknown.

Management Summary and Recommendations

The management objectives for the 3 subject caribou herds are (1) to allow expansion of the herds until they are large enough to have a viable hunt during a season when caribou are the most accessible and (2) to keep the human-induced harvest low and yet allow limited opportunistic harvest. The season is currently open when most of the caribou are inaccessible, so the present regulations meet the objectives.

Literature Cited

Robinson, S. R. 1985. Status of the Ray Mountains Caribou Herd. U.S. Bureau Land Management, Alaska Open File Report 12. 11pp.

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 21D, 22A, 22B, 23, 24, and 26A

HERD: Western Arctic

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

A photocensus of the Western Arctic Herd (WAH) was completed on 15 July 1986, resulting in an estimate of 229,433 animals (James and Larsen 1986). This number should be considered as a minimum estimate of population size because less area was searched in 1986, compared with previous photocensus efforts. The 1986 estimate is 34% higher than the 1982 estimate of 171,699 caribou, reflecting an average annual rate of increase of 8%. The average annual rates of increase were 15% and 11% from 1978-80 and 1980-82, respectively. Apparently, the growth rate of the WAH is decreasing as herd size increases.

Population Composition

Spring composition surveys were conducted during March and April 1987 (Table 1). Of 10,131 caribou, 21% were classified as short-yearlings. This percentage has not changed significantly in recent years, suggesting that the recruitment rate is adequate for continued growth of the WAH.

Distribution and Migration

The July postcalving migration followed the same pattern that has been observed annually for the past 10 years or more. Likewise, the fall migration pattern during August-October occurred in typical fashion. Although a few caribou were reported to have migrated through the middle Koyukuk drainage during fall 1986, this movement apparently was of lesser magnitude than that reported for fall 1985. The continued growth of the WAH, however, increases the probability of large-scale migrations occurring in the Koyukuk River area.

During winter 1986-87, only 3 radio-collared caribou were located north of the Brooks Range and 30 collared animals were located south of the Brooks Range divide. This supports the

conclusion drawn from numerous other observations: the majority of the WAH wintered in or south of the Brooks Range. The pattern of southward winter range extensions observed in recent years apparently did not reoccur because no movement of caribou south of the Unalakleet River was observed. The northward spring migration occurred during March through May. The peak of the calving period was not well documented, but it took place in early June. Interestingly, a few groups of up to 200 caribou with newborn calves were seen in the Selawik River drainage in late May. Also, 2 female caribou with satellite radio collars spent the calving period in the vicinity of Feniak Lake. It was unlikely that deep snow or other unusual environmental conditions retarded the spring migration of caribou to the calving grounds. Perhaps, increased sightings of parturient females outside the normal calving area is a function of the increasing size of the herd.

Caribou were essentially absent from the Point Hope area during the entire reporting period. This resulted in considerable stress on the local subsistence economy.

Radio collars were attached to 26 female caribou live-captured while swimming across the Kobuk River during late August and early September. These collars increased the number of functioning collars in the WAH to approximately 50. This will enhance our ability to conduct all phases of the survey-inventory program during the coming year.

Mortality

Reported harvest from the WAH during 1986-87 was 3,398 caribou (Table 2). Although the harvest is substantially less than reported last year (4,018), the 1987 results are not yet complete because the 3rd, final reminder letter has not yet been sent to hunters who failed to return their harvest reports. The 1986-87 harvest results are comparable to the 1985-86 results tabulated prior to the mailing of the 3rd reminder letter. The final harvest figure will appear in the next annual survey-inventory progress report. As reported in previous years, local residents accounted for most of the harvest (Table 3). We believe that the reported harvest is only a fraction of the actual harvest because reporting rates are poor in many rural communities; the actual harvest is approximately 6,000-15,000 caribou.

Management Summary and Recommendations

Results of the photocensus and other demographic indices indicate that the WAH is currently a growing or, at least, stable population. The growth rate since 1982 has averaged 8% annually and is apparently decreasing as herd size increases.

Radiotelemetry data and reports from the public indicate that the fall migration pattern to winter ranges was similar to that of previous years, although they did not move south of the Unalakleet River in significant numbers as they did in 1985-86. The northward spring migration to calving areas was not well documented, but it appeared to be typical; calving occurred in early June.

No changes in seasons or bag limits are recommended at this time.

Literature Cited

James, D., and D. N. Larsen. 1986. Western Arctic caribou herd photocensus, 1986. Unpubl. Report. Alaska Dept. Fish and Game. Kotzebue, Alaska. 25pp.

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Table 1. Proportion of short-yearling (approximately 10 months old) caribou in the Western Arctic Herd, March and April 1987.

