file

ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Walter Kirkness, Commissioner

DIVISION OF GAME
James W. Brooks, Director
Don H. Strode, Federal Aid Coordinator

CARIBOU REPORT

by

Jack Lentfer

Volume VI
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-6-R-5,6, Work Plan c

(Printed June 1965)

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-5,6 TITLE: Alaska Wildlife Investigations

WORK PLAN: C TITLE: Caribou Investigations

JOB NOS.: 1,2,3,4,5,6,7,8

PERIOD COVERED: January 1, 1964 to December 31, 1964

ABSTRACT

Arctic Herd

1. Arctic caribou displayed a general shift to the east in their movements throughout the year as compared to movement patterns observed in past years. The northward movement to the calving grounds was delayed about a month by late-remaining snow. The main calving grounds were on drainages of the Colville River from the Nuka River to Umiat and on the headwaters of the Ketik, Meade, and Ikpikpuk Rivers. Animals moved southward in the fall on a front extending from the Kobuk-Ambler area on the west to the Chandler Lake-Anaktuvuk area on the east. Major segments of the herd wintered at the head of the Selawik River and on the middle and lower Koyukuk River.

2. Animals autopsied in late winter and spring were in poor condition with a fairly high incidence of brucellosis (28 per cent) among 61 animals which were checked. Evidence of abortion in late pregnancy and abnormal retention of placenta at time of parturition were noted in some animals. These conditions were not definitely associated with brucellosis. Poor animal condition, presence of brucellosis, and difficulties at time of calving were similar to conditions noted in 1963.

3. Of 58 cows 2 years old and older examined in April, 44 (76 per cent) were pregnant. This is similar to the 73 per cent fertility rate obtained in the Arctic herd in April 1963, and is less than the 82 per cent rate which has been determined for the Nelchina herd. The calf:cow ratio on June 11 near the end of the calving period was 64:100.

4. Examination of 304 jaws from caribou killed by native hunters throughout the winter revealed abnormally low percentages of

younger age classes. Part of this might have been because of hunter selection for larger animals. It might also indicate lowered production and/or lowered survival of young animals the last few years. A sample of 266 jaws from caribou killed by hunters in 1965-52 was examined and found to contain higher percentages of younger age classes.

5. Throughout the winter of 1963-64 caribou were available to hunters from Kotzebue and the lower Noatak, Kobuk, and Selawik Rivers. An estimated 20,000 were killed in 1963 and 5,000 during the first 4 months of 1964. Animals were more readily available to hunters further to the east during the fall of 1964 and winter of 1964-65.

Nelchina Herd

1. Nelchina caribou did not move to traditional calving grounds in the spring, presemably because of deep snow. The largest segment of the herd which had wintered in the northwest section of the range remained there to calve. Distribution throughout the summer and fall was similar to that observed in past years. Main segments of the herd spent the winter of 1964-65 in the northwest and extreme eastern sections of the range with some movement noted east toward Mentasta and south across the Copper River beyond the boundaries of what has been considered normal Nelchina range.

2. Calf production was good with an estimated ratio of 75 calves: 100 cows in post-calving concentrations of animals on June 20.

3. The sex and age structure of hunter-killed caribou was similar to that of past years.

4. The hunter kill was estimated to be 6,300 during the 1963-64 season with 6,000 killed prior to January 1. The kill during the 1964-65 season was estimated to be 8,000 with 5,500 killed prior to January 1.

5. Animals continued to remain in good condition with no significant number of diseased animals reported by hunters. In 1963, 13 (4 per cent) of 342 animals checked had positive titers for brucelloses; 1 of 232 was positive in 1964.

6. Data were tabulated and a statistical analysis designed to determine the distribution of major vegetative type from randonized aerial transects flown after the fall vegetation color change. Range exclosures were checked and the necessary repairs made.

Fortymile Herd

1. The large segment of the Fortymile herd which remained in the Ogilvie Mountains during the winter of 1963-64 moved north in the spring of 1964 onto the range of the Porcupine herd. Most of the remainder of the herd summered in the high hills between the Steese and Taylor Highways and moved southeast in the fall in normal fashion.

2. The pattern of hunter harvest was similar during both the 1963-64 and 1964-65 seasons with over 50 per cent of the kill occurring each season along the Steese Highway. Normally the greatest portion of the kill is on the Taylor Highway late in the season. Relatively few caribou were killed each season, an estimated 335 in 1963-64 and an estimated 270 in 1964-65.

Other Work

1. An aerial survey of the Delta herd in Feburary 1964 revealed that most animals were ranging in the foothills and spruce flats between the Delta and Little Delta Rivers on the north side of the Alaska Range.

2. In March 1964, 55 caribou were counted on Adak, survivors and descendents of 24 calves released in 1958 and 1959. Three bulls and one cow were harvested during the first hunt held in August 1964. Weather and lack of adequate transportation limited the hunting effort.

