Alaska Department of Fish and Game
Division of Wildlife Conservation
Federal Aid in Wildlife Restoration
Annual Report of Survey-Inventory Activities
1 July 1988-30 June 1989

MOUNTAIN GOAT

Compiled and edited by
Sid O. Morgan, Publications Technician
Vol. XX, Part VII
Project W-23-2, Study 12.0
May 1990

STATE OF ALASKA
Steve Cowper, Governor

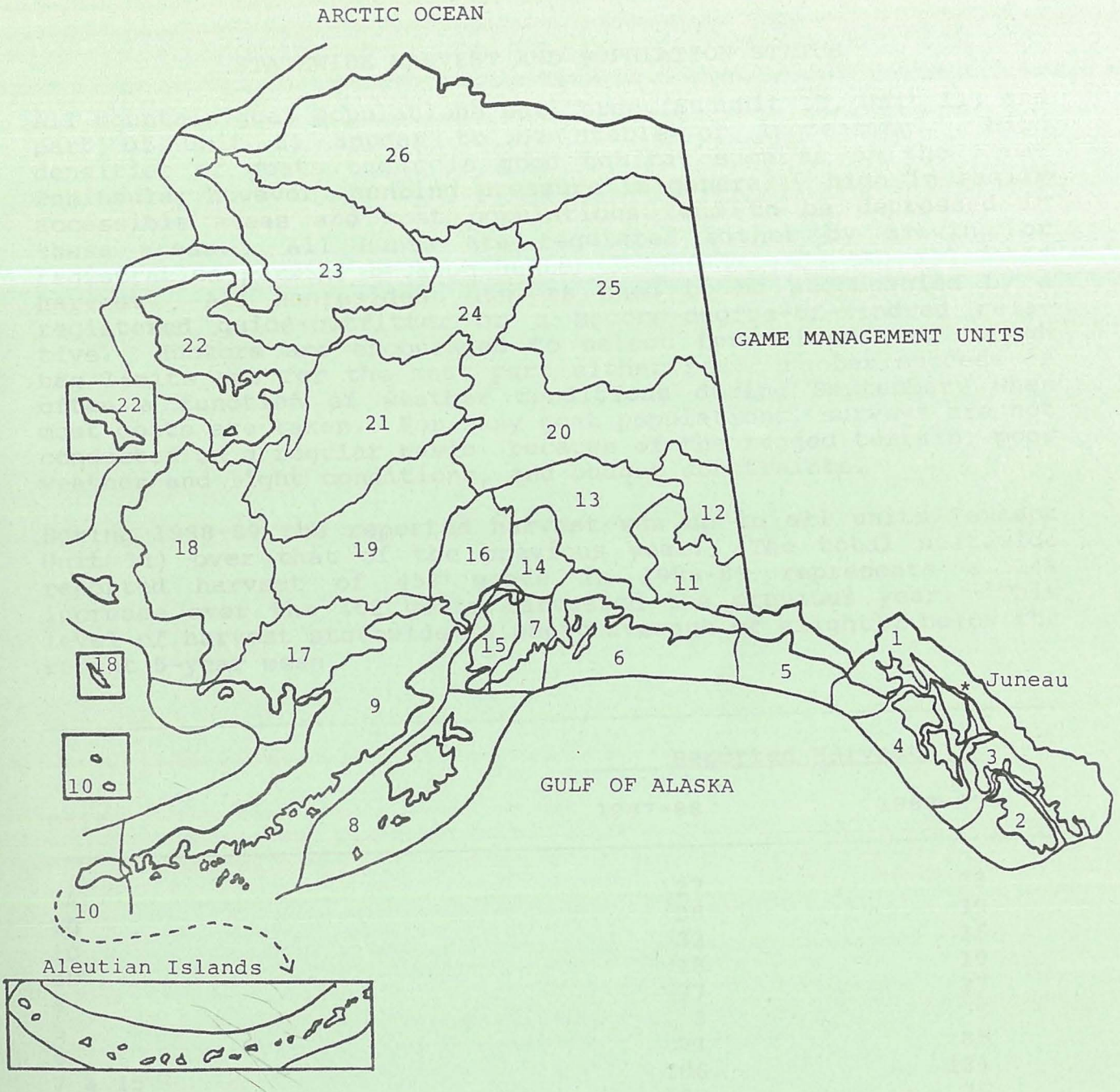
DEPARTMENT OF FISH AND GAME
Don W. Collinsworth, Commissioner

DIVISION OF WILDLIFE CONSERVATION
W. Lewis Pamplin, Jr., Director
W. Bruce Dinneford, Acting Planning Chief

Additional copies of this report, or reports on other species covered in this series may be obtained from:

Publications Technician
ADF&G, Wildlife Conservation
P.O. Box 3-2000
Juneau, AK 99802
(907) 465-4190

TABLE OF CONTENTS


ARCTIC OCEAN
GAME MANAGEMENT UNITS
GULF OF ALASKA
Juneau
Aleutian Islands
26
23
25
24
22
22
21
20
13
12
18
19
16
14
11
7
15
6
5
1
18
17
9
4
3
10
8
2
10

STATEWIDE HARVEST AND POPULATION STATUS

All mountain goat populations but three (Subunit 1D, Unit 11, and part of Unit 6) appear to be stable or increasing. High densities of goats occur in good habitat such as on the Kenai Peninsula; however, hunting pressure is generally high in easily accessible areas and goat populations tend to be depressed in these areas. All hunts are regulated either by drawing or registration permit, because hunter demand exceeds the allowable harvest. All nonresident hunters need to be accompanied by a registered guide-outfitter or a second-degree-of-kindred relative. Hunters are encouraged to select for males, even though bag limits are for the most part either sex. Hunter success is often a function of weather conditions during September, when most goats are taken. For many goat populations, surveys are not conducted on a regular basis because of the rugged terrain, poor weather and light conditions, and budget constraints.

During 1988-89 the reported harvest was up in all units (except Unit 11) over that of the previous year. The total statewide reported harvest of 458 goats in 1988-89 represents a 14% increase over the 402 goats harvested the previous year. This level of harvest statewide is about average or slightly below the recent 5-year mean.

	Reported Harvest	
Unit	1987-88	1988-89
1A	27	33
1B	38	39
1C	32	36
1D	18	19
4	37	37
5	3	5
6	71	85
7 & 15	106	131
8	22	25
11	19	15
13D &14	29	33
Totals	402	458

Steven R. Peterson
Senior Staff Biologist

STUDY AREA

GAME MANAGEMENT UNIT: 1A (5,000 mi^2)

GEOGRAPHICAL DESCRIPTION: Ketchikan area, including mainland areas draining into Behm Canal and Portland Canal.

BACKGROUND

Goat populations in Subunit 1A were at very high levels in the mid- to-late 1960's and at very low levels in the mid-1970's, following a series of hard winters. Since that time, goat populations have increased to high levels, and they have been relatively stable since about 1981. Until recently, goats in Subunit 1A were found only on the mainland. In 1983 seventeen goats were transplanted to Revillagigedo Island, and since that time they have increased in number.

Harvests, which did not change much from 1980 through 1986, have dropped substantially during the last 2 seasons. Very poor weather apparently reduced float plane access to the high-elevation lakes during most of the prime August and September hunting periods.

Nonresidents have taken an average of 38% of the harvest since 1984. Most goats are taken in September, and the harvest is fairly well distributed across the subunit. Aircraft transportation is used by more than 75% of the successful hunters. The remaining hunters use boats.

Comparable fall surveys that have been conducted almost every year since the late 1960's seem to represent population trends well. Limited spring surveys to assess overwinter kid survival were initiated in 1982; they also appear to be fairly accurate in assessing overwinter survival of the young.

POPULATION OBJECTIVES

To maintain goat populations densities above 20 goats per hour of survey time during fall surveys.

METHODS

Up to 9 fall survey areas are counted annually, depending on weather conditions. These survey areas are specific routes flown under comparable conditions from year to year. In the Ketchikan area they are generally flown with a Super Cub in late August or September, in the late evening. The same pilot has flown the surveys since 1968. Goats are classified as either adults or

kids. No effort is made to ascertain sex or distinguish any other age groups.

The spring survey is conducted in April or May with the same plane and pilot or by boat. The same area is counted each year, and it overlaps portions of several fall survey routes. Timing of the surveys is more critical than in the fall, because of changing green-up dates. During the last 2 years, a boat was utilized during the surveys, and goats were observed in slide areas with a spotting scope.

Harvest and hunter information is obtained from hunt reports that are a requirement of the registration permitting process. Compliance is strictly enforced, and reporting exceeds 95%. Data collected include hunter success, area hunted, number of days hunted, date of hunt and harvest, transport methods, and hired services used. Successful hunters may obtain a 2nd permit and are treated as separate hunters for all calculations.

RESULTS AND DISCUSSION

Population Status and Trend

Goat populations appear to have been fairly stable for at least the past 8 years. Fewer fall survey routes have been flown in the past 4 years, and the number of goats observed per hour of flight time has remained about the same. This year, the number of kids:100 adults, which has been declining for the past 5 years, increased to a level comparable to the early 1980's.

The Revillagigedo Island goat herd, transplanted in July 1983, continues to grow. As of May 1985 only 1 known mortality had occurred in 15 radio-collared animals. In September 1988, 43 goats (29 adults, 14 kids) were counted in a little over 1 hour of survey time. At least five of the adults were collared goats from the original release. All goats were within a 6-mile radius of the release site.

Population Size:

Mountain goat population levels are probably closely correlated with goats observed per hour of survey time. Table 1 displays fall survey data since 1968. Table 2 lists individual survey routes and information corrected in 1988. It is not possible to say with certainty what proportion of the goats are seen on a survey, but I believe we see 33% to 50% of the goats present.

Population Composition:

Because of weather conditions, few goats were seen during spring survey. Of the 29 goats observed, 21 were adults, six were kids, and two were unclassified.

The ratio of 29 kids:100 adults is comparable to that for the previous fall survey, suggesting little overwinter mortality.

Mortality

Season and Bag Limit:

There is no open season on Revillagigedo Island. The open season for subsistence, resident, and nonresident hunters in the remainder of Subunit 1A is 1 August to 31 December. The bag limit for all hunters is 2 goats by registration permit only.

Human-induced Mortality:

Goat hunting in Southeast Alaska has been regulated by a registration permit system for 9 years. For the past 7 years, 2nd permits for portions of Subunits 1A and 1B have been available to those hunters who killed a goat and returned their 1st hunting report; 195 and 6 1st and 2nd permits, respectively, were issued from the Ketchikan office for the 1988 season (Table 3). For these calculations, 2nd permit holders are considered as separate hunters. Within Subunit 1A, 99 hunters killed 33 goats (14 males and 19 females) in 363 hunter-days. Success was 33%, and 11.0 hunter days were expended per goat taken; 42% of the harvest was taken by nonresident hunters (Table 4).

The 1988 season was the second-poorest since initiation of the registration permits in 1980. For the 2nd year in a row, weather conditions were so poor during the prime hunting months that many hunters were not able to fly into the alpine lakes where most hunting occurs.

Illegal and unreported harvests are low (Table 5). Virtually all of the hunter reports are returned. Some loss of unretrievable goats occurs, but it is probably low.

The harvest chronology for the past 5 years is shown in Table 6. September and August are the months when most goats are taken. Very few goats are taken in November and December; hunting during these last two months is generally from boats in very poor weather. Most hunters prefer the earlier season, even though the hides are of lower quality.

Table 7 shows the transportation used by successful hunters. Most hunters prefer to fly into high-elevation lakes early in the season. Some hunters use boats after weather conditions make air transportation very difficult late in the season.

The areas sustaining the heaviest harvest were between the Unuk and Chickamin Rivers and from the Chickamin River to Rudyerd Bay; 33% of the 1988 harvest came from each of these areas. Fifteen percent of the goats were taken in the area between Boca de Quadra and Portland Canal, while the area west of Reflection Lake

provided 12% of the harvest. The remaining 6% were taken between the Smeaton Bay and Boca de Quadra areas.

CONCLUSIONS AND RECOMMENDATIONS

The current goat population in Subunit 1A appears to be moderately high and relatively stable. The harvest is low and fairly well distributed over a wide portion of the subunit. The heavy winter snows that occurred last winter at the higher elevations apparently did not cause significant kid mortality.

New state legislation that takes effect 1 July 1989 requires all nonresident goat hunters to be accompanied by a registered guide or an Alaskan resident over 19 years of age within the 2nd degree of kindred. This will probably reduce the goat harvest in this area by 30% to 40%.

The Revillagigedo goat population should be surveyed annually to document range extension and population changes. Spring surveys of the Rudyerd Bay-Walker Cove area should be continued on an annual basis. I recommend that a boat rather than an aircraft be used.

No changes in seasons or bag limits are recommended.

PREPARED BY:

Robert E. Wood
Wildlife Biologist III

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Goat survey data for Subunit 1A, 1968-1988.

Survey[a] dates	No. of kids	No. of adults	Total goats	Kids: 100 adults	Count time (Hrs.)	Goats/ hour
Aug. 20 to Sept. 18, 1968	162	553	715	29	4.92	145
Sept. 13 to Sept. 16, 1971	111	357	468	31	3.88	121
Aug. 16 to Sept. 16, 1973	35	149	184	23	2.50	74
Aug. 27 to Sept. 21, 1974	14	50	64	28	1.83	35
Aug. 12 to Sept. 11, 1975	84	270	354	31	7.63	46
Sept. 1 to Sept. 11, 1976	73	283	356	26	8.01	44
Aug. 31 to Sept. 6, 1977	165	354	519	47	6.33	82
Sept. 5 to Sept. 9, 1978	126	404	530	31	5.17	103
Sept. 18 to Sept. 21, 1979	62	238	300	26	3.78	79
Aug. 20 to Sept. 12, 1980	215	617	832	35	9.63	86
Aug. 26 to Sept. 21, 1981	153	461	614	33	5.98	103
Aug. 29 to Sept. 18, 1982	167	515	682	32	6.87	99
Aug. 30 to Sept. 23, 1983	177	658	835	27	7.55	111
Sept. 5 to Sept. 24, 1984	174	666	840	26	7.09	118
Sept. 12 to Sept. 15, 1986	64	359	423	18	4.05	104
Sept. 23 to Oct. 8, 1987	39	182	221	21	2.03	109
Sept. 3 to Sept. 19, 1988	104	304	408	34	4.37	93

[a] Most comparable data is from 1975-1988

Table 2. Mountain goat composition surveys in Subunit 1A, September 1988.