Location	Adults	Short-yearlings	Total caribou	Percent short-yearlings
Omalik R. & Ikpihpuk R.	943	103	1,046	10
Mulgrave Hills	1,950	855	2,085	41
Eli, Agashashok, and Squirrel Rivers	2,110	442	2,552	17
Upper Kobuk R.	1,962	446	2,408	19
Upper Selawik R.	1,016	304	1,320	23
Totals	7,981	2,150	10,131	21

Table 2. Reported harvest of caribou from the Western Arctic Herd according to 3 non-overlapping report systems, 1986-87^a.

GMU	WAH harvest report	Arctic harvest report	Statewide harvest report	Total harvest
21D	36	0	0	36
22	725	0	5	730
23	2,150	37	98	2,285
24	0	0	4	4
26A	319	9	15	343
Totals	3,230	46	122	3,398

Table 3. Summary of Western Arctic Caribou harvest report system by hunter residency, 1986-87^a.

Residency	Reports issued	Reports returned	Harvest
Alaska	1,105	790	3,196
Local ^b	997	710	3,101
Non-resident	48	31	34
Total	1,153	821	3,230

^a Report period incomplete; i.e., only 2 of 3 reminder letters sent to hunters who had not returned harvest reports.

^b Resides within WAH range (GMU 21D, 22, 23, 24, 26A).

CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 25A, 25B, 25C, 25D, and 26C

HERD: Porcupine

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The Porcupine Caribou Herd apparently remained stable at approximately 100,000 animals during the 1960's and early 1970's. Since 1979 the Porcupine Herd has been increasing, and 135,284 caribou were counted during an aerial photocensus in July 1983. Since then, herd productivity, recruitment, and mortality have been estimated through studies of radio-collared caribou. The Porcupine Herd appears to have increased at a rate of about 10% per year between 1983 and 1986, resulting in an estimated herd size of approximately 180,000 caribou in July 1986.

Population Composition

Radio-collared cows were not located as frequently as in previous years. Among 3-year-old or older radio-collared females for which data are available, 27 of 38 (71%) gave birth to calves in June 1986; two (7%) of these calves died within 2 weeks of birth, yielding a calf:cow ratio of 66:100 in mid-June. One of 10 radio-collared 2-year-olds had a calf; it is not known if this calf survived.

During a census attempt in July 1986, 19,499 Porcupine Herd caribou were classified in composition counts. All known groups in the herd were sampled, and sampling intensity was about equal in all groups. There were 51 calves, 58 bulls, and 28 yearlings:100 cows. This yearling figure represents a minimum recruitment because many yearlings look like adults. Also, the calf:cow ratio was lower than that for radio-collared females that were at least 3 years old, but the figure from composition counts includes less productive 2-year-olds and an additional 2-3 weeks of early calf mortality.

Although early calf survival was relatively low in 1985, survival to yearling age in 1986 was apparently good. I think the Porcupine Herd is probably still increasing at something near 10% per year, as calculated for the 1983-85 period.

Mortality

Among radio-collared caribou older than calves, mortality was 15-26% for adult males and 5-30% for adult females. The large range in estimated mortality rates resulted from uncertainty about the fate of 11 caribou for which mortality-type radio signals were detected, but the sites were never inspected on the ground. Ten of these signals were from expandable collars put on in 1984-85. Several collars from the same series broke off prematurely, and it is likely that many of the current uninspected mortality signals will prove to be coming from dropped collars rather than dead caribou. The low end of the range in current mortality estimates is similar to estimates for previous years in which collar shedding was not a problem.

Ninety-one people harvested Porcupine Herd caribou in Alaska during the 1986-87 season, based on harvest report card returns. In Unit 25, 74 hunters took 51 bulls and 11 cows. In Subunit 26C, 17 hunters harvested 19 bulls and 3 cows. Only 21 hunters reported taking more than 1 Porcupine Herd caribou.

As in past years, harvest by local residents was unreported. Caribou were widely available to village residents during July and from October through May. All but a small portion of the Porcupine Herd wintered in Alaska during 1986-87. Porcupine Herd caribou wintered in the immediate vicinity of Venetie for the 1st time in several years and were even available to residents of Beaver on the Yukon River. Total subsistence harvest in Alaska was thus higher than in most years, probably exceeding 1,000 and perhaps as high as 2,000.

Final harvest data are not yet available for Canada. Preliminary compilations indicate that about 500-1,000 caribou were taken in Old Crow and several hundred in Aklavik. Porcupine Herd caribou were not available along the Dempster Highway or to residents of Ft. MacPherson. Overall harvest (both Alaskan and Canadian) for the herd was thus about 2,000-3,000 (or about 1-2% of the total).

Management Summary and Recommendations

The Porcupine Herd has been increasing for the past 10 years. Harsh weather conditions on calving grounds during the past 2 summers may have decreased neonate survival, but recruitment to yearling age has been good. Census attempts in 1984, 1985, and 1986 failed.

Current seasons and bag limits are adequate to meet sport hunting demands. However, local residents will probably continue to take caribou opportunistically during the closed season, and hunters providing for large or extended families will take more than their individual bag limits. The Porcupine Herd can readily provide for all these uses. Much additional education is necessary before hunting regulations will be acceptable and enforceable for all parties involved.