3. The Kenai Peninsula was checked for possible sites for a caribou transplant. The Mystery Creek-Chickaloon River area on the north end of the peninsula appears to be the most favorable.

RECOMMENDATIONS

1. Continue basic studies on the Nelchina herd designed to provid data on productivity, mortality, range, animal condition, and incidence and effects of various diseases and parasites. Emphasis should be given to ascertaining egress from the range.

2. Continue to observe productivity, natural mortality, and movement patterns in the Arctic herd to determine changes which may occur in association with the present high population. The population size and composition should be determined by an aerial status evaluation in the spring of 1965.

3. Explore methods for obtaining a more precise measure of caribou body condition and for measuring range quality.

4. Review all sampling procedures with Frank Ossiander, department statistician, so that meaningful data can be obtained with a minimum expenditure of time and money.

5. Survey caribou range on Adak and establish exclosures to measure vegetation changes caused by introduction of caribou.

6. Determine distribution throughout the year, population status, productivity, and mortality of other herds as time is available.

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-5, 6 TITLE: Alaska Wildlife Investigations

WORK PLAN: C TITLE: Caribou Investigations

JOB NOS.: 1,2,3,4,5,6,7,8

PERIOD COVERED: January 1, 1964 to December 31, 1964

OBJECTIVES

To determine the distribution, relative abundance, status, and general condition of the various cauibou herds in Alaska.

To record the distribution and movement of various herds in order to: identify main summering, wintering, and calving areas; determine population shifts, movement patterns, and range use; and provide current information regarding distribution to the hunting public to attempt to promote needed harvests.

To obtain information relating to productivity including sexual cycles, fertility and natality rates, growth of fetus, and effects of population size, body condition, and disease.

To identify and evaluate natural mortality with emphasis on the Arctic herd.

To determine the magnitude, chronology, spatial distribution, and population structure of hunter harvests in the Arctic, Nelchina, and Fortymile herds.

To maintain Nelchina range exclosures established in past years.

METHODS

Aerial observations by project personnel and reports from other persons both within and outside the Department provided information on distribution and movements. Aerial observations and counts gave information on calf production and survival. Checking stations were operated in the Nelchina and Fortymile areas to obtain information on

Magnitude, composition, aerial distribution, and chronology of the hunter kill. Blood samples were obtained from hunter-killed caribou to test for brucelloses. Testes were obtained for productivity studies.

Visits to western Arctic villages provided information on magnitude and composition of the hunter harvest. Calendars for each hunter were left in the villages in the fall of 1963 and hunters were asked to record their daily kills. When calendars were picked up in the spring, jaws were also obtained for an indication of the age composition of hunter-killed animals. Villages were again visited in the fall of 1964 and meetings held with village council members and interested hunters to explain the caribou work in the Arctic and the need for harvest information. Forms with each hunter's name were prepared for each month. A responsible-appearing person was asked to post forms in the store or post office each month and remind hunters to keep recording kills. Forms and jaws will be collected in the spring of 1965.

The cooperative study to determine the prevalence and effects of brucellosis on Arctic caribou was continued by the Arctic Health Research Center, U. S. Department of Agriculture, and Alaska Department of Fish and Game. Carcasses of hunter-killed animals were examined at Anaktuvuk Pass in April 1964 for evidence of disease and parasites. Serologies were performed and infected tissue cultured for evidence of brucellosis. Body weights and measurements were obtained and the general condition of each animal recorded. The fertility rate was determined and fetus weights were obtained. Similar data were obtained from animals collected on the calving grounds on the upper Colville River in June.

Range exclosures in the Nelchina area were checked and repairs were made as needed.

Caribou were collected for radiation analysis by the Atomic Energy Commission as part of the Disease and Parasites Work Plan. This program calls for four collections distributed throughout the year from the Arctic, Nelchina, and Alaska Peninsula herds, each collection to consist of five 2- to 3- year old animals. These collections provide an opportunity to obtain information on distribution, condition, fertility rates, and disease and parasites.

FINDINGS

Arctic Herd

Distribution and Movements

During the winter of 1963-64 caribou in the Arctic herd extended further south and east than they have for years. Segments of the herd wintered at the base of the Seward Peninsula, on the drainages of the lower and middle Koyukuk River, and in the mountains southeast of Bettles between the Koyukuk and Yukon Rivers, extending eastward as far as Venetie on the lower Chandalar River. Large numbers also wintered in the lower Noatak and Kobuk drainages and in the Mulgrave Hills.