Area	Date	No. Adults	No. kids	Total goats	Hours of survey time	No. goats observed/hr	Kids:100 adults	Survey rating
K-3	(no survey)							
K-4	3 Sept. 88	17	4	21	0.68	31	24	Good
K-5	7 Sept. 88	93	29	122	1.28	95	31	Fair
K-6	(no survey)							
K-7	(no survey)							
K-8	(no survey)							
K-9	19 Sept. 88	119	46	165	1.28	129	39	Good
K-10	16 Sept. 88	70	23	93	0.93	100	33	Good
K-11	16 Sept. 88	5	2	7	0.18	39	40	Good
Totals		304	104	408	4.35	94	34	

Table 3. Permit hunt harvest data in Subunit 1A, 1984-88.

Hunt No.	Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	M	F	Total
801	1984	261	120	88	53	34	19	53
	1985	261	122	88	51	29	22	51
	1986	244	122	71	51	16	33	51
	1987	195	107	61	27	14	13	27
	1988	201	87	66	33	14	19	33

[a] Number of permits issued from Ketchikan office. Second permit holders are treated as another hunter.

Table 4. Hunter residency and success in Subunit 1A, 1984-88.

	Successful				Unsuccessful			
Year	Local[a] res.	Nonlocal res.	Nonres.	Totals	Local[a] res.	Nonlocal res.	Nonres.	Total
1984	33		20	53	66		22	88
1985	30		21	51	67		21	88
1986	39		12	51	48		23	71
1987	15	0	12	27	44	3	14	61
1988	19	0	14	33	35	0	31	66

[a] Local and non-local resident combined for years 1984-86. Local residents are those persons living in Game Management Unit 1A.

Table 5. Unit 1A. Annual harvest, 1984-88.

Reported Hunter Kill			
Year	M	F	Total
1984	34	19	53
1985	29	22	51
1986	16	33	51
1987	14	13	27
1988	14	19	33

Table 6. Harvest chronology in Subunit 1A, 1984-88, in percent.

Year	Aug	Sept	Oct	Nov	Dec
1984	21	62	11	0	6
1985	14	49	29	0	8
1986	16	59	8	2	16
1987	33	30	22	7	7
1988	24	58	15	3	0

STUDY AREA

GAME MANAGEMENT SUBUNIT: 1B (3,300 mi^2)

GEOGRAPHICAL DESCRIPTION: Southeast mainland from Cape Fanshaw to Lemesurier Point

BACKGROUND

Mountain goats are indigenous to and distributed throughout appropriate habitat in Subunit 1B. The goats primarily inhabit alpine and subalpine areas from spring until fall. During winter, when most of the alpine and subalpine areas are under deep snow, goats use wind-blown or other relatively snow-free slopes where forage is obtainable. The necessity of relatively snow-free areas for obtaining food also results in utilization of adjacent forests and beaches. Limited information suggests overall stability of the goat population since at least 1959, with the notable exception of the late 1960's and early 1970's when severe winter weather probably caused significant reductions in the number of animals. The mild winters from the mid-1970's to the present have presumably reduced natural mortality rates of the goat populations in Subunit 1B, which may be experiencing ideal conditions for population growth. Direct and indirect data are insufficient at this time to make a meaningful estimate of overall goat numbers in Subunit 1B.

Accessibility by hunters dictates the distribution of hunting pressure in Subunit 1B. Accessible areas receive a disproportionate share of harvest and must be closely monitored, while relatively inaccessible areas receive little or no harvest. Average annual harvests during the most recent three 5-year periods beginning with 1974 were 22, 26, and 39 goats, respectively.

POPULATION OBJECTIVES

To maintain an average population density in excess of 20 goats per uniform coding area.

METHODS

Aerial surveys of established trend count areas were conducted to obtain data on the numbers of goats and the proportion of kids. Trend count lines were established to make surveys more consistent from year to year. Harvest was closely monitored through a registration permit system.

RESULTS AND DISCUSSION

Population Status and Trend

The data are insufficient for determing the population trend in Subunit 1B; however, the population is probably stable, and it may be increasing because of the mild winters in recent years.

Population Composition:

The most recent 5 years of age composition data from aerial trend counts are shown in Table 1. Large differences in sample sizes were the result of inclement weather, makeing it difficult and frequently impossible to complete surveys. The survey data do not suggest either an upward or downward trend in production of kids. Annual differences in survey intensity (i.e., minutes/mi^2 search time) and survey methodology make it difficult to interpret indices of goat abundance. Also, lack of information about seasonal movements further complicates meaningful interpretation of the data.

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters for all of Subunit 1B is 1 August to 31 December. The bag limit for that portion of Subunit 1B between the Muddy River LeConte Bay, is 1 male (billy) goat by registration permit only. The bag limit for the remainder of Subunit 1B is 2 goats by registration permit only.

Human-induced Mortality:

The 1988 harvest of 39 goats was equal to the 5-year average (1984-1988), which was substantially higher than the 2 previous 5-year periods of 26 and 22. The data in Table 2 suggest a stabilizing of the harvest. Males composed 72% of the harvest, representing a change from the previous 3 years (i.e., 42% males) and contrasting sharply with 1984 (i.e., 24% males). The billies only hunt at Horn Cliffs contributed 6 males, compared with none in the previous year. Most permit holders were given information to help them identify a male goat and were encouraged to take only males.

Hunter Residency and Success. The number of successful non-residents increased for the 4th year. Local and nonlocal resident success remained about the same. Only local residents were successful in Horn Cliffs. Permit data is shown in Table 4. The number of hunters in Subunit 1B has remained relatively constant during the past 5 years, varying from 101 to 118. Other harvest parameters also suggest relative stability during the past 5 years. The number of hunters at Horn Cliffs more than

doubled from 15 in 1987 to 34 in 1988, and the harvest increased from zero to six.

Harvest Chronology. The harvest chronology data in Table 5 show that September was the most important goat hunting month. August was the second most important. After September, the weather usually determines hunter activity and success, with enough snow before the end of December in some years to drive the goats to low elevation and easier access.

Transport Methods. Transportation methods in Subunit 1B (Table 6) remained relatively stable during the most recent 5-year period.

Game Board Actions and Emergency Orders

No Emergency Orders were issued during the past 5 years; however, 3 regulatory changes, occurred. The bag limit for Subunit 1B (including all of the Cleveland Peninsula) was increased from 1 to 2 goats for the 1984 season, and it has remained in effect. The regulation was changed because hunting pressure was light and goat populations were healthy. The 2nd regulatory change instituted a bag limit of 1 male goat only for the Horn Cliffs area (Hunt No. 807), effective for the 1987 and 1988 seasons. The 3rd regulatory change removed the male only restriction from the Horn Cliffs area and prohibited the harvest of kids or females accompanied by kids. The 1-goat bag limit was retained.

CONCLUSIONS AND RECOMMENDATIONS

Goat populations appear to be stable or increasing slightly in Subunit 1B. New legislation (i.e., effective 1 July 1989) requires all nonresident goat hunters to be accompanied by a guide. This will probably reduce the number of nonresident goat hunters, at least in the short term.

Although few hunters kill the 2nd goat allowed in Hunt No. 801, hunting pressure is concentrated in areas of easy access. The 2nd allowable goat puts additional pressure on these accessible populations. I recommend that the bag limit for Hunt No. 801 be reduced to 1 goat, making it consistent with the rest of Southeast Alaska. Because there are presently 13 separate registration hunts in Region I, I recommend that a single permit be issued for hunting goats in Region I. Should a hunter wish to hunt near a boundary or have an opportunity during the season to hunt in different areas, he must have in possession a permit from each area. By reducing the bag limit to 1 goat and issuing 1 permit, we could greatly reduce the burden on the hunter without losing any of the benefits of the permit system.

PREPARED BY:

Charles R. Land
Wildlife Biologist I

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Mountain goat age composition in Subunit 1B, 1984-88.[a]

Date	No. adults	No. kids	Total goats	Kids:100 adults	% kids
1984	438	130	568	30	23
1985	69	5	74	7	7
1986	78	22	100	28	22
1987	138	43	181	31	24
1988	141	42	183	30	23

[a] Survey areas for each year are not equal, therefore total numbers are not comparable.

Table 2. Reported mountain goat harvest in Subunit 1B, 1984-88.

Year	Reported Hunter Kill			Total
	M	F	Unk	
1984	10	32	0	42
1985	14	19	0	33
1986	17	24	0	41
1987	16	22	0	38
1988	28	10	1	39[a]
	Horn Cliffs			
1988	6	0	0	6

[a] Includes Horn Cliffs.

Table 3. Hunter residency and success for goat hunting in Subunit 1B, 1985-88.

Date	Successful				Unsuccessful			
	Loc. res.[a]	Nonloc. res.	Non-res.	Total	Loc. res.	Nonloc. res.	Non-res.	Total
1985	10	15	8	33	35	32	12	79
1986	16	16	9	41	50	8	9	67
1987	19	8	11	38	21	13	14	48
1988	25	1	13	39	5	13	15	79
				Horn Cliffs				
1988	6	0	0	6	32	1	1	34

[a] Local residents are those Alaskans living in Petersburg and Wrangell.

Table 4. Permit issuance data for goat registration hunt numbers 801 and 807[a] (Horn Cliffs) in Subunit 1B, 1984-88.

Date	Permits issued	No. of hunters	Successful	% successful
1984	169	104	42	40
1985	202	112	33	29
1986	195	109	41	38
1987	171	86	38	44[a]
1988	236	118	39	33
		Horn Cliffs		
1988	81	34	6	18

[a] Includes Horn Cliffs.

Table 5. Chronology of goat harvest in Subunit 1B, 1984-88.

	Aug.		Sep.		Oct.			Nov.		Dec.	
	M	F	M	F	M	F	U	M	F	M	F
1984	4	2	5	15	1	10		0	0	0	2
1985	3	5	8	8	1	2		1	2	1	2
1986	7	6	7	15	2	1		1	1	0	1
1987	0	7	4	10	12	3		0	2	0	0
1988	7	1	13	5	3	2	1	2	1	3	1

Table 6. Transportation means of successful goat hunters in Subunit 1B, 1984-88.

Year	Airplane	Boat	ORV
1984	27	15	0
1985	18	15	0
1986	26	15	0
1987	27	9	2
1988	21	18	0

STUDY AREA

GAME MANAGEMENT UNIT: 1C (6,500 mi^2)

GEOGRAPHICAL DESCRIPTION: The Southeast Alaska mainland and the islands of Lynn Canal and Stephan's Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay.

BACKGROUND

Mountain goats probably arrived in Southeast Alaska from southern refugia sometime after the retreat of Pleistocene glaciation. (Chadwick 1983) Because mountain goats utilize alpine and subalpine zones in the summer and the upper reaches of the coniferous forests in the winter, the coastal mountains of British Columbia and Alaska have promoted range expansion rather than acting as a barrier. Mountain goats now inhabit most of the coastal range of Southeast Alaska where the steep forested slopes broken by rock outcrops, which are important components of their winter range, are common.

A popular species for local hunters and hunters from around the world, mountain goat populations in easily accessed areas near Juneau have been reduced significantly from historical high numbers. In the immediate vicinity of Juneau, goat populations may have been reduced to low numbers early in this century as mining activity increased. Hunting of already depleted populations contributed to further declines. Low goat numbers prompted the Board of Game's decision to close that the area between Taku Glacier and Eagle River to hunting in 1985.

POPULATION OBJECTIVES

To maintain goat population densities that result in the observation of at least 30 goats per hour during fall surveys in the Eagle and Antler River drainages and in the Chilkat Range north of the Endicott River and 50 goats per hour in the area south of Taku Inlet.

To retain the existing closure of the Chilkat Range south of the Endicott River until surveys reveal at least 80 goats in the area between William Henry Mountain and Tear Drop Lake.

METHODS

Harvest data were obtained from registration permit returns for the 1988 fall hunt. Weather prevented aerial surveys in most of

the subunit. The Chilkat Peninsula below the Endicott River and the area between the Taku and Eagle River Glaciers on the Juneau mainland were surveyed on 17 and 15 August 1988, respectively.

RESULTS AND DISCUSSION

Population Status and Trend

Survey data suggests that the goat populations of both closed areas, the Chilkat Peninsula below Endicott River and the Juneau mainland between Taku and Eagle River Glaciers are stable at low levels and have not rebounded despite hunting closures. The population of each area is probably about 100 goats.

Success rates and harvest per unit effort for the remainder of the unit suggest at least stable populations. The success rate of 45% for 1988 goat hunters was an increase over the 32% success rate in 1987 and above the 5-year mean of 40%. The average number of days required to bag a goat, which had steadily increased through the early 1980's to a high of 3.6 in 1987, dropped to 2.6 days in 1988. The proportion of females in the harvest continued to increase. Nannies represented 58% of the known sex harvest; however, because of the difficulty of identifying sex in the field, this parameter may not be a reliable indicator of population status.