Much of the calving and midsummer habitat of the Porcupine Herd could potentially be affected by petroleum leasing and development. The State of Alaska has urged Congress to defer leasing on about 242,000 acres of prime calving habitat and to authorize construction of only necessary facilities, which cannot be located within 3 miles of the Arctic coast, until more can be learned about the importance of these areas to caribou.

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CARIBOU

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 26B

HERD: Central Arctic

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The Central Arctic Herd (CAH) grew from approximately 5,000 caribou in 1975 to 13,000 (estimated by photocensus) in July 1983. No population estimate has been attempted since that time. Calf production and yearling recruitment have remained high, and natural and hunting mortalities have been low. Harvest by hunters has increased over the past 4-5 years. Restrictions in the 1987-88 caribou hunting regulations should reverse the recent trend of rapidly increasing harvests. The herd is probably still growing, but at a decreased rate. Industrial development near Prudhoe Bay and the Trans-Alaska Pipeline appears to be affecting the local distribution of caribou, but there has been no detectable effect of these developments on herd productivity.

Population Composition

No composition counts were completed during summer and fall 1986 and winter 1986-87. Calving-ground surveys conducted on 11-14 June 1987 indicated 74 calves and a ratio of 20 yearlings:100 cows ($n = 4,839$). Initial calf productivity was good, in spite of adverse weather conditions on the calving grounds. Yearling ratios on CAH calving grounds are difficult to interpret because substantial annual variation in the proportion of yearlings accompanying cows contributes to annual variation as much as or more than overwinter survival. However, the combined data from the surveys of radio-collared cows, as well as those conducted on the calving grounds in 1985-86, indicated an initially low productivity; therefore, the yearly recruitment for 1986-87 was probably lower than that for most previous years.

Mortality

Two hundred eighty-seven people reported hunting CAH caribou during the 1986-87 regulatory year; the 218 hunters that were successful took 345 caribou. Most hunting occurred along the Dalton Highway; 133 of 176 hunters using road access harvested 230 caribou (196 bulls and 34 cows). Ninety-four of these hunters using road access also used off-road vehicles, and 91 of these were successful in taking caribou. Thirty-six hunters using road access used bow and arrow; 25 were successful, harvesting 30 bull caribou. One hundred eleven hunters used aircraft access; of these, 85 successful hunters harvested 115 caribou, all bulls. Aircraft transportation was used by 22 bowhunters, and 19 of them harvested a total of 20 caribou.

The proportion of females in the harvest dropped from 27% to 10%, perhaps because hunters were more selective for bulls. Nevertheless, all females were taken by road-based hunters using off-road vehicles and firearms.

All harvest figures are minimum numbers. Of nearly 2,500 arctic caribou harvest report cards issued, only about 43% were returned. No effort has ever been made to increase hunter reporting for CAH caribou. I think many of the unreturned reports were issued to hunters who did not intend to hunt north of the Yukon River but picked up the arctic caribou harvest reports "just in case." However, many successful hunters probably did not report, especially since many of their activities along the Dalton Highway were technically illegal.

Management Summary and Recommendations

I think growth of the CAH was probably reduced because of lower yearling recruitment in spring 1987 and harvest by hunters in 1985 and 1986. The larger 1985 harvest (662 reported) occurred partially because prohibitions on use of off-road vehicles in the Dalton Highway corridor were unenforceable. In 1986 the Department of Transportation operated a check station from July through November; hence, only drivers with valid permits could proceed to Subunit 26B via the Dalton Highway. This was at least partly effective; the number of successful hunters using the road decreased from 222 to 133. However, hunters using aircraft increased from 61 in 1985 to 85 in 1986. I think limiting the number of caribou that could be transported out of Subunit 26B from 5 to 2 also reduced the harvest, especially along the road. Total reported harvest dropped from 662 in 1985 to 345 in 1986. To some extent, the lower harvest may have resulted from decreased availability of caribou near the road. However, the

generally high success rate of road hunters, particularly those with off-road vehicles, suggests that hunters had little trouble finding caribou. In summary, more stringent regulations reversed the trend toward increasing harvest in the CAH and reduced reported harvest by 48%.

More restrictive regulations enacted for the 1987 hunting season will probably reduce harvest even more. The bag limit for resident and nonresident hunters will be 1 caribou. The bag limit for subsistence hunters will remain at 5 caribou. All transport of hunters and game by motor vehicle (except aircraft, licensed highway vehicles, and motorized boats) in the Dalton Highway corridor will be enforced. In addition, the Nanushuk River drainage in Subunit 26A, used primarily by CAH caribou, will be under the same restrictive regulations for caribou as Subunit 26B.

Long-term studies are continuing on the effects of petroleum development on the CAH. The more restrictive hunting regulations recently enacted should ensure that harvest effects do not mask any potential effects of development.

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