The beginning of the northward movement to the calving grounds was delayed about a month by deep, lingering snows. At Anaktuvuk Pass the first caribou arrived the last part of April. As has been the pattern in years past, animals moved north at various locations through the DeLong, Baird, Schwatka, and Endicott Mountains, and once on the north slope many moved to the west. The animals that wintered in the Mulgrave Hills moved north along the Wulik River through DeLong Pass onto the Kukpowruk River. By the end of May most of the calving group was on the north side of the Brooks Range. The principal calving grounds in years past have been in the area drained by the headwaters of the Colville, Utukok, Ketik, and Meade Rivers. In 1964 the main calving grounds were further to the east extending eastward from the Nuka River past Liberator Lake and the Killik River to the Anaktuvuk River and northward from the foothills and the tundra regions of the Ketik, Meade, and Ikpikpuk Rivers. A smaller segment calved to the west in the Kukpowruk and Kokolik drainages. By the last week of June the main calving segment was moving westward presumably to the DeLong Mountains. Further specific information regarding 1964 summer movements is not available. The general pattern is a dispersal during July and August with many animals moving northward onto the coastal plain between the Chukchi Sea on the west to below the lower Colville River on the east.

The fall movement started in September with a large segment of animals moving south through the Anaktuvuk Pass-Chandalar Lake area. This movement reached a peak in October and continued through December. Many of these animals spent the winter in the area south of Bettles. Another large segment moved south further to the west from early September through October with the bulk of the movement occurring the last two weeks of October. These animals moved from the north slope

of the range and crossed the Noatak River between the mouths of the Nimiuktuk and Cutler Rivers. The main movement was then up the Ambler River, across the Kobuk River, and onto the headwaters of the Selawik River and drainages of the lower Koyukuk River. These was no movement south across the lower Noatak and lower Kobuk Rivers as has occurred in recent years. A small group of Caribou spent the winter in the Jarvis Mountain-Wulik River area and another small group was reported in the area south of Wainwright.

Productivity

An indication of the fertility rate of the Arctic herd was obtained by examining carcasses in the Anaktuvuk area in April 1964. Of 58 cows 2 years old and older, 44 (76 per cent) were pregnant. This is similar to the 73 per cent fertility rate obtained at Anaktuvuk in April 1963 and is less than the 82 per cent fertility rate noted in the Nelchina herd in recent years.

Counts make on the main calving grounds gave information on the 1964 calf crop (Table 1). Composition counts were made June 3, 5, and 6 of the main calving segment located on the south side of the upper Colville River between the Kiligwa and Ipnavik Rivers. A general movement to the northwest occurred during this period and by June 11, when the last count was make, this calving segment was located on the headwaters of the upper Meade River tributaries and the upper Awuna River. Parturient cows were identified by having calves and/or hard antlers.

Pregnant cows reach the calving grounds before the non-pregnant cows and young bulls, and tend to group fairly tightly while the non-pregnant cows and young bulls remain somewhat dispersed. The ratio of parturient cows to adults tends to decrease as more non-parturient animals reach the calving grounds. This probably explains the differing ratios of parturient cows to total adults in Table 1. Also, in making composition counts the fact that animals are somewhat segregated makes it difficult to obtain a truly representative count.

The ratio of calves to parturient cows shows an increase for successive counts as would be expected. The ratios also indicate that the peak of calving occurred between June 6 and 11. The peak of calving is considered to occur when 50 per cent of the pregnant cows have given birth. The peak obtained in 1964, between June 6 and 11, is later than the May 26 peak in 1960 and the June 5 peak in 1961 as determined by Lent (1964). It is also later than peaks for other herds as determined by Skoog-May 25 for the Nelchina and Fortymile herds (Alaska Game Commission 1955-59) and May 31 for the Porcupine herd (Skoog 1963). If the peak of calving actually

Table 1. Caribou composition counts, Arctic calving grounds, 1964.

Date	Total adults tallied	Parturient cows	Non-parturient cows and young bulls	Calves	Parturient cows/adult	Calves/ parturient cow	Calves/ adult
6/3	565	419	146	29	.74	.07	.06
6/5	1005	662	343	105	.66	.16	.10
6/6	900	498	402	130	.55	.26	.14
6/11	2439	1971	468	1570	.81	.80	.64

occurred earlier in the western Arctic in 1964 than indicated by the counts, inadequate sampling is a possible reason for non-representative counts, although it was believed at the time of counting that representative counts were being obtained. Another possible reason for obtaining a late peak of calving date is a relatively high calf mortality immediately after birth and before females have shed their antlers.

Mortality

Hunter Harvest

Caribou in the Arctic are normally killed in the greatest numbers when they are readily accessible from villages during their southward migration in the fall and the northward migration in the spring. Some years they are available to certain villages during the winter. This occurred during the winter of 1963-64 when they remained in the lower Noatak-lower Kobuk region through much of the winter and were available to hunters from villages in this area and from Kotzebue. As has been the case since 1956 there was no limit in the Arctic on the number of caribou an individual hunter could kill. Because caribou were available for an extended period and because there was no restriction on the number which could be killed, the total kill was fairly high an estimated 20,000 in 1963 and an estimated 5,000 for the first 4 months of 1964. The method of obtaining 1963-64 harvest data, whereby native hunters were left calendars for the fall, winter, and spring months on which to record daily kills, was judged to be only fair. Some hunters did not fill out calendars either because they did not want to or forgot about them. Others apparently filled out calendars just prior to their being picked up.