A reintroduction of mountain goats to Mount Juneau is planned for late summer of 1989. Funding for the project has been made available through efforts of the Juneau Chapter of the Audubon Society. Goats are expected to come from either the Whiting River area, some 50 miles south of Juneau, or from the Olympic Peninsula in the state of Washington. The Washington animals are part of a goat reduction effort currently being carried out by the National Park Service. The proposed Mount Juneau reintroduction, if successful, will provide animals for viewing and form the nucleus of a breeding population that should contribute to the repopulation of the larger area currently closed to hunting.

Mortality

Season and Bag Limit:

There is no open season in that portion of Subunit 1C draining into Stephens Passage and Taku Inlet between Eagle Glacier and River and Taku Glacier and all drainages of the Chilkat Range south of the Endicott River drainage. The open season for subsistence, resident, and nonresident hunters in that portion of Subunit 1C draining into Lynn Canal and Stephens Passage between Antler River and Eagle Glacier and River is 1 October to 30 November. The bag limit is 1 goat by registration permit only. The open season for all hunters in the remainder of Subunit 1C is

1 August to 30 November. The bag limit is 1 goat by registration permit only.

Human-induced Mortality:

The harvest reported during the 1988 hunting season is summarized in Table 2. A total of 36 goats were harvested this year in Unit 1C; it was composed of 14 males, 19 females, and three of unknown sex. This total harvest was the same as the mean harvest of the previous 5 years.

Hunter Residency and Success. Thirty of the goats harvested in 1987 were taken by local residents, three by nonlocal residents, and three by nonresidents (Table 3). Approximately 43% of the local residents that hunted were successful, compared with success rates of 60% and 50% for nonlocal residents and nonresidents, respectively. There is no apparent trend in nonresident or nonlocal resident participation in these hunts or in success rates.

Permit Hunts. This is the 1st year in which the permit hunt areas (i.e., Nos. 802 and 803) were covered by 1 permit. A total of 169 permits were issued. (Table 4).

Harvest Chronology. The November harvest of 15 goats (42% of the total) was again the largest of the four-month season. The remainder of the harvest was evenly spread over August, September, and October. The preponderance of harvests late in the season reflected hunters' desires to take a goat in prime winter pelage.

Transport Methods. Table 6 depicts the transportation methods for successful hunters. Most hunters continue to use boats to reach hunting areas. A few use airplanes and highway vehicles.

Natural Mortality:

There are little data available concerning natural mortality. Holroyd (1967) cited several instances of goats being killed in falls, rock slides, and avalanches. Up to 50% of the deaths of radio-collared goats in a study conducted near Haines, Alaska were attributed to falls. (Hundertmark et al. 1983)

Many wolf fecal samples collected between Eagle River and the Mendenhall Glacier in the early 1980's contained goat hair, but whether they had been killed or scavenged could not be determined (ADF&G files). There were several reports of wolf packs traveling through alpine areas in close proximity to goat herds during the spring, a time when kids are most vulnerable. Within a 2-week period centered around the peak of kidding, wolf activity was reported near Berners Bay, on the Chilkat Peninsula, and on the north side of Taku Inlet; all were in close proximity to kidding goats.

Habitat Assessment

Winter and summer goat ranges within Subunit 1C are extensive. Goat numbers in most of the subunit are well below carrying capacity, with the possible exception of the Tracy and Endicott Arm areas.

Some loss of critical winter range could be expected, if proposed mining projects in Berners Bay, Chilkat Peninsula, and Sheep Creek area move forward. The Sheep Creek proposal may have the most impact in the near term. The damming of a large portion of the valley as a tailings disposal site would cause direct loss of potential winter range. This area may currently be utilized by the largest remaining group of goats in the Eagle River-Taku Glacier closed area. In addition to habitat loss, related mining activity could further limit use of the valley by wintering mountain goats.

Timber harvest is also planned in the area between Juneau and Taku Inlet. A selective cutting, helicopter operation is scheduled for the Rhine and Grindstone Creek areas in the summer of 1989. This area also provides potential winter range for the 60 to 70 goats that inhabit the ridges between Sheep Creek and Taku Inlet.

CONCLUSIONS AND RECOMMENDATIONS

Intensive aerial surveys should be conducted in the coming year to determine population composition and status for the subunit. Predation by wolves or bears should be considered a probable limiting factor in both of the closed areas. The low kid:adult ratios observed in these areas indicate either low reproductive rates or poor kid survival. Given the reported wolf activity near goat groups in the spring, the role of predation in the recovery of depressed goat populations should be investigated. Direct observation of goats during the kidding and immediate postkidding period should be attempted in the spring of 1990 in an effort to determine natality rates as well as kid mortality rates and causes.

Wolf predation has been shown to limit the growth of low-density ungulate populations. (Boertje et al. 1987) Methods used in Alaska and elsewhere to reduce wolf mortality have included direct removal of predators and diversionary feeding during critical calving or kidding periods. The addition of goats to a depressed population may be an additional method of decreasing population recovery time. The Mount Juneau goat reintroduction project may be a way of testing this hypothesis.

Easily accessed areas are receiving increasing hunting pressure in relation to the unit as a whole. For this reason, finer-scale management of goat populations is being considered for northern Southeast. A reversal of the trend to administer 2 or more

permit hunt areas under 1 permit is likely in 1989. Finer-scale management will allow monitoring of harvest pressure in discrete areas within permit hunt boundaries.

The Division of Wildlife Conservation should continue to direct hunting pressure away from females. Hunters will be encouraged to select for billies through educational materials provided to all goat hunters. Harvest quotas established for discrete portions of the permit hunt areas, will be in place for the 1989 season in Subunit 1C. Harvested billies and nannies will be assigned values of 1 and 2 points respectively, and nannies two points in comparing the harvest to the quota.

LITERATURE CITED

Boertje, R.D., W.C. Gasaway, D. V. Grangard, D.G. Kellyhouse, and R.O. Stephenson. 1987. Factors limiting moose population growth in Subunit 20E. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Juneau. 86 pp.

Chadwick, D.H. 1983. A beast the color of winter. Sierra Club Books. San Francisco, Calif. 208 pp.

Holroyd, J. C. 1967. Observations of rocky mountain goats on Mount Wardle, Kootenay National Park, British Columbia. Can. Field-Nat. 81:1-22.

Hundertmark, K.J., W.L. Eberhardt, and R.E. Ball. 1983. Winter habitat utilization by moose and mountain goats in the Chilkat Valley. Alaska Dep. Fish and Game. Haines-Klukwan Coop. Res. Study. Juneau. 47 pp.

PREPARED BY:

Thomas M. McCarthy
Wildlife Biologist II

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Mountain goat composition counts in Subunit 1C, 1983-88.

Year	Kids	Adults	Kids: 100 adults	Total goats	Goats /hr.
1984	31	129	24	160	43
1985	75	260	28	335	140
1986	55	192	22	247	42
1987	--	--	--	--	--
1988[a]	26	81	32	107	26

[a] Surveys limited due to weather, not representative of entire Unit.

Table 2. Mountain goat harvest by sex in Subunit 1C, 1983-88.

Year	Males	Females	Unknown	Total
1984	15	14	0	29
1985	19	16	0	35
1986	33	10	0	43
1987	15	16	1	32
1988	14	19	3	36

Table 3. Hunter residency and success in Subunit 1C, 1983-88.

	Successful				Unsuccessful			
Year	Local[a] res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1984	15	5	9	29	40	11	3	54
1985	28	1	6	35	35	2	12	49
1986	35	7	1	43	32	6	4	42
1987	25	3	4	32	52	3	13	68
1988	30	3	3	36	39	2	3	44

[a] Local residents are residents of Unit 1C.

Table 4. Harvest data by permit hunt in Subunit 1C, 1983-88.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unknown	Total
802	1983	29	21	7	1	0	1	0	1
	1984	33	21	17	4	2	2	0	4
	1985	46	30	16	0	0	0	0	0
	1986	55	37	12	6	5	1	0	6
	1987	52	34	15	3	0	3	0	3
803	1983	203	109	53	41	23	17	1	41
	1984	169	107	37	25	13	12	0	25
	1985	156	88	33	35	19	16	0	35
	1986	163	97	29	37	28	9	0	37
	1987	163	81	53	29	15	13	1	29
802 803[a]	1988	169	89	44	36	14	19	3	36

[a] Beginning in 1988 Hunt Nos. 802 and 803 were administered under one permit.

Table 5. Harvest chronology in Subunit 1C, 1983-88.

Year	Aug	Sept	Oct	Nov
1984	4	9	6	10
1985	4	5	4	22
1986	6	11	2	18
1987	9	2	7	14
1988	6	7	8	15

Table 6. Successful hunter transport methods in Subunit 1C, 1983-88.

	Percent		
Year	Airplane	Boat	Highway Vehicle
1984	11	18	0
1985	7	28	0
1986	15	25	3
1987	11	21	0
1988	5	26	2

STUDY AREA

GAME MANAGEMENT UNIT: 1D (2,600 mi^2)

GEOGRAPHICAL DESCRIPTION: That portion of the Southeast Alaska mainland lying north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay.

BACKGROUND

There are 3 separate registration permit hunt areas (Nos. 804, 805, and 806) in Subunit 1D. Hunt area No. 804 is the smallest of the 3 areas; it is bounded by the Taiya River, Yukon and White Pass Railroad, and the Canadian border. This area was closed to hunting by Game Board action in 1984 because of an apparent sharp decline in goat numbers, (i.e., fewer sightings), reduced hunter success, and a greater proportion of females in the harvest. Aerial composition counts conducted between 1983 and 1987 suggested that the population in hunt area No. 804 has not stabilized despite the closure. In the rest of the subunit, mountain goat populations in the 1980's have remained below those of the late 1960's and 1970's.

Hundertmark *et al.* (1983) examined mountain goat winter habitat utilization in the Chilkat Valley. They felt that increased access afforded by road construction related to timber and mineral development would result in increased hunting pressure and illegal harvests. This added hunting pressure and the ability to access previously unhunted areas were detrimental to goat populations because of the habitat loss resulting from logging and mining.

POPULATION OBJECTIVES

To increase population to 100 animals in Skagway.

To increase estimated population from 600 to 1,000 goats and maintain hunter success of 25% in Haines North.

To increase estimated population from 300 to 500 goats and maintain hunter success of 25% in Haines South.

METHODS

Poor weather throughout the late summer and fall prevented aerial surveys during this reporting period. Harvest information was

jointly determined for area Nos. 805 and 806 by using a single registration permit for both hunts.

RESULTS AND DISCUSSION

Population Status and Trend

The limited available survey data suggest goat numbers have decreased in easily accessed areas and hunting pressure has been heavy. Despite being closed to hunting since 1987, hunt area No. 804 has shown no population increase. Other areas in Subunit 1D and northern Southeast have also exhibited similar low growth rates, even after several years of hunting closures.

Population Size:

Conservative estimates based on previous survey data suggest minimum populations of 520 goats in hunt area No. 805 and 160 goats in No. 806. The population of hunt area No. 804 has probably declined from more than 150 animals in 1981 to between 40 and 60 goats. The total Subunit 1D population probably numbers about 730 goats.

Mortality

Season and Bag Limit:

There is no open season in that portion of Subunit 1D lying east of Taiya Inlet and River between the Chilkoot Trail and the White Pass and Yukon Railroad. The open season for subsistence, resident, and nonresident hunters for that portion of Subunit 1D lying north of the Katzehin River and east of the Haines Highway is 15 September to 30 November. The bag limit is 1 goat by registration permit only. The open season for all hunters for the remainder of Subunit 1D is 1 August to 31 December. The bag limit is 1 goat by registration permit only.

Human-induced Mortality:

A total of 19 goats were harvested in Subunit 1D in 1988. Of these, nine were males and 10 were females. The total harvest of 19 animals was similar to that for 1987 and somewhat below the 5-year mean of 23.

Hunter Residency and Success. Hunters were issued 168 registration permits for hunt Nos. 805 and 806 in 1988 (Table 4); 25% of the 76 who hunted were successful. The mean success rate for the previous 5-year period was 26%.

Most of the participating hunters (72%) were residents of Subunit 1D. Other hunters were Alaska residents (18%) or nonresidents (9%). Eighty-five percent of the nonresidents were successful, while only 22% of the local residents and 7% of nonlocal

residents reported taking goats (Table 3). The proportion of nonresidents taking advantage of guiding services is not known.

Harvest Chronology. Goats can be hunted in Subunit 1D from the 1 August until 31 December; however, no goats were taken during August or December in 1988. The harvest of 10 goats in September represented 53% of the total, while 5 goats (26%) were harvested in October and four (21%) in November (Table 5).

Transport Method. Successful hunters used boats, highway vehicles, and other means in almost equal proportions (Table 6).

CONCLUSIONS AND RECOMMENDATIONS

The lack of current survey data makes it difficult to assess population trends and status; however, based on available data, it does not appear that population objectives are being met in any of the 3 hunt areas. With the closure of hunt area No. 804 in 1987, some pressure has been transferred to area No. 805 and has been concentrated near sites of easy access. Although goat numbers in this area appear to be near target levels, local declines may occur if current hunting strategies continue. The goal of a 25% hunter success rate is currently being met unit-wide.

To address the problems associated with concentrated hunting pressure, harvest guidelines for discrete populations within the hunt areas will be established for internal use before the 1989 season. Ridge systems will be used as geographical divisions. An effort will be made to conduct complete aerial surveys of the subunit. Using a 5% harvest level, quotas will be determined for each ridge system. Hunters will be encouraged to take males and to ensure that adequate females remain in the population, females taken by hunters will be weighted more heavily in harvest calculations.

Goats in Subunit 1D will be managed on a finer scale in 1989. The 2 currently open hunt areas (Nos. 805 and 806) will be further subdivided and administered with multiple permits, to facilitate more accurate harvest monitoring and enable timely season closures should they become necessary. Closures may be required to avoid excessive harvest in areas where hunting pressure is concentrated.