During the winter of 1964-65 caribou were not available to Kotzebue and lower Kobuk River hunters, and it is anticipated that the 1964-65 kill will be considerably lower than the 1963-64 kill. It is hoped that 1964-65 harvest data will be improved by posting a form with each hunter's name in the general store or post office in each village and asking a village council member or the storekeeper to keep reminding hunters to record their kills. More precise harvest data could be obtained by spending a few days in each village and visiting the village several times during the season. This would give an opportunity to obtain firsthand kill information and should also help gain confidence of the natives so they would be willing to provide more complete information.

Natural Mortality

Arctic caribou examined in 1964 were generally in poor condition and with a fairly high incidence of brucellosis. Of 72

animals autopsied in the Anaktuvuk area in April 1964, all were in poor body condition as judged by small amounts of subcutaneous and visceral fat. Two animals, both mature males, had reddish-colored gelatinous bone marrow. Even the Eskimos at Anaktuvuk were impressed by the poor condition of these animals. Of 37 animals tested for brucellosis, 5 (14 per cent) were positive.

Fetuses of cows killed at Anaktuvuk in April were examined and weighed. The mean weight of 39 fetuses was 6.5 pounds; the range was 2.5 to 10.5 pounds. Five fetuses which weighed 4 pounds or less still had no hair. The cause of these fetuses being somewhat undeveloped is not known, nor is it known if they would have had a reduced chance for survival at birth. No correlation was apparent between these small fetuses and the mother's age, body condition, or reaction to a test for brucellosis.

Calving ground work also gave information on natural mortality factors. Deep, lingering snow delayed the northward movement to the calving grounds, but by June 1 a large segment of calving animals had reached the upper Colville River. Once the snow started to melt it disappeared rapidly, and calving occurred under favorable conditions.

Twenty-four animals older than calves were examined and all were found to be in poor condition with little or not fat reserves. The bone marrow of one cow with a normal appearing fetus was reddish and gelatinous. Serologies were positive for brucellosis on 12 (50 per cent) of the adult animals examined. This figure is probably not representative of the herd since, in some cases, non-parturient females or crippled animals were selected for collection.

Seven fetuses and calves were weighed. Six were within the normal range of 10 to 13 pounds: one, the offspring of a 4-year old cow with a low titer for brucellosis, weighed only 6-1/2 pounds. Two calves, both normal appearing, were tested for brucellosis. Both were negative. The mother of one was negative. The mother of the other was positive with a low titer (1:20).

Examination of seven non-parturient cows 3 years old and older revealed that three had probably aborted during the last half of their pregnancy. One of these three was positive for brucellosis. For the second consecutive year a certain portion of the cows in this herd retained afterbirth at time of parturition. This condition is probably abnormal as it has been noted only three times previously (Nelchina, 1963) during several seasons of calving ground work on the Nelchina and Fortymile herds. Autopsy of cows in the Arctic in 1964 killed prior to their giving birth revealed that

generally fetal membranes readily separated from cotyledons of the uterus and would probably have been expelled at time of birth. In some cases, however, membranes remained firmly attached to the uterus and would probably not have been expelled. Two cows with retained afterbirth were examined. One, which was negative for brucellosis, had a 4- to 6- hour old calf with her, and the uterus did not appear to be infected. It is not known if the afterbirth would have been expelled naturally or would have been retained with a resulting metritis. The other cow did not have a calf with her and appeared listless before she was collected. She was positive for brucellosis with a titer of 1:40. The uterus was infected with necrotic suppurating cotyledon areas. It is likely that the infection would have spread and resulted in death.

Animals with retained afterbirths could be identified at a distance by bloodied perineums. Aerial counts were made of cows with young calves to determine the incidence of bloodied perineum. Of 451 cows with calves less than 3 days old, 68 (15 per cent) had bloody perineums. A similar count in 1963 revealed an incidence of about 20 per cent (62:314).

When retained afterbirths were first noted in 1963, brucellosis was thought to be a probable cause; however, of ten animals with retained afterbirth examined during 1963 and 1964, only four were positive for brucellosis. The other possible cause was malnutrition. In both 1963 and 1964 late-remaining snow forced animals to remain on winter food longer than usual which perhaps resulted in some diet deficiency. More work remains to be done before the cause of the reproductive difficulty can be determined definitely.

Population Structure

Animals examined at Anaktuvuk in late April 1964 were aged by tooth wear (Table 2). There were few young animals and no calves or yearlings. It is believed that there was no bias in collecting this group of animals. A low number of young animals in this collection led to an examination of jaws which could be collected from the following villages: Selawik, Shungnak, Noorvik, Kobuk, Kivalina, Kiana, and Noatak. Table 2 reveals a low percentage of young animals in this group. It is not known how much hunter bias may have existed because of selection for larger animals or bringing only heads of the larger animals back to the villages. However, if the low numbers of animals in the younger age classes are not entirely due to bias, a low reproductive rate is implied for the past 2 or 3 years. This is what might be expected considering the rather high incidence of brucellosis, the high population, and the relatively poor condition of individual animals.

Table 2. Sex and age structure of Arctic caribou killed by hunters from Anaktuvuk Pass, April 1964; and other villages, winter 1963-64.

AGE CLASS		ANAKTUVUK				OTHER VILLAGES		TOTAL	
		Male	Female	Both sexes No.	%	Both sexes No.	%	No.	%
Juvenile:	Calf	0	0	0		12	5	12	4
	1 yr.	0	0	0		17	7	17	6
	2 yrs.	0	7	7	10	24	10	31	10
	Total	0	7	7	10	53	22	60	20
Prime:	3-5yrs.	9	33	42	61	126	54	168	55
Mature:	6-9yrs.	2	15	17	25	40	17	57	19
Old:	10+yrs.	0	3	3	4	16	7	19	6
Total		11 (16%)	58 (84%)	69	100	235	100	304	100

A collection of 266 jaws from hunter-killed caribou made by Dr. Robert L. Rausch of the Arctic Health Research Center in 1950-52 was aged and provides a comparison with the present age structure (Table 3). These data show a definite younger age composition during the 1950-52 period, perhaps indicating a lowered calf production and/or survival during the years immediately preceding 1964.

Table 3. Sex and age structure of Arctic caribou killed by Anaktuvuk Pass hunters, 1950-52.

AGE CLASS		MALE	FEMALE	SEX UNKNOWN	TOTAL No.	%
Juvenile:	Calf	18	7	3	28	11
	1 yr.	6	11	4	21	8
	2 yrs.	14	22	10	46	17
	Total	38	40	17	95	36
Prime:	3-5 yrs.	32	57	39	128	48
Mature:	6-9 yrs.	6	29	6	41	15
Old:	10+ yrs.	0	2	0	2	1
Total		76(29%)	128(48%)	62(23%)	266	100

Nelchina Herd

Distribution and Movements

During the winter of 1963-64 the largest segment of the Nelchina herd wintered along drainages of the Yanert Fork of the Nenana River, ranging north to the upper Wood River, west to eastern McKinley Park, and south to Cantwell and Deadman Lake. Other segments spent part of the winter in drainages of the upper Talkeetna River and in the Tangle Lakes-Paxson Lake-upper and middle Chistochina River area. Pilots in the area indicate there was some movement from the Gakona-Chistochina area south across the Copper River and east toward Mentasta. This may have been a permanent egress from the Nelchina range.

Animals did not move to the traditional calving grounds in the Clarence Lake-upper Tuone River area in the spring, presumably because of deep and exceptionally late-remaining snow. The largest segment of the herd which wintered in the northwest section of the range remained there to calve.

A post-calving movement resulted in a distribution similar to that observed in previous years. By late June the major portion of the calving animals were concentrated in the High country bordering upper Kosina Creek, Black River adjacent to Black Lake, and the upper Oshentna River. A smaller group of animals was distributed from the Jay Creek-Coal Creek Plateau west to Deadman Creek. Scattered animals occurred throughout much of the rest of the range. By late August a portion of these animals had moved east to the Alphabet Hills. During the first half of September another portion concentrated in the area from Fog Lakes north to the Denali Highway and east to the Susitna River. These animals moved east and southeast and by early October had reached the Lake Louise Flats with a major concentration of animals remaining in the Lake Louise-Crosswind Lake area for about 10 days. These animals then moved north and northeast and appeared to split into two groups. By the first part of November the larger segment was moving west, parallel to the Denali Highway, to Monahan Flats where the movement stopped. The other group appeared to be somewhat settled in the Hogan Hill-Paxson Lake-Gakona River area. By late December animals had moved from Monahan Flats to the Cantwell-Brushkasna where they remained for the winter. The Paxson Lake-Gakona group drifted east to the Chistochina and Indian Rivers by January of 1965. There was some movement south across the Copper River and east toward Mentasta, beyond the boundaries of what has been considered the normal Nelchina range.

Productivity

A flight on June 20 gave information on productivity. A post-calving movement had occurred by this time and cows and calves were concentrated in the upper Kosina Creek-Black Lake and upper Oshetna River area. From sample counts made of approximately 6,300 adults in this area it was estimated that 75 per cent had calves. Non-calving animals were widely dispersed over much of the range along with some cows with calves. Of 1,880 animals without antlers which were tallied away from the Kosina Creek-Black River-Oshetna River area, 273 (15 per cent) had calves.