LITERATURE CITED

Hundertmark K. J., W. L. Eberhardt, and R. E. Ball 1983. Winter habitat utilization by moose and mountain goats in the Chilkat Valley. Alaska Dept. of Fish and Game. Final report for the Haines-Klukwan Cooperative Resource Study. 44pp.

Schoen J. W. and M. D. Kirchhoff. 1982. Habitat use by mountain goats in southeast Alaska. Final Rept. Fed. Aid. Wildl. Restor. Proj. W-17-10, W-17-11, W-21-1, W-21-2, Job 12.4R. Alaska Dept. of Fish and Game, Juneau. 67pp.

PREPARED BY:

Thomas M. McCarthy
Wildlife Biologist II

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Mountain goat composition counts, by hunt area in Subunit 1D, 1984-88.

Area	Year	No. of kids	No. of adults	Kids:100 adults	Total goats	Count time (hrs)	Goats/ hr
804	1984	13	27	48	40	1.1	36
	1985	3	29	10	32	1.3	26
	1986	No survey					
	1987	0	7	0	7	0.7	11
	1988	No survey					
806	1984	No survey					
	1985	13	41	32	54	0.8	69
	1986	No survey					
	1987	4	14	29	18	1.6	11
	1988	No survey					

Table 2. Mountain goat harvest by sex in Subunit 1D, 1984-88.

Year	Males	Females	Unknown	Total
1984	12	18	0	30
1985	10	5	0	15
1986	9	13	3	25
1987	8	9	1	18
1988	9	10	0	19

Table 3. Hunter residency and success in Subunit 1D, 1984-88.

	Successful				Unsuccessful			
Year	Local res.[a]	Nonlocal res.	Nonres.	Total	Local res.[a]	Nonlocal res.	Nonres.	Total
1984	28	1	1	30	72	6	8	86
1985	11	4	0	15	46	21	2	69
1986	21	2	2	25	40	10	4	54
1987	9	7	2	18	39	8	5	52
1988	12	1	6	19	43	13	1	57

[a] Local residents are those persons living in Haines, Klukwan, or Skagway.

Table 4. Harvest data by permit hunt in Subunit 1D, 1984-88.

Hunt No.[a]	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unknown	Total
805	1984	198	118	55	25	10	15	0	25
806	1984	138	102	31	5	2	2	1	5
805/ 806[b]	1985	165	81	69	15	10	5	0	15
	1986	143	64	54	25	9	13	3	25
	1987	169	99	52	18	8	9	1	18
	1988	168	92	57	19	9	10	0	19

[a] Hunt area No. 804 was closed to hunting after the 1983 season
[b] A single permit was used for hunt areas Nos. 805 and 806 beginning in 1985.

Table 5. Harvest chronology in Subunit 1D, 1984-88.

Year	Aug	Sept	Oct	Nov	Dec
1984	1	19	5	11	2
1985	0	5	5	4	1
1986	0	9	13	2	1
1987	1	6	6	4	1
1988	0	10	5	4	0

Table 6. Successful hunter transport methods in Subunit 1D, 1984-88.

Year	Boat	Highway vehicle	Other
1984	18	7	4
1985	8	4	3
1986	9	15	1
1987	12	4	2
1988	6	7	6

STUDY AREA

GAME MANAGEMENT UNIT: 4 (5,700 mi^2)

GEOGRAPHICAL DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent islands

BACKGROUND

In Unit 4 a huntable population of mountain goats is found only on Baranof Island (Permit Registration Hunt Area No. 815). The population is the result of a 1923 transplant of 18 goats from Tracy Arm on the Southeast Alaska mainland. Forty-one goats were observed on Baranof Island in 1937, and the first hunting season was held in 1949 (Burris and McKnight 1973). Average annual goat harvests on Baranof Island have varied from 28 to 75 animals since the registration permit system was implemented in 1976.

Chichagof Island, immediately north of Baranof Island, was also the recipient of transplanted mountain goats. A total of 25 goats was released there by the U.S. Fish and Wildlife Service in the mid-1950's (Burris and McKnight 1973). Sightings have been reported sporadically since 1957 (ADF&G files, Sitka). The latest recorded sighting was in 1978, when a professional guide reported seeing 10 goats near Stag Bay on western Chichagof Island (Johnson 1981). While no other sightings have been reported, it is possible that a small herd of goats still exists in a remote area on the island. Other than humans, the only potential predators present on the two islands are brown bears and the bald eagles, which have been suspected of goat predation elsewhere (Chadwick 1983).

Admiralty Island has no mountain goat populations, and I have found no references to goats occurring there in historic records. There are no other goat populations in Unit 4.

POPULATION OBJECTIVES

To maintain a population sufficient to provide an annual harvest of at least 35 goats.

To maintain a mountain goat population sufficient to provide an annual hunter success rate of at least 25%.

METHODS

Goat hunting registration permits have been required in Unit 4 since 1976. Registration permits are free and unlimited. An average of 146 permit holders have hunted annually since 1976. Successful and unsuccessful permit holders are required to report

goat kills within 10 days of the harvest and 15 days of the close of the season, respectively. A helicopter survey was conducted on the northern portion of Baranof Island in the fall of 1988.

RESULTS AND DISCUSSION

Population Status and Trend

Goats on Baranof Island have been surveyed by helicopter in recent years. A triennial survey schedule was established in 1982. The 1988 survey was conducted on 17 August and 19 September (Table 1), and the goat population appeared to be increasing. Only a portion of the goat habitat was surveyed, because much of the goat range is inaccessible to hunters (Johnson 1987) and the expense of helicopter surveys (>$500 per hour). A Jet Ranger helicopter with two observers was used. During the survey, 523 goats were counted and classified north of Blue Lake, compared with 534 in 1985 north of Lake Diana (Johnson 1987). Lake Diana is approximately 14 miles southeast of Blue Lake, suggesting an increasing population in that portion of Baranof Island.

Population Composition:

During the 1988 survey, kids composed 22% of the population (28 kids:100 adults), compared with 14% (17 kids:100 adults) during the 1985 aerial survey. Regulations do not prohibit the taking of kids or nannies. Billies tend to be solitary during hunting season, while kids and nannies are gregarious. Females and young goats in groups are more likely to be spotted by hunters. In 1988, 22 (59%) of the goats killed were males and 15 (41%) were females. In 1987, 20 (54%) were males and 16 (43%) were females (Young 1988).

There was no legal requirement for hunters to present horns for examination, but hunters were encouraged to submit horns for measurement and age determination. The average age of 24 goats harvested in 1988 was 7.4 years for females (n = 8) and 3.8 years for males (n = 16), compared with 5.3 years for males and 4.4 years for females in 1987 (Young 1988).

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters is 1 August to 31 December. The bag limit is 1 goat by registration permit only.

Human-induced Mortality:

Hunters harveted a total of 37 mountain goats, equalling that for 1987 (Table 2). This represents 7% of the observed 1985

population of 534 goats. This harvest appears to be conservative, especially considering that not all of the goats were seen by surveyors.

Three hunting areas provided over half of the harvest. Katlian Mountain, which is accessible from the Sitka road system and by hiking from salt water, provided 24% of the goats taken. The area around Rosenburg Lake, a popular fly-in hunting area, accounted for 19% of the kill, while Cold Storage Lake provided 11% of the harvest.

Hunter Residency and Success. Alaska residents accounted for 25 (68%) of the goats harvested in Unit 4; nonresident hunters took 12 (32%). Eighty-two percent of all permit holders listed Sitka as their place of residence. Twenty (54%) of the Alaska hunters who killed goats in 1987 were Sitka residents; three (8%) were residents of Port Alexander; and two (5%) were from Fairbanks. Hunter residency since 1984 is given in Table 3.

Successful hunters expended 3.2 days on the average to harvest a goat in 1988, compared with 2.8 days in 1987 (Young 1988). This variation may be due to weather or other factors unrelated to changes in the goat population. Of the 123 permit holders who actually hunted, 37 (30%) were successful and 86 (70%) were unsuccessful (Table 4). All but 2 permit reports were returned.

Harvest Chronology. The winter of 1988-89 was colder than the average for the decade. Snow persisted later than usual, and this may have affected the harvest. A total of 33% of the goats harvested were taken in September, 27% in December, 24% in October, and 16% in August. None were taken in November (Table 5).

Transport Methods. Boats were used more than any other transportation means by Unit 4 mountain goat hunters. A total of 59% listed boats as their transportation method, 25% of the hunters used airplanes, and 14% walked into the hunting area from the Sitka road system (Table 6).

CONCLUSIONS AND RECOMMENDATIONS

The mountain goat population objectives for Unit 4 are to maintain an annual harvest of at least 35 goats and a hunter success rate of at least 25%; both objectives were met during 1988. Hunters harvested a total of 37 mountain goats in Hunt Area No. 815. Thirty percent of the hunters who actually hunted were successful. The goat season in Unit 4 lasts for 5 months to allow for the poor weather conditions that can frustrate efforts to hunt goats. If funding permits, goats should be surveyed to determine the effects of the winter on kid survival. Accessible areas should be monitored to ensure that overharvesting does not occur.

LITERATURE CITED

Burris, O. E., and D. E. McKnight. 1973. Game transplants in Alaska. Alaska Dep. Fish and Game. Tech. Bull. No. 4. Juneau. 57pp.

Chadwick, D. H. 1983. A beast the color of winter-the mountain goat observed. Pages 84-86. Sierra Club Books. San Francisco. 208pp.

Johnson, L. J. 1981. Mountain goat survey-inventory progress report. Pages 59-62 in R. A. Hinman, ed. Annual report of survey inventory activities. Part III. Bison, Caribou, Mountain Goat, Muskoxen, and Sheep. Vol. XI. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-17-12. Job 12. Juneau. 116pp.

Johnson, L. J. 1986. Mountain goat survey-inventory progress report. Pages 20-23 in B. Townsend, ed. Annual report of survey inventory activities. Part VII. Mountain Goat. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 12.0. Juneau. 39pp.

Johnson, L. J. 1988. Mountain goat survey-inventory progress report. Pages 19-24 in S. O. Morgan, ed. Annual report of survey inventory activities. Part VII. Mountain Goat. Vol. XVIII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-6. Job 12. Juneau. 53pp..

Young, E. L. 1989. Mountain goat survey-inventory progress report. Pages 31-39 in S. O. Morgan, ed. Annual report of survey inventory activities. Part VII. Mountain Goat. Vol. XIX. Alaska Dep. Fish and Game. Fed Aid in Wildl. Rest. Prog. Rep. Proj. W-23-1. Job 12. Juneau. 112pp..

PREPARED BY:

E. L. Young
Wildlife Biologist III

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Mountain goat survey data in Unit 4, 1979-1988.

Date	No. kids	No. adults	Unknown	Total goats	Kids:100 adults	Goats/ hour	Observer	Aircraft type
Aug 1979[a]	76	321	0	397	24	80	Johnson-ADF&G	Hughes 500 helicopter
Aug 1980[b]	106	367	0	473	29	71	Johnson-ADF&G	Alouette II helicopter
Sep 1982[c]	84	422	0	506	20	77	Johnson-ADF&G	Alouette II helicopter
Sep 1985[b]	76	458	0	534	17	69	Johnson-ADF&G	Jet Ranger helicopter
Aug-Sep 1988[d]	114	403	6	523	29	101	Young-ADF&G	Jet Ranger

[a] North of Medvejie Lake - Baranof River only.
[b] North of Lake Diana only.
[c] North of Vodopad River only.
[d] North of a line from Blue Lake to the southernmost tip of the South Arm of Kelp Bay.

Table 2. Mountain goat harvest data in Unit 4, 1984-1988[a].

Year	Reported Harvest				Estimated total harvest
	M	F	U	Total	
1984	34	15	0	49	49
1985	18	18	6	42[b]	42[c]
1986	28	22	0	50	50
1987	20	16	1	37	37
1988	22	15	0	37	37

[a] Some data is different than listed in previous S & I reports; data from past years was updated when entered into computer database, fall 1987.
[b] Includes 6 goats that were reported killed but not retrieved.
[c] One hunter took 2 goats but did not retrieve the first.

Table 3. Hunter residency and success in Unit 4, 1984-1988.

	Successful				Unsuccessful			
Year	Local res.	Nonlocal res.	Nonres.	Total	Local res.[a]	Nonlocal res.	Nonres.	Total
1984	34	9	6	49	82	9	3	94
1985	29	3	9	41	70	13	14	97
1986	39	5	6	50	70	6	2	78
1987	31	2	4	37	78	8	13	99
1988	23	2	12	37	76	5	5	86

[a] Includes all residents of Baranof Island.

Table 4. Harvest data for permit hunt No. 815 in Unit 4, 1984-1988.

Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Nonreporting	M	F	U	Total
1984	322	176	94	49	3	34	15	0	49
1985	337	193	97	41	6	18	18	6	42
1986	270	139	78	50	3	28	22	0	50
1987	244	108	99	37	0	20	16	1	37
1988	259	134	86	37	2	22	15	0	37

Table 5. Harvest chronology in Unit 4, 1984-1988.

Year	Aug	Sept	Oct	Nov	Dec	Total
1984	13	21	4	4	7	49
1985	8	15	5	9	5	42
1986	5	24	8	2	11	50
1987	12	4	7	2	12	37
1988	6	12	9	0	10	37

Table 6. Successful hunter transport methods in Unit 4, 1984-1988.