Testes were collected from 472 hunter-killed animals in 1964. These will be examined histologically to determine the spermato-

genesis cycle and minimum breeding age, and an attempt will be made to relate findings to antler condition to give field indicators of fertility. A portion of the large number of female reproductive tracts collected in the Nelchina area since 1956 were examined grossly along with lesser numbers of tracts from the Arctic and Alaska Peninsula. Fertility rates as determined from this examination will be discussed in the comprehensive caribou report. Ovaries from approximately 700 animals will be sectioned and examined microscopically by Ronald Skoog at the University of California to determine the cyclic changes taking place throughout the year.

Mortality

Hunting

As has been the case in years past, accessibility of animals from a road strongly influenced the amount of hunting effort and the total kill during the 1963-64 and 1964-65 seasons. In both years, however, hunting effort dropped off during periods of extremely cold weather and also after January 1, even when animals were available. Both these seasons extended from August 10 to March 31 with a bag limit of four animals of either sex. Harvest data were obtained by operating a check station from August 10 to October 27 in 1963 and from August 10 to November 16 in 1964. Additional information was obtained from other department personnel, hunters checked in the field, and lodge operators, guides, and local residents.

During the 1963-64 season the major portion of the kill was fairly uniformly distributed throughout the September to December period. Animals were killed in fewer numbers in August and from January to the end of the season. The total harvest was estimated at 6,300 with 6,000 being taken prior to January 1.

During the 1964-65 season a major portion of the kill was made from the last part of October through November when animals were readily available along the eastern portion of the Denali Highway. The check station checked 2,997 caribou. The total harvest was estimated at approximately 8,000 with 5,500 being taken prior to January 1.

Natural Mortality

Animals continued to remain in good condition with no significant number of diseased animals reported by hunters. Of 342 usuable blood samples supplied by hunters in 1963, 13 (4 per cent) were

positive for brucelloses. Testing of 232 similar samples in 1964 revealed only 1 to be positive.

Population Structure

Population structure of the hunter kill in 1964 was determined by sexing animals and obtaining jaws for aging at a hunter check station operated from August 10 to November 16 (Table 4). The structure of the kill is similar to that obtained in past years but is not considered representative of the herd. Results of ground counts compared with the hunter kill in past years indicates that hunters are biased against killing calves and toward killing bulls. Also, bulls are readily available many years when concentrations of them move south across the Denali Highway in September to join main herd segments prior to the rut. Cows older than calves are probably the most correctly represented in the hunter kill since it is difficult to distinguish cow age groups.

Table 4. Sex and age structure of hunter-killed caribou as determined at Nelchina check station, August 10-November 16, 1964.

AGE CLASS		MALE		FEMALE		SEX UNKNOWN		TOTAL	
		No.	%	No.	%	No.	%	No.	%
Juvenile:	Calf	22	4	30	5	3	.5	55	9
	1 yr.	64	10	44	7	10	2	118	19
	2 yrs.	54	9	25	4	7	1	86	14
	Total	140	22	99	16	20	3	259	42
Prime:	3-5 yrs.	163	26	88	14	24	4	275	44
Mature:	6-9 yrs.	43	7	25	4	6	1	74	12
Old:	10+ yrs.	9	1	6	1	1	-	16	3
Total		355	57	218	35	51	8	624	100

Analysis of Range

Field work was completed in September 1963 on a project designed to determine the distribution of major vegetation types on the Nelchina range. The technique used was to fly randomized east-west and north-south transects and identify vegetation at a point intercept each 15 seconds. Work was done after the fall color change, and color was used to help identify vegetation. Approximately 10,000 points were obtained. Data were tabulated during the past year and a program designed for statistical analysis. Results will be published after the analysis.

Nelchina range exclosures were checked and repairs made as needed. Most exclosures were in good shape and only slight maintenance was necessary.

Flights were made to determine the distribution of main segments of the herd throughout the year so that range condition can eventually be related to range use.

Fortymile Herd

Distribution and Movements

During the winter of 1963-64 the largest segment of the Fortymile herd wintered in the Ogilvie Mountains north of Dawson. Another segment wintered in the Mt. Harper area at the upper drainages of the Middle Fork of the Fortymile River and of the Goodpaster River. A spring movement which usually starts in April was about a month late, delayed presumably by late-remaining snow. During the spring movement the caribou usually move west and northwestward across the various drainages of the Fortymile River and onto the Charley River drainages. In 1964, however, most of the animals wintering in the Ogilvie Mountains apparently went northward with the Porcupine herd. The animals in the Mt. Harper area generally remained in that area but also extended northward into the hills dividing the Charley River drainage from that of the Salcha and Chena Rivers. The animals remained throughout the summer in these high hills with a portion of them extending northwestward to the Steese Highway.

The fall movement began in October with a northwest movement toward the Steese Highway with the main segment of the herd remaining in the high country south of the highway. The movement then reversed itself and went to the southeast as has been the normal pattern in past years. By mid-November the leaders had reached the Mosquito Fork and the bulk of the herd was concentrated in the Mt. Harper area.