Year	Airplane	Boat	Walked
1984	30	19	0
1985	14	24	3
1986	20	25	5
1987	11	22	4
1988	13	22	2

STUDY AREA

GAME MANAGEMENT UNIT: 5 (6,235 mi^2)

GEOGRAPHICAL DESCRIPTION: Cape Fairweather to Icy Bay, eastern gulf coast

BACKGROUND

Klein (1965) surmised that mountain goats extended north and west from a southern refugium and the present northern and western limits of distribution may be the result of a relatively recent arrival in the area. Thus, unlike other large mammals in the Yakutat Forelands area (*i.e.*, moose and bear), mountain goats may have come "up the coast," rather than down the Tatshenshini/Alsek River corridor.

Alaska Natives used mountain goat hides for clothing and other purposes. Recreational hunting occurred by the early 1970's, but probably earlier because Yakutat was the site of a large Army base during World War II.

Aerial surveys were first conducted by the ADF&G in 1971; 283 goats (33 kids:100 adults) were enumerated between Gateway Knob and Harlequin Lake in the Brabazon Mountains. By 1973 Division biologists had documented a significant decline in goat numbers in the area that they attributed to severe winter weather. Counts in Subunit 5A have increased somewhat over the years, and counts in the Subunit 5B portion of Icy Bay appear to be higher than those recorded in the early 1970's.

POPULATION OBJECTIVES

To increase the estimated population from 850 to 1250 goats and maintain a hunter success rate of 25%.

METHODS

Aerial surveys were conducted from Gateway Knob to Harlequin Lake in June 1989 (Tables 1 and 2). Goats were classified as kids or adults (including yearlings), the number of goats per hour was calculated, and the kids:100 adults ratio was determined. Hunters were required to obtain registration permits from local ADF&G offices, allowing inseason monitoring of harvest effort and intensity. Anecdotal information was gathered from hunters, ADF&G field personnel, and other agencies.

RESULTS AND DISCUSSION

Population Status and Trend

Surveys conducted in June 1989 were flown in a Supercub, probably the most efficient aircraft for this type of effort. The area between Gateway Knob and Harlequin Lake in Subunit 5A was surveyed in 3.4 hours, resulting in a count of 193 goats. This is one of the higher counts for this area, and the ratio of 38 kids:100 adults is the highest on record. As reported in the 1987-88 report, the healthy kid:adult ratio and high total count suggests a stable or growing population. The Unit 5 population probably numbers between 850 and 1,000 goats and appears to be slowly increasing.

Mortality

Season and Bag Limits:

The open season for subsistence, resident, and nonresident hunters in Unit 5 is 1 August to 31 December. The bag limit is 1 goat by registration permit.

Human-induced Mortality:

The reported Unit 5 mountain goat harvest in 1988 was five (two male, two females and one of unknown sex), one of the smallest recent harvests recorded (Table 3). Since 1983, when the third-highest annual harvest of 23 was recorded, the harvests have been significantly reduced (the 1984-88 average harvest was 6 goats). The reduction appears to be due to decreased effort, rather than a reduced success rate. The illegal harvest remains unquantified; however, it is probably small, because of the small size of the Yakutat community where word spreads quickly.

Hunter Residency and Success. The success rate for hunters has varied from 15% to 50% in the last 5 years (Table 4). Two successful hunters in 1988 were nonlocal residents, and three were nonresidents (Table 4). Since 1984 nonresidents have taken an average of 47% of the harvest, while local and nonlocal residents have taken 31% and 22%, respectively.

Permit Hunts. Since the use of registration permits began in 1980, the smallest number of registration permits was issued for mountain goat hunt No. 817 in 1988 (Table 5). This may be due, in part, to the more restrictive nature of moose hunting for nonlocals in Subunit 5A in 1985, 1987, and 1988 that reduced the chance for a mixed-bag hunt. Since 1984 an average of only 41% of the permittees have actually hunted. The registration permit format remains a viable method for effectively managing goat hunting in the unit.

Harvest Chronology. As illustrated in Table 6, most (45%) of the harvest has been taken in October in recent years. September is

the second most popular month (26%) followed by December (19). Few goats have been taken in August and November.

Transport Methods. Four of five goats taken in 1988 were accessed via aircraft; the 5th hunter used a highway vehicle (Table 7). Aircraft transportation access has averaged 72% since 1984, while boat access has been used by 25% of the successful hunters.

CONCLUSIONS AND RECOMMENDATIONS

Goat numbers documented during aerial surveys in the Brabazon Mountains of Subunit 5A indicated the population is probably increasing. The small harvest in Unit 5 should not be construed as an indicator of population health or trend. The management objective of 25% hunter success was achieved in 1988. The population is apparently growing, but it has not yet reached 1,250 animals.

LITERATURE CITED

Klein, D. R. 1965. Postglacial distribution patterns of mammals in the southern coastal regions of Alaska. Arctic, Vol. 18, No. 1.

PREPARED BY:

Bruce Dinneford
Wildlife Biologist III

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Mountain goat age composition in Unit 5, June, 1989.

Date	Location	Number adults	Number kids	Total goats	Kids:100 adults	Goats/ hour
6/19/89	Gateway Knob to Akwe Drainage	66	27	93	41	38
6/19/89	Italio Drainage to Harlequin Lake	74	26	100	35	105
Total		140	53	193	38	56

Table 2. Mountain goat composition counts in Unit 5, 1984-88 and subunit composition for 1988[a].

Year	Number of adults	Number of kids	Total goats	Kids:100 adults	Percent Kids	Goats/ hour
1984	327	100	427	31	23	74
1985	No data					
1986	36[b]	11	47	31	23	40
1987	196	53	249	27	21	60
1988	140	53	193	38	27	56
Subunit						
A	140	53	193	38	27	56
B	No data					

[a] Survey areas vary from year to year within subunits.
[b] Harlequin Lake to Mt. Pinta only.

Table 3. Annual harvest and accidental death in Units 5 for 1984-88.

	Harvest			
Year	M	F	Unk.	Total
1984	2	4	1	7
1985	2	6	0	8
1986	5	4	0	9
1987	2	0	1	3
1988	2	3	0	5

Table 4. Hunter residency and success in Unit 5, 1984-88.

Year	Successcul				Unsuccessful			
	Local res.[a]	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1984	2	3	2	7	7	4	10	21
1985	4	1	3	8	5	10	4	19
1986	4	1	4	9	0	2	7	9
1987	0	0	3	3	3	3	11	17
1988	0	2	3	5	5	1	8	14

[a] Local residents are those persons living in GMUs.

Table 5. Harvest data by permit hunt in Unit 5, 1984-88.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Billies	Nannies	Total
817	1984	73	44	21	7	2	4	7
	1985	53	26	19	8	2	4	8
	1986	53	35	9	9	5	4	9
	1987	52	33	16	3	2	0	3
	1988	44	25	14	5	2	3	5

Table 6. Harvest chronology in Unit 5, 1984-88

Year	Aug	Sept	Oct	Nov	Dec
1984	0	2	3	0	2
1985	0	2	4	0	2
1986	0	2	3	2	2
1987	0	1	2	0	0
1988[a]	1	1	2	0	0

[a] One kill date unknown.

STUDY AREA

GAME MANAGEMENT UNIT: 6 (10,140 mi^2)

GEOGRAPHICAL DESCRIPTION: Prince William Sound and north Gulf Coast

BACKGROUND

Griese (1989) summarized the historical distribution, population trends, and effects of excessive localized hunting on mountain goats in Unit 6. Aerial composition surveys have been conducted infrequently in Unit 6. Unit-wide harvest data were collected by various means beginning in 1972. Maximum allowable harvest levels (Griese 1988) were established to encourage subpopulation recovery or stability (Appendix A).

POPULATION OBJECTIVES

To increase the goat population to a minimum of 4,500 and sustain an annual harvest of 160 goats, including a maximum of 30% females and an average male age of 6.0 years, by the year 2000.

METHODS

Composition and trend surveys were conducted in 11 of 50 subareas (Griese 1988) during 1988. Surveys were conducted from a Piper PA-12 or PA-18 on floats between 20 July and 13 September from 0705 to 0911 hours or 1758 to 2154 hours. Goat habitat between 1,000 and 3,000 feet elevation was extensively surveyed. Observations of goats were recorded on USGS 1:125,000 maps; the number of adults and kids were identified.

All permittees were provided a handout that presented methods of differentiating sexes of goats at a distance and presented benefits for selectively harvesting males only. Successful hunters were required to have horns checked by Department staff to correctly identify the goat's sex and age. Hunters who did not report effort were sent up to 2 reminder letters.

Fifteen mountain goats (14 female, 1 male) were captured and fitted with radio collars to enable relocation during winter months to identify mountain goat winter range. Goats were captured between 27 and 29 June by darting from a Hughes-500 helicopter using the drug carfentanil citrate. The effects of this immobilizing drug were reversed with a combination of naloxone HCL (IM) and naltrexone HCL (orally). Radio-tagged goats were relocated on 30 June to evaluate family integrity and recovery from capture. Preliminary information on tagged goats is presented in Appendix B.

Minimum elevation of mountain goat winter range was investigated in eastern Subunit 6A, east of Cape Yakataga. As part of a study to identify important wildlife and fishery resources in this coastal area, an effort to identify goat winter range in association with proposed and past timber sales was made between 15 and 20 May. Ridge lines were searched for evidence of use by mountain goats. When evidence was found, it was identified, and habitat, slope, aspect, elevation and location were recorded. Results of this investigation will be reported in the next management report.

RESULTS AND DISCUSSION

Population Status and Trend

Goat management subareas in Subunits 6B, 6C, and 6D were surveyed, and total goat numbers were estimated (Table 1). The largest population surveyed was in southwestern Subunit 6D (6D17); the Heney Range goat observation area (6C4) appeared to have no goats.

The 1988 survey results indicated declining populations in subareas 6C1 to 6C4 and a substantially increased population in subarea 6D17 (Table 2). Please note that 1987 survey results for 6B2 (Griese 1989, Table 1, 55) were incorrectly reported as 6B3 and vice versa. Subarea 6D16 was surveyed for the 1st time and exhibited low densities.

Population Size:

Population estimates from composition survey results (Table 1) provided an opportunity to reestimate the unit's population at between 3180 and 3780. The new range of estimates for Subunits 6B, 6C and 6D were 310-360, 120-150, and 1750-1970, respectively. The goat population for Subunit 6A ranges between 1,000-1,300 goats.

Population Composition:

Composition counts from Subunits 6B, 6C and 6D identified a mean composition of 19% kids (Table 1), which was equal to the mean composition of counts between 1969 and 1987.

Mortality

Season and Bag Limit:

The open season for resident and nonresident hunting in Subunits 6A and 6B in those portions in the Ragged Mountains and Don Miller Hills hunt subareas is 20 August to 30 November. The bag limit is 1 goat by drawing permit only; up to 25 permits will be issued. The open season for subsistence hunters in the remainder of Unit 6 is 1 August to 31 January; the bag limit is 1 goat by

registration permit only. The open season for resident and nonresident hunters in the remainder of Unit 6 is 1 September to 20 November; the bag limit is 1 goat by registration permti only.

Human-induced Mortality:

Reported goat harvest in 1988 reached 85 goats (Table 3), the third-lowest harvest since 1971. In the last 5 years both harvest levels (Table 3) and number of permits issued (Table 4) have steadily declined. Declines were likely because of declining goat numbers and associated reduced hunting opportunities.

The reported harvest of 85 goats included 59% males (50), 35% females (30) and 6% of goats of unknown sex (5), most of which had been killed but not recovered. Female goats were 38% of the known sex harvest, which was slightly higher than the historical average (36%).

The average age of 45 male goats was 6.1 years (range = 1.3-14.3 years). The average age of 25 female goats was 5.2 years (range = 2.3-12.3 years).

Illegal, unrecovered, and unreported harvests were estimated to represent 21% of total harvest in 1988 (Table 3). Beginning in 1985 hunters were specifically asked to report goats killed and not recovered with no legal implications. Hunters have since reported up to 7% of the total harvest in that category (Table 3). One female goat died from a fall during capture efforts during June.

Hunter Residency and Success. Goat hunters exhibited 36% success in Unit 6 during 1988. Hunter success in Unit 6 over the last 4 years has averaged 33%; in 1985 and 1987 it was 29% (Table 4).

Unit residents reported the second-lowest goat harvest on record; i.e., 8% of the harvest, 35% hunter success. In the past 5 years (1984-88) residents accounted for 16% of the harvest at 28% hunter success (Table 4). The decline in harvested success for residents ar directly related to hunt area closures near the major population centers of Valdez, Cordova, and Whittier. The difficulty and additional costs in accessing more distant hunting areas reduced the resident effort.

Nonresidents harvested 56% of the harvest in 1988, substantially higher than the 5-year average of 45%. However, nonresident hunter effort has increased only slightly during the past 5 years.

Permit Hunts. The number of permits issued to goat hunters has continued to decline over the last 5 years. In 1988, 423 registration permits and 14 drawing permits were issued, representing a 39% decline since 1984 (Table 4).

Emergency Order closures occurred for the 3rd consecutive year because of enforcment of maximum allowable harvest levels (Appendix A) in popular registration permit hunt areas.

Harvest Chronology. Seventy-three percent of the harvest occurrred in September 1988. The season opening was changed from 1 August to 1 September in 1987. Emergency closures, fewer open subareas near major community centers, and the Board of Game's decision to exclude Valdez and Whittier residents from participating in late-season subsistence seasons were responsible for the reduced harvest levels between November and January.

Transport Methods. The only important change in transport methods over the last 5 years was reduced use of snowmachines, ORV's, and highway vehicles beginning in 1986 (Table 6).

Natural Mortality:

Nichols (1984) estimated overwinter mortality on the Kenai Peninsula at 10-40%, depending on winter severity. Winter severity in 1988-89 was moderate to light in Unit 6. Precipitation levels were low, while temperatures reached record low levels. In 1988-89, moderate snow depths accumulated above elevations of 500 feet.

Predation by wolves may have been responsible for substantial reductions in the goat population. The wolf population has expanded its range and size substantially since 1972, and wolves may have caused reductions in the goat population in subareas lacking adequate escape terrain. Subareas experiencing declines from wolf predation (Fig. 1) are 6A3B and 6A3C (29%, 1977 to 1989); 6A4 (22%, 1977 to 1989); 6A7 (59%, 1980 to 1986); 6A10 (47%, 1980 to 1986); 6C3 (47%, 1985 to 1988); and 6D1 (70%, 1979 to 1989). Predation by wolves also caused reductions in the goat populations in subareas 6A1 and 6D4. The harvest and loss of winter habitat to timber cutting contributed to the goat decline in subarea 6A1, while subarea 6D4 also experienced heavy hunting pressure. Mountain goats in subarea 6A1 declined 76% between 1977 and 1989 surveys, and 6D4 declined 45% between 1986 and 1989. Although subarea 6A7 (Suckling Hills) has been closed to hunting since 1980, the mountain goat population there may eventually be eliminated by wolf predation.

Habitat Assessment

The 15 goats carrying radio transmitters should provide valuable information on specific wintering areas and characteristics of wintering range unique to northeastern Prince William Sound. A summary of data collected from goats radio-tagged in June are presented in Appendix B. Results of the investigation conducted in eastern Subunit 6A to identify goat winter range in asssociation with planned or past timber harvest plans will be reported in the 1989-90 progress report.

Game Board Actions and Emergency Orders

Hunting regulations have changed in recent years. Local high harvest levels and declining goat populations prompted a reduced season length in 1987, following the 1st emergency closure in October 1986. Lack of population data for much of western and northern Subunit 6D and indications of depressed local populations prompted season-long closures in those areas in 1987. Goat populations in the Ragged Mountains (Subunit 6B) and Don Miller Hills (Subunit 6A) have exhibited substantially increased populations since they were closed (1980). Drawing hunts were established for the 1987 season to allow limited hunter participation in these recovering populations.

The Board of Game determined that residents of Valdez and Whittier did not qualify as rural residents and therefore could not participate in subsistence seasons established in 1987 for Subunits 6C and 6D for all other residents of those subunits. Reported goat harvests reached upper harvest limits established for Subunit 6C and portions of Subunit 6D, which were popular hunting areas likely to receive additional hunting pressure before the normal season closure. Emergency Orders closed those subareas.

The 1989 Board of Game reduced the size of the Goat Mountain closed area and established hunt area No. 878 north of the Martin River. This area has a harvest quota of 4 goats. The Board was also briefed on the status of wolf and goat interactions in Unit 6. The board declined to reinstate the land-and-shoot method of hunting of wolves. Department staff testified that this hunting method is ineffective in Unit 6.

CONCLUSIONS AND RECOMMENDATIONS

Population objectives were partially attained. The current estimate of goat numbers suggests that a 31% population increase is required to meet objectives by the year 2000. Future population estimates should be expected to fluctuate as more current survey data are collected. Average age of male goats in the harvest met objectives. Harvest and composition objectives were not accomplished.

Number of individuals hunting goats in Unit 6 has continued to decline because of reduced hunter success and opportunity as well as increasing opportunities in more accessible units. Declining goat numbers in popular hunting areas also reduced hunter success and interest. Low success and effort by unit residents was probably the result of local closures. Reduced opportunities resulted from season reductions and increased subarea closures, in response to low or declining goat numbers. In the last 4 or 5 years, substantial increases in goat hunting opportunities have occurred in adjacent Units 7, 14, and 15, perhaps drawing hunters away from Unit 6.

I recommend continued effort to complete subarea surveys. The time between surveys in all subareas should average no more than 3 years; however, surveys should be conducted more often in heavily hunted subareas. Effort should also be made to survey all subareas not yet surveyed.

Additional changes to hunting season dates and bag limits are not warranted at this time. The maximum allowable harvest levels (Appendix A) for Unit 6 subareas (Griese 1988) need to be adjusted annually. Harvest levels for any one subarea should be adjusted within the accepted range, as dictated by the previous year's harvest composition, winter severity, varying levels of predation (if known), and population status and trend. Frequent surveys and diligent harvest monitoring are essential under this strategy.

Hunter education is essential to meet population objectives. Under current bag limit regulations, a goat of either sex may be killed by hunters. To attain desirably low percentages of female goats in the harvest, hunters must be briefed on methods of differentiating sex and age of goats and benefits of selectively harvesting male goats.

Identification of goat winter range through radio relocation of radio-collared goats should provide essential information for addressing impacts of proposed timber harvest plans and private developments. Goats should be relocated once per month between November and April. On-the-ground verification of winter range and habitat characterization are recommended to facilitate goat winter range modeling.

LITERATURE CITED

Griese, H.J. 1988. Unit 6 mountain goat survey-inventory progress report. Pages 26-35 in S. O. Morgan, ed. Annual report of survey and inventory activities. Part VII. Mountain goat. Vol. XVIII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-6, Job 12.0. Juneau. 53pp.

_____. 1989. Unit 6 mountain goat survey-inventory progress report. Pages 48-61 in S. O. Morgan, ed. Annual report of survey and inventory activities. Part VII. Mountain goat. Vol XIX. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-23-1, Job 12.0. Juneau. 112pp.

Nichols, L. 1984. Mountain goat movements study. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-2, Job 12.5R. Juneau. 21pp.

PREPARED BY:

Herman Griese
Wildlife Biologist

SUBMITTED BY:

John Trent
Management Coordinator

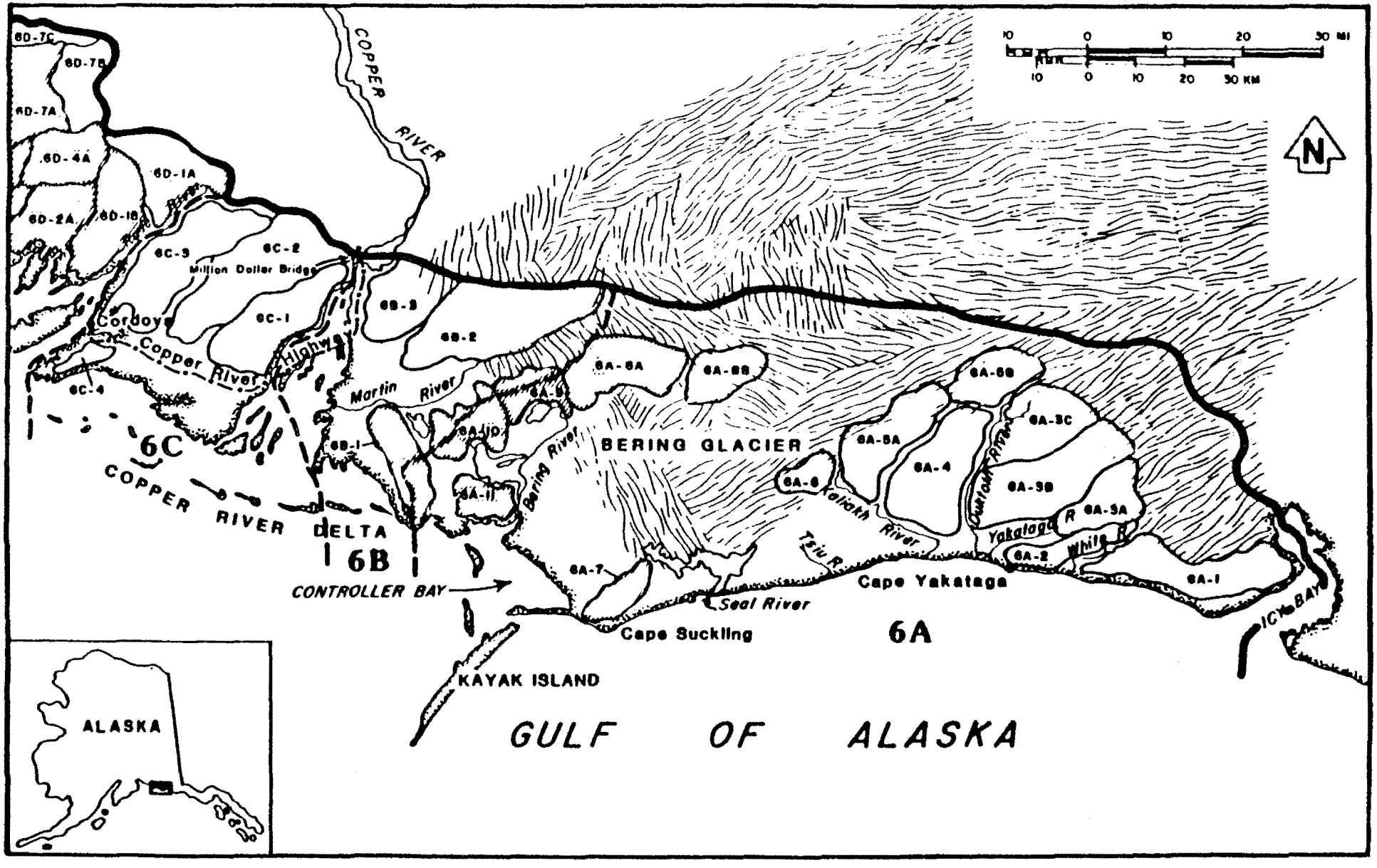


Fig. 1. Mountain goat count areas, management subareas, and subunits in eastern Game Management Unit 6.

Table 1. Mountain goat population status by subarea, as determined from aerial surveys in Unit 6, July-September 1988.

	Subarea									
	6B2	6C1	6C2	6C3	6C4	6C Subtotal	6D16	6D17	6D Subtotal	Total
Goats observed	70	30	32	43	0	105	9	291	300	475
Estimated population	77-91	33-36	38-48	52-65	0	123-149	10-15	320-369	330-384	530-624
% kids	17	23	16	14	--	17	11	21	21	$\underline{x}$ = 19

Table 2. Mountain goat composition counts by zone in Unit 6, 1980-88.

Zone[a]	Year	Subareas	Adults	Kids	n	Kids: 100 adults	% kids	Goats /hr.
Eastern 6A	1984	6A1-2	187	56	243	29	23	152
Central 6A	1984	6A3	55	24	79	44	30	163
Western 6A	1980	6A7-8, 6A10-11	124	56	180	45	31	108
	1986	6A7-11	192	52	244	27	21	79
6B	1980	6B1	38	12	50	32	24	50
	1986	6B1	93	28	121	30	23	101
	1987	6B2-3	126	27	153	21	18	109
	1988	6B2	58	12	70	21	17	68
6C	1983	6C3	30	2	32	6	6	22
	1985	6C1-3	128	17	145	13	12	41
	1988	6C1-4	87	18	105	21	17	29
Eastern 6D	1981	6D2, 6D4-6	460	85	545	18	16	152
	1983	6D1-2	131	28	159	21	18	63
	1986	6D1-7	600	146	746	24	19	84
Northern 6D	1981	6D9-10	146	30	176	21	17	68
	1986	6D8-10	70	18	88	26	20	40
	1987	6D10-11	230	56	286	24	20	68
Western 6D	1987	6D13-15	64	13	77	20	16	16
Southwestern 6D	1980	6D17	90	33	126	37	26	60
	1983	6D17	137	33	170	24	19	52
	1988	6D16-17	238	62	300	26	21	70

Table 2. Continued.

[a] Eastern 6A = Icy Bay to Clear Creek, subareas 6A1-2
Central 6A = Clear Creek to Bering Glacier, subareas 6A3-6
Western 6A = Bering Glacier to Katalla River, subareas 6A7-11
6B = Katalla River to Copper River, subareas 6B1-3
6C = Copper River to Rude River, subareas 6C1-4
Eastern 6D = Rude River to Shoup Glacier, subareas 6D1-9
Northern 6D = Shoup Glacier to Harvard Glacier, subareas 6D10-12
Western 6D = Harvard Glacier to Kings Bay, subareas 6D13-15
Southwestern 6D = Kings Bay to Cape Fairfield, subareas 6D16-17

Table 3. Annual mountain goat harvest, 1984-88, and subunit harvest 1988 in Unit 6.

Year	Reported harvest				Estimated	Total
	Male	Female	Unk[a]	Total	Other[b]	
1984	86	42	2	130	40	170
1985	53	36	6	95	20	115
1986	75	39	6	120	22	142
1987	46	20	5	71	18	89
1988	50	30	5	85	17[c]	102
Subunit						
A	8	12	0	20	5	25
B	2	0	0	2	1	3
C	1	1	0	2	1	3
D	39	17	5	61	10[c]	71

[a] Includes unrecovered kills
[b] Includes unreported and illegal kills
[c] Includes 1 female killed during capture in June, 1989

Table 4. Mountain goat hunter residency and success in Unit 6, 1984-1988.

Year	Permits issued	Successful								Unsuccessful[a]			
		Unit Res.	%	Nonlocal Res.	%	Nonres.	%	Total	%	Unit Res.	Nonlocal Res.	Nonres.	Total
1984	722	24	--	43	--	51	--	130	--	--	--	--	--
1985	611	24	26	37	25	33	38	95	29	66	111	53	231
1986	548	25	33	43	41	50	39	120	38	50	63	77	192
1987	477	2	10	28	26	41	36	71	29	18	79	74	171
1988	437	7	35	30	38	48	35	85	36	13	48	88	149
Total	2795	82		181		223		501		147	301	292	743
Mean	559.0	16	28	36	31	45	37	100	33	37	75	73	186

[a] Unsuccessful effort was not solicited prior to 1985.

Table 5. Mountain goat harvest chronology in Unit 6, 1984-88.

Year	August	September	October	November	December	January
1984[a]	36	29	29	5	9	12
1985	25	18	27	8	5	10
1986	16	57	44	1	1	0
1987[b]	0	42	23	4	0	1
1988[b]	0	62	14	9	0	0

[a] Does not include harvest from subarea 6D17 (11 goats killed)
[b] Major registration permit hunts for non-locals was 1 Sept.-30 Nov.