By mid-December caribou were distributed on the drainages of the Goodpaster and Middle Fork, and south of the Mosquito Fork. Only a few had crossed the Taylor Highway. By mid-January animals had broken into two segments, one in the Salcha-Goodpaster area and one in the Ladue River area of Canada.

Mortality

Hunting mortality was low during both 1963-64 and 1964-65 seasons. Normally caribou on the northwest periphery of the summering grounds are available to hunters along the Steese Highway during the early part of the season. During the fall movement large numbers of caribou move southeastward across the Taylor Highway, usually in October. The largest portion of the kill is made at this time. Such a movement did occur in late October in 1963. However, hunting pressure and the harvest along the Taylor Highway remained low. The total estimated kill for the 1963-64 season based largely on check station data was 335 (Table 5). During the fall of 1964 caribou were readily available along the Steese Highway; they did not reach the Taylor Highway before snow blocked the road. A check station was operated on the Steese Highway from August 23 through October 7 and on the Taylor Highway from September 15 through October 7 and for 3 days at the end of November. The total harvest estimate was about 270 (Table 5). The annual harvest estimates since 1951 have averaged about 1,000 and ranged from 50 to 2,300.

Table 5. Hunter-harvest, Fortymile caribou herd. 1963-64 and 1964-65 seasons.

	1963-64		1964-65	
Location	Known Kill	Estimated Total Kill	Known Kill	Estimated Total Kill
Steese Highway	196	215	103	200
Taylor Highway	68	110	1	20
Upper Salcha-Good paster (riverboat)				50
Yukon Territory		10		
Total	264	335	104	270

Alaska Peninsula Herd

Examination of Alaska Peninsula caribou collected for radiation analysis revealed that animals were in generally good condition. These caribou furnish both sport and subsistence hunting. The kill in 1963 was estimated to be about 300; during the first 4 months of 1964 it was extimated to be about 100.

Delta Herd

An aerial survey was made in February 1964 to determine the wintering grounds of the Delta caribou herd. This herd ranges on the north slopes of the Alaska Range from the upper Wood River on the west to the Robertson River on the east. Caribou activity observed in February indicated that most of the animals were ranging in the spruce flats and foothills between the Delta River and Dry Creek. The number of trails observed indicates a general north-south movement between the flats and foothills and the high open ridges and plateaus at the headwaters of the Delta River, Delta Creek, and Little Delta River. The largest concentrations in February were in the foothills and spruce flats between the Delta River and Delta Creek and between Delta Creek and the Little Delta River. Smaller groups were located near the head of the Tatlanika River, in the Tanana Flats between Delta Creek and the Little Delta River, in the high open ridge country in the east and west sides of the Gerstle River, and in the high open ridge country near the Macomb Plateau east of the Johnson River. The herd was estimated to number over 5,000.

Adak Herd

The introduced caribou on Adak, an island in the central Aleutians, were hunted for the first time in 1964. In early 1958 it was decided to introduce caribou to Adak to provide a food source in case of military need and a recreational resource for military personnel stationed there. Calves from the Nelchina herd were released as follows: three males and seven females in 1958 and five males and nine females in 1959. A total of 36 animals, including seven calves, was seen in January 1962. In March 1964, 55 animals were counted. The 1964 hunt was conducted in August. It was planned that ten bulls would be harvested with hunters comprised of Naval personnel chosen by drawing. Weather and lack of adequate transportation so limited hunting effort that only four animals, three bulls and one cow taken by mistake, were killed. Weights, measurements, and detailed autopsy information were not obtained. However, the animals appeared to be exceptionally large, with large antlers, and in excellent condition was determined by heavy fat deposits.

Other Herds

Little specific information was obtained for other herds. Size and kill estimates are presented in Table 6.

Kenai Peninsula Transplant

A caribou transplant to the Kenai Peninsula is being considered as part of the restocking and transplanting work plan. Caribou were native to the Kenai Peninsula but were extirpated about 1913, presumably because of destruction of lichen range, blockage of migration routes and excessive hunting. A reconnaissance of the Kenai Peninsula was made in October by the Caribou Work Plan Leader and Kenai Moose Range Manager for possible transplant sites. Different areas were checked from both the air and the ground. An earlier Fish and Wildlife Service report (1952) indicated that three areas had possibilities for a transplant. These were the Mystery Creek-Chickaloon River area on the Moose Range and Forest Service land, the Tustumena-Skilak Lakes area entirely on the Moose Range, and the Caribou Hills on the Moose Range and on state land.

The Mystery Creek-Chickaloon River area has mountains with extensive lichen growth at the upper elevations. Lower slopes have a fairly dense spruce cover with an excellent lichen understory. Caribou could be transported into the area by ground vehicle or wheel plane. A road which parallels for a distance the natural gas pipeline to Anchorage skirts the base of the mountains on the west and north at between the 400- and 500-foot elevation. There are two airstrips on this road suitable for DC-3 operation. This road would also provide hunter access; the Refuge does not restrict its use.