Table 6. Successful mountain goat hunter transport methods in Unit 6, 1984-88.

Year	Airplane	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle
1984[a]	61	30	0	6	5	13
1985	53	17	0	8	5	8
1986	64	35	2	0	2	9
1987	47	21	0	1	0	0
1988	68	14	0	0	0	2

[a] Does not include data from successful hunters in subarea 6D17.

Appendix A. Maximum allowable and reported mountain goat harvest levels by subarea in Game Management Unit 6, Alaska, 1987-1988.

Subarea	Maximum allowable harvest 1987	Maximum allowable harvest 1988	Reported harvest 1987	Reported harvest 1988	Subarea	Maximum allowable harvest 1987	Maximum allowable harvest 1988	Reported harvest 1987	Reported harvest 1988
6A1	6	4	3	0	6D1	4	4	2	0
6A2	2	2	0	0	6D2	8	6	5	5
6A3	9	7	1	0	6D3	8	7	6	2
6A4	8	6	3	5	6D4	11	10	8	5
6A5	3	3	2	0	6D5	5	4	5	2
6A6	2	2	4	5	6D6	3	4	1	4
6A7	0	0	0	0	6D7	0	0	0	0
6A8	11	9	3	8	6D8	0	0	0	0
6A9	0	0	0	0	6D9	0	0	0	0
6A10	0	0	0	0	6D10	12	11	12	13
6A11	2	2	1	2	6D11	8	7	3	12
					6D12	0	0	0	0
6B1	6	5	1	2	6D13	0	0	0	0
6B2	0	0	0	0	6D14	0	0	0	0
6B3	0	0	0	0	6D15	0	0	0	0
					6D16	0	0	0	0
6C1	0	0	0	0	6D17	9	20	9	18
6C2	2	1	1	1					
6C3	3	1	1	1					
6C4	0	0	0	0	Total	122	115	71	85

Appendix B. Characteristics, and status of mountain goats, fitted with radio collars in June, 1989.

Goat no.	Sex	Age	Weight (kg)	Girth (mm)	Neck cir. (mm)	Total length(mm)	Capture date	Assoc.	Location	Status 6/30/89
10	female	13	est. 68	1067	470	1600	06/27/89	kid	Whalen Bay	active/not visible
11	female	10	est. 66	1092	400	1473	06/27/89	kid	Olsen Bay	feeding/w/kid
12	female	5	est. 68	1080	394	1473	06/27/89	ylg+kid	Olsen Bay	feeding/w/kid+ylg
13	female	10	75	1118	--	1464	06/27/89	kid	Koppen Creek	feeding/w/kid
14	female	9	70	1112	366	1530	06/27/89	ylg+kid	Sheep River	feeding/w/ylg
15	female	8	73	1011	381	1615	06/27/89	kid	Sheep River	feeding/w/kid
16	female	6	est. 73	1022	407	1601	06/27/89	kid	Sahlin Lake	feeding/w/kid
17	female	10-11	est. 77	1070	405	--	06/27/89	kid	Gravina Mt.	feeding/w/kid
18	female	6	63	1105	345	1585	06/28/89	kid	Fidalgo River	bedded/w/kid
19	female	7	68	1075	376	1654	06/28/89	ylg+kid	Sunny River	walking/w/kid
--	female	11	est. 75	--	--	--	06/28/89	0	St. Matthews Bay	capture mortality
20	female	5	71	1109	382	1619	06/28/89	kid	Fish Bay	walking/alone
21	female	4	57	1055	405	1482	06/28/89	0	Fish Bay	standing/alone
22	female	7	80	1065	403	1600	06/28/89	ylg	Dead Creek	walking/alone
23	male	5	109	--	472	1662	06/29/89	0	St. Matthews Bay	hiding/alone
24	female	5	79	1044	383	1654	06/29/89	kid	Whalen Bay	feeding/w/kid

STUDY AREA

GAME MANAGEMENT UNITS: 7 and 15 (10,038 mi^2)

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

BACKGROUND

Mountain goats are the most abundant, widely distributed alpine ungulate on the Kenai Peninsula. They occur along the entire length of the Kenai Mountains, which represent the the western-most extension its continental range. Goat populations are most abundant in the highly glaciated coastal mountains and least abundant along the relatively dry west slope and interior portions of the range, where they coexist with Dall sheep (Holdermann 1986).

The Kenai Peninsula has been a popular mountain goat hunting area since statehood (1959), because of its proximity to a large human population and the relative accessibility of the goat populations. By the late-1970's, game managers recognized that general seasons with 2-goat bag limits had led to some local overharvesting, particularly in accessible goat ranges. Consequently, permit hunt systems were implemented in 1978 to reduce harvest rate and to more evenly distribute hunters. Since 1982 goat harvests have been managed by a combination of drawing and registration permit hunts. Goats within the Kenai Fjords National Park (KFNP) are protected from hunting. Holdermann (1989) provided a summary of the Kenai Peninsula mountain goat management system.

Although most goat range on the Kenai Peninsula is contained within federal or state conservation land units and remains unaffected by human development, several exceptions warrant concern. First, portions of the Bradley Lake Hydroelectric Project are being constructed on a goat winter range located approximately 20 miles southeast of Homer. To determine the effects of construction activities on the winter goat population, ADF&G has intensively monitored the number, sex-age composition, and distribution of mountain goats along the Bradley River drainage since 1985 (Holdermann 1986). Second, developing markets in Asia for Alaska wood products present a very real potential for extensive logging on Native corporation lands (e.g., Blying Sound and Kachemak Bay) during the next decade that could adversely effect coastal wintering goat populations.

POPULATION OBJECTIVES

To maintain a population of at least 3,000 mountain goats.

METHODS

The Kenai Peninsula goat range, excluding KFNP, is subdivided into 31 count areas. Since the early-1970's, goat populations in these areas have been routinely monitored by a rotation of mid-summer aerial surveys according to the techniques of Lentfer (1955). Surveys were flown using a PA-18 Super Cub with an observer during early morning and evening hours in July and August. Flights were made along drainage contours, usually beginning at the uppermost subalpine zone and progressing upward into the alpine zone by 150-to 200-m intervals. Within each area, observed goats were counted and classified as either kids (<4 months) or older goats, and data were recorded on standardized forms. These data provided general indices to kid recruitment and overall population abundance.

In 1987 survey procedures were modified to improve the consistency and accuracy of goat population data (Holdermann 1989). Three goat population trend areas were established, each consisting of 2 or 3 contiguous individual count areas, in the Blying Sound, West Slope, and Upper Kachemak Bay mountain regions. The 3 newly formed areas became the primary sampling units for monitoring trends in goat production and abundance for the regions they represent. Aerial surveys of individual count areas, although of a lesser priority than the trend areas, continued to monitor the welfare of small populations and to adjust permit quotas.

Minimum density refers to the number of goats counted during summer in the alpine zone within a trend area. The nearly exclusive summer use of alpine areas by mountain goats in the Kenai Mountains is well documented (Hjeljord 1971, Nichols 1985). The surface area of alpine range was calculated from 1:250,000-scale USGS topographic maps using a mechanical planimeter. The lower limit of alpine range varied from elevations of 1,500 feet in Blying Sound to 2,500 feet along the West Slope and Upper Kachemak Bay regions, reflecting geographic differences in climate and plant community distributions.

The size of the peninsula-wide mountain goat population was determined by combining a range of estimates for the 31 count areas with a point estimate of the goat population within KFNP. The goat population bounded by the 31 count areas was estimated by summing the most recent aerial count of each area. The composite estimate was expressed as a range, by assuming that 70% and 90% of the goats present during aerial surveys were observed. The number of goats in the KFNP was derived from a 1985 National Park Service helicopter survey of the total area (Adams 1985).

RESULTS AND DISCUSSION

Population Status and Trend

Blying Sound:

The extremely rugged and heavily glaciated mountains in the Blying Sound region support the most abundant mountain goat population on the Kenai Peninsula. Aerial surveys conducted in the Blying Sound trend area showed that a population of approximately 300 goats have remained stable from 1968 to 1971, declined slightly in the mid-1970's, and then steadily increased to at least 458 goats in 1983 (Table 1). The 1987 survey revealed that the population had stabilized at approximately the the 1983 level of 460 goats. The minimum density in this trend area, which has varied between 3.1 and 4.8 goats/mi of suitable alpine range, is considered very high.

West Slope:

The formations along the west slope of the Kenai Mountains between Chickaloon Bay and Tustemena Glacier support the lowest mountain goat density on the Kenai Peninsula because of habitat and climatic conditions that favor Dall sheep more than goats. Nonetheless, goat populations in this area have expanded their range and undergone rapid growth during the last 2 decades. Surveys indicate that the area's goat population declined in the early-1970's and then increased rather rapidly by 1983 (Table 1). The number of goats counted in the West Slope trend area doubled from 44 to 90 between 1983 and 1987, strongly suggesting that this population was still well below carrying capacity. Since 1968, minimum density has ranged between 0.01 and 0.5 goat/mi of suitable habitat.

Upper Kachemak Bay:

The quality of mountain goat ranges and goat abundance in the upper Kachemak Bay trend area appear to be intermediate between those of Blying Sound and the West Slope. The distributions of goats and Dall's sheep overlap in the northern one-third of this trend area. Complete survey data for this area prior to 1980 are limited. However, this population grew substantially during the early-1980's, peaked about 1985, and then appears to have declined slightly between 1985 and 1987. Minimum density has ranged between 1.4 and 2.7 goats/mi of suitable range (Table 1).

Population Size

It is estimated that there are between 3,300 (i.e., 70% observability) and 4,000 goats (i.e., 90% observability) on the Kenai Peninsula, including approximately 800 goats within KFNP (B. Rice/National Park Service, pers. commun.; Adams 1985).

Population Composition

Three aerial surveys in individual count areas were conducted in 1988. Count area Nos. 837 (Cooper Mountain) and 854 (Skilak Glacier) within the West Slope region produced a total of 109 goats, including 22 kids (20%). Additionally, 43 goats, including 8 kids (19%), were counted in area No. 857 (Tustemena Glacier) of the upper Kachemak Bay region.

Within trend areas during the period 1968-1987, the ratio of kids:100 older goats and the percentage of kids observed in the population sample ranged from 24-48:100 and 19-32%, respectively (Table 1). Increasing populations were characterized by 30-48 kids:100 older goats and 23-32% kids. Conversely, survey samples with 22-26 kids:100 older goats and 19-23% kids were associated with stable or declining populations.

Mortality

Season and Bag Limit:

The open season for resident and nonresident hunters is 10 August to 30 September by drawing permit and 15 October to 30 November by registration permit; the bag limit is 1 goat. The open season for subsistence hunters is 10 August to 31 October; the bag limit is 1 goat.

Human-induced Mortality:

In 1988 sport and subsistence hunters reported taking 131 mountain goats on the Kenai Peninsula. During the early drawing-permit season, 156 hunters killed 60 goats (38% success) in 26 hunt areas, including 43 males (72%) and 17 females (28%) (Table 2). The registration permit season following that provided hunting for 180 hunters in 14 hunt areas. Fifty-two goats were killed (36% success), including 32 males (62%), 19 females (37%), and 1 goat of unspecified sex (1%) (Table 3). Subsistence hunters from the villages of Port Graham and English Bay were unsuccessful at harvesting goats in 1988 (Table 4). Drawing and registration permit hunt harvest levels in 1988 were comparable to those of recent years (Tables 5 and 6).

Hunter Residency. In 1988 residents composed 95% and 96% of the permitees for drawing (n = 160) and registration (n = 152) permit hunts, respectively.

Game Board Actions and Emergency Orders

In 1985 the Alaska Board of Game authorized subsistence mountain goat hunting by residents of Port Graham and English Bay in hunt area Nos. 852 (Brown Mountain), 863 (Port Dick), 864 (Seldovia), and 865 (English Bay). During their spring 1989 meeting, the Alaska Board of Game authorized the subsistence harvest of up to 3 goats in hunt area No. 864 (Seldovia River) by residents of

Seldovia at the request of the Seldovia Fish and Game Advisory Committee. This registration hunt will open 1 August 1989. At the request of residents of English Bay, the Board also advanced the opening date from 10 Aug to 1 August for registration hunt Nos. 852W, 863W, 864W, and 865W .

CONCLUSIONS AND RECOMMENDATIONS

The management objective of maintaining approximately 3,000 mountain goats on the Kenai Peninsula is presently being met. There are an estimated 3,300-4,000 mountain goats, including a point estimate of 800 in KFNP.

The system of mountain goat harvest management developed on the Kenai Peninsula may have application in other areas susceptible to overharvesting. Advantages are (1) the use of hunt areas that correspond with population count or trend areas; (2) the use of permits to control hunting pressure; (3) the allocation of hunting permits within relatively small hunt areas; and (4) its emphasis on standardized population monitoring within trend areas that represent populations with unique characteristics within larger game mangement units. Allocation of permits by hunt areas effectively disperses hunting efort, alleviating the problem of localized overharvesting in areas with easy acess. Long-term use of trend areas that correspond with several adjacent hunt areas will greatly facilitate the assessment of hunting and environmental effects on mountain goats. No changes in goat harvest management are recommended at this time.

LITERATURE CITED

Adams, L.G. 1985. Mountain goat survey, Kenai Fjords National Park. Nat. Park Serv. Alaska Reg. Office, Anchorage. 12pp.

Hjeljord, O.G. 1971. Feeding ecology and habitat preference of the mountain goat in Alaska. M.S. Thesis. Univ. Alaska, Fairbanks. 126pp.