In the Tustumena-Skilak Lakes area the mountains have extensive covers of fair lichen growth. Below the mountains is a bench land of primarily willow, sedge, and grass, with some spruce and extremely limited lichens. The area below this bench land contains primarily spruce, aspen, and alder, interspersed with open sedge area. There are no roads into the area. Caribou could be transported by amphibious aircraft to Harvey Lake between the Killey and Funny Rivers or to the east shore of Tustumena Lake. Harvey Lake would probably be the best. Hunting pressure in this area would be light since horses which would provide the best means of access are not used to any extent.

The tops of the Caribou Hills have extensive areas of willow

Table 6. Alaska caribou estimated herd size and 1963-64 hunter harvest.

Herd	Area of Alaska	Estimated Herd Size	Hunter Kill				
			Known			Estimated Total	
			No.	Period	Source	1963	1/64-4/64
Alaska Peninsula	Alaska Peninsula	11,000	-	-	-	300	100
Arctic	Northwest	300,000	9,992	10/63-12/63	Villages	20,000	-
Arctic	Northwest	300,000	2,570	1/64-4/65	Villages	-	5,000
Beaver	McGrath	3,000	-	-	-	30	10
Chisana	Wrangell Mts.	3,000	-	-	-	50	10
Delta	Cent.Alaska Range	5,000	-	-	-	50	10
Fortymile	Eastcentral	30,000	264	8/63-10/63	Check stn.	450	50
McKinley	Westcentral	14,000	- 8	6/63-9/63	Check stn.	50	20
Mentasta	Wrangell Mts.	5,000	-	-	-	100	10
Mulchatna	West Alas.Range	5,000	-	8/63-11/63	-	50	10
Nelchina	Talkeetna Mts.	80,000	3,714		Check stn.	6,000	300
Porcupine	Northeast	140,000	-		-	500	200
Total		Approx. 600,000	16,550			Approx. 28,000	Approx. 6,000

mixed with grass (Calamagrostis sp.)and some sedge. A few ridges have moderately dense lichen cover. The slopes of the hills have alder and grass interspersed, and spruce with aspen and birch interspersed at somewhat lower elevations. The Fox River valley, a wide valley of sense spruce, separates the Caribou Hills from the mountains to the east. A possible release site would be Caribou Lake south of the hills. Animals also could be taken in by vehicle on one of the weasel roads which go into the area from the west and south. Most hunter access would probably be by. these same weasel roads, either with vehicles or horses.

Snow conditions were checked at various locations in these three areas on January 19, 1965. This was after a month of fairly cold weather with little or no thawing followed by several days of relatively warm weather with some thawing during the day. Snow depths gradually increased from north to south. Average depths were: 16 inches at airstrips on the pipeline road in the Mystery Creek-Chickaloon area, 19.5 inches at Harvey Lake in the Tustumena-Skilak Lakes area, and 21 inches at Caribou Lake in the Caribou Hills area. Refuge personnel confirmed that the general snow depth pattern is for increasing snow depths going from north to south on the Kenai Peninsula. Snow conditions at all points checked at lower elevations were generally similar with the snow fairly dense and moist and with a thin surface crust. The snow at Timberline Lake in the Tustumena-Skilak Lakes area at the 2,200-foot elevation was windblown and of granular consistency with a 4-inch hard-packed surface layer. Depth varied from about 1 foot to 3 feet because of drifting.

Of the three areas checked, the Mystery Creek-Chickaloon area appears to be somewhat more favorable because of better lichen growth, somewhat better access for hunting, and slightly less snowfall. Also, in the Caribou Hills, hills are separated from high mountain habitat, and increasing human development on the south and west might conflict with an expanding caribou herd.

LITERATURE CITED

Alaska Game Commission. 1952. Investigations to determine feasibility of re-establishing caribou on the Kenai Peninsula. Federal Aid in Wildlife Restoration quarterly progress report, Project W-3-R-7, pp. 60-63. Juneau, Alaska.

Lent, Peter C. and Odd Lønø. 1962. Caribou investigations, northwest Alaska. Unpublished manuscript, Project Chariot, University of Alaska, 40 pp., College, Alaska.

Skoog, Ronald O. 1955-59. Nelchina calving-ground studies. Alaska Game Commission Federal Aid in Wildlife Restoration quarterly progress reports. Juneau, Alaska

_____1963. Statewide caribou distribution. Alaska Department of Fish and Game Federal Aid in Wildlife Restoration job completion report, Project W-6-R-3, pp. 2-14. Juneau, Alaska.

SUBMITTED BY:

Jack Lentfer
Game Biologist

APPROVED BY:

Don H. Strode
Federal Aid Coordinator

James W. Brooks
Director, Division of Game