Holdermann, D.A. 1986. Units 7 and 15 mountain goat survey-inventory progress report. Pages 30-33 in B. Townsend ed. Annual report of survey-inventory activities. Part VII. Mountain Goat. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 12.0. Juneau. 39pp.

Holdermann, D.A. 1989. Units 7 and 15 Mountain Goat Survey-Inventory Progress Report. Pages 62-68 in S. O. Morgan ed. Annual reprot of Survey-Inventory activities. Part VII. Mountain Goat. Vol. XIX. alaska Dept. Fish and Gme. Fed. Aid in Wildl. Rest. Prog. Rep. Prog. W-23-1. Job 12.0. 112 pp.

Lentfer, J.W. 1955. A two-year study of the Rocky Mountain Goat in the Crazy Mountains, Montana. J. Wildl. Manage. 19(4):417-429.

Nichols, L. 1985. Mountain goat fidelity to given areas by season and seasonal movements. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Final Rep. Proj. W-21-1, W-21-2, W-22-1, W-22-2, and W-22-3. Job 12.5R. Juneau. 72pp.

PREPARED BY:

David A. Holdermann
Wildlife Biologist II

SUBMITTED BY:

John N. Trent
Management Coordinator

Table 1. Kenai Peninsula mountain goat trends 1968-87[a].

Trend Area	Year	Kids: 100 older goats	% Kids	Total count	Minimum density[b]	Population trend[c]
Blying Sound	1968	34	25	299	3.1	
	1971	24	19	304	3.1	+2
	1974	38	28	258	2.7	-15
	1978	39	28	366	3.8	+42
	1983	34	25	458	4.7	+25
	1987	26	20	461	4.8	+1
West Slope	1968	57	36	11	0.1	
	1975	50	50	3	[d]	-73
	1981	30	23	30	0.2	+900
	1983	33	25	44	0.3	+47
	1987	48	32	90	0.6	+105
Upper Kachemak Bay	1980	29	23	172	1.4	
	1985	30	23	339[e]	2.7	+97
	1987	28	22	301	2.4	-11

[a] No trend counts flown in 1988, next scheduled counts are planned for FY1991.

[b] Minimum density expressed as goats/mi^2 of suitable summer range.

[c] Population trend expressed as % change between successive surveys.

[d] <0.1 goat /mi^2.

[e] Only count areas 858 and 860 were actually flown. Total count derived by estimating 125 goats in count area 859.

Table 2. Kenai Peninsula mountain goat drawing permit hunt summary, 1988[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
831	2	2	50		1		1
833	8	3	33	1			1
834	4	2					0
835	4	2					0
836	20	9	33	1	2		3
837	3	2	50		1		1
839	16	15	53	4	4		8
840	15	4					0
842	8	6	33	2			2
843	2	1	100	1			1
844	15	2	50	1			1
845	38	10	40	4			4
846	40	20	10	2			2
847	12	5	40	1	1		2
852	20	10	10	1			1
854	8	4	100	3	1		4
855	4	3	33	1			1
856	2	1	100		1		1
857	10	5	80	4			4
858	8	2	50	1			1
859	16	6	83	2	3		5
860	20	12	42	3	2		5
861	18	9	11		1		1
862	10	6	50	3			3
863	16	8	50	4			4
864	10	7	57	4			4
Totals	340	156	38	43	17	0	60

[a] Season dates: 10 August - 30 September.

Table 3. Kenai Peninsula mountain goat registration permit hunt summary, 1988[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
833	29	19	32	4	2		6
836	10	3	33	1			1
840	9	2					0
842	60	40	23	7	2		9
843	1						0
846	47	23	39	7	2		9
847	8	5	60	2	1		3
852	8	5	80	2	1	1	4
858	14	7	71	2	3		5
860	19	8	75	4	2		6
861	16	10	30	2	1		3
863	30	21	29	1	5		6
Totals	251	143	36	32	19	1	52

[a] Season dates: 15October - 30 November.

Table 4. Kenai Peninsula subsistence harvest, 1986-88.

Year	Season dates	No. permits issued	No. hunters	Percent success	Harvest			
					M	F	U	Total
1986	6 Sept. - 31 Oct.	15	6	50	1	2	0	3
1987	10 Aug. - 31 Oct.	7	5	40	1	1	0	2
1988	10 Aug. - 31 Oct.	7	3		0	0	0	0
Totals and means		22	11	45	2	3	0	5

Table 5. Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1980-88.

Year	Season dates	No. permits issued	No. hunters	Percent success	Harvest			
					M	F	U	Total
1984	10 Aug. - 30 Sept.	355	169	38	50	14	1	65
1985	10 Aug. - 30 Sept.	16	11	45	2	3		5
1986	6 Sept. - 31 Oct.	130	60	58	21	14		35
1987	10 Aug. - 30 Sept.	340	160	42	49	17	1	67
1988	10 Aug. - 30 Sept.	329	156	38	43	17		60
Total		1170	556	$\bar{x}$ = 42	165	65	2	232

Table 6. Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984-88.

Year	Season dates	No. permits issued	No. hunters	Percent success	Harvest			
					M	F	U	Total
1984	15 Oct. - 30 Nov.	289	189	37	43	26	1	70
1985	1 - 31 Oct.	578	326	38	64	57	3	124
1986	6 Sept. - 31 Oct.	349	180	44	52	27	1	80
1987	15 Oct. - 31 Nov.	327	155	25	26	13		39
1988	15 Oct. - 31 Nov.	301	180	39	46	24	1	71
Total		1844	1030	$\bar{x}$ = 37	231	147	6	384

STUDY AREA

GAME MANAGEMENT UNIT: 8 (8,750 mi^2)

GEOGRAPHICAL DESCRIPTION: Kodiak and adjacent islands

BACKGROUND

Mountain goats were introduced near Ugak Bay on northeastern Kodiak Island in 1952 and 1953. Most suitable habitat on Kodiak Island is occupied by goats; the highest densities occur in the Ugak, Kizhuyak, Terror, Kiliuda, and Uganik Bay drainages of northcentral Kodiak Island. Permit hunts for goats have been held since 1968. The population (i.e., 400+) is stable to slightly increasing. The annual harvest from 1984 to 1988 ranged from 22 to 55 goats, with a mean of 35.6 goats. Demand for hunting goats exceeds the allowable annual harvest.

POPULATION OBJECTIVES

To maintain a prehunting season population of at least 200 goats.

METHODS

Composition counts were done in August by fixed-wing aircraft. Known goat habitats in the Kizhuyak, Terror, northern Ugak, and northern Uganik Bay drainages were covered. Incidental sightings of goats outside the survey area by reliable observers were recorded. Hunting is regulated by drawing permit. Harvest data were collected from mandatory hunter reports and by examining horns of hunter-killed goats.

RESULTS AND DISCUSSION

Population Status and Trend

The goat population appears to be stable in northern Kodiak Island and increasing in the southwestern part of the island. Goats are now found in most major drainages, with the exception of extreme western Kodiak Island where there is little suitable habitat. Approximately 23% fewer goats were counted in the survey area in 1988 than in 1987, but unusually high snow cover in traditional summer range may have reduced sightability of goats. Sightings of goats in the Uyak Bay drainage indicated that the population in southwestern Kodiak Island continued to increase.

Population Size:

The goat population was estimated at 435 animals in 1988 (Table 1). That estimate is probably conservative, because aerial surveys have not been done in more sparsely populated goat habitat in southern Kodiak Island since 1985. For the area open to hunting, the estimated population was 335 goats.

Population Composition:

Poor reproductive success in 1988 was indicated by the unusually low ratio of 11 kids:100 adults (Table 2). An extremely heavy snow pack in traditional summer goat ranges on northern Kodiak Island was noted during the August composition surveys. Winter severity may have been factor in the poor production and survival of kids in 1988. A declining trend in productivity has been indicated since 1984.

Distribution and Movements:

Goats were generally distributed at lower elevations and on southerly and easterly aspects in late summer of 1988. Much of the traditional summer range at higher elevations remained covered by snow through late summer, and the development of vegetation was conspicuously retarded.

Mortality

Season and Bag Limits:

The open season for resident and nonresident hunters is 1 September to 31 October; the bag limit is 1 goat by drawing permit only; 100 permits will be issued.

Human-induced Mortality:

The harvest of 25 goats in 1988 was within the range of annual take recorded for the past 5 years (Table 3). Males composed 60% of the harvest, and their mean age was 4.1 years (n = 13; range = 2.3-9.3 yrs). Females composed 40% of the harvest, and their mean age was 5.0 years (n = 9; range = 1.3-13.3 yrs).

Hunter Residency and Success. Local residents killed 68% of the goats in 1988 (Table 4). Overall hunter success was 48%.

Permit Hunts. All goat hunting is regulated by drawing permit. One hundred permits were issued in 1988, and the distribution of the permits for each of 5 hunt areas has remained the same since 1986 (Table 5). Fifty-two permittees (52%) reported going into the field. Harvests ranged from 2 to 9 goats in the permit hunt areas.

Harvest Chronology. The goat harvest was nearly equally distributed between September and October (Table 6).

Transport Methods. Aircraft is the primary access means for goat hunting in Unit 8 (Table 7).

Habitat

The goat population is probably near carrying capacity in the best habitat on northern Kodiak Island. Habitat suitability for goats declines toward the southwestern part of Kodiak Island, although increasingly frequent sightings of goats indicate the population is slowly increasing there.

Game Board Actions and Emergency Orders

Recent regulatory actions were reviewed in the previous reporting period. The present regulations have been in effect since 1986.

CONCLUSION AND RECOMMENDATIONS

The drawing-permit hunt continued to be effective in distributing the harvest and hunting effort uniformly. Hunters continued to kill more males than females. Population objectives are being met, and the goat population appears to be stable. No changes in regulations are recommended.

PREPARED BY:

Roger B. Smith
Wildlife Biologist III

SUBMITTED BY:

Lawrence J. Van Daele
Survey-Inventory Coordinator

Table 1. Mountain goat population status by hunt area in Unit 8, 1988.

	871-Wild Ck-Center Mtn	872-Crown Mtn.	873-Hidden Basin-Terror Lk	874-W. Terror Lk.-Uganik	876-NW Kiliuda	Other areas	Total
Goats observed	75	27	53	37	Not surveyed	86	278
Estimated population	85	45	90	55	60	100	435
% kids	13%	4%	6%	14%	--	--	$\bar{x}$ = 10%

Table 2. Mountain goat summer composition counts, 1984-1988, and composition by hunt area in Unit 8, 1988.

Year	Adults	Kids	Kids/100 adults	Total
1984	155	48	31:100	203
1985	295	65	22:100	360
1986	175	38	22:100	213
1987	210	44	21:100	254
1988	176	20	11:100	196
Hunt Area				
871-Wild Ck. Center-Mtn.	65	10	15:100	75
872-Crown Mtn.	26	1	4:100	27
873-Hidden Basin-Terror Lk.	50	3	6:100	53
874-W. Terror Lk.-Uganik	32	5	16:100	37
876-NW Kiliuda	--	--	--	--

Table 3. Annual harvest, 1984-88, and harvest by hunt area in Unit 8, 1988.

Year	M	F	Unk	Total	Illegal	Total
1984	32	20	3	55	0	55
1985	15	21	0	36	0	36
1986	23	17	0	40	0	40
1987	13	9	0	22	0	22
1988	15	10	0	25	0	25
Hunt Area						
871-Wild Creek-Center Mtn.	2	0	0	2		
872-Crown Mtn.	4	3	0	7		
873-Hidden Basin-Terror Lk.	1	3	0	4		
874-W. Terror Lk.-Uganik	1	2	0	3		
876-NW Kiliuda	7	2	0	9		

Table 4. Hunter residency and success in Unit 8, 1984-88.

Year	Successful				Year	Unsuccessful			
	Local Res.	Non-local Res.	Nonres.	Total		Local Res.	Non-local Res.	Nonres.	Total
1984	44	3	8	55	1984	--	--	--	--
1985	33	2	1	36	1985	--	--	--	--
1986	31	6	3	40	1986[a]	15	--	0	15
1987	10	9	3	22	1987[a]	29	--	3	32
1988	17	3	5	25	1988	16	11	0	27

[a] Local and non-local lumped.

Table 5. Harvest data by permit hunt in Unit 8, 1984-88.

Hunt no.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Percent hunter success	Males	Females	Total
871	1984	25	12	8	5	38%	3	1	
5[c]									
	1985[a]	136[b]	72	34	30	47%	13	17	30
	1986	20	7	6	7	54%	6	1	7
	1987	20	10	7	3	30%	1	2	3
	1988	20	10	8	2	20%	2	0	2
872	1984	20	8	0	12	100%	6	6	12
	1985	25	18	1	7	86%	2	4	6
	1986	15	2	5	8	62%	4	4	8
	1987	15	8	3	4	57%	0	4	4
	1988	15	3	5	7	58%	4	3	7
873	1984	20	8	5	7	58%	5	1	7[c]
	1985	----------	----------	----------	See Hunt No. 871	----------	----------	----------	----------
-									
	1986	20	11	1	8	89%	4	4	8
	1987	20	10	5	5	50%	4	1	5
	1988	20	9	7	4	36%	1	3	4
874	1984	25	22	1	2	67%	0	2	2
	1985	----------	----------	----------	See Hunt No. 871	----------	----------	----------	----------
-									
	1986	20	9	3	8	73%	4	4	8
	1987	20	9	7	4	36%	3	1	4
	1988	20	15	2	3	60%	1	2	3
876	1984	81	43	9	29	76%	16	12	29[c]
	1985	----------	----------	----------	See Hunt No. 871	----------	----------	----------	----------
-									
	1986	25	15	1	9	90%	5	4	9
	1987	25	9	10	6	38%	5	1	6
	1988	25	11	5	9	78%	11	2	9

[a] Boundaries of hunt nos. 873, 874 and 876 changed.
[b] Permits valid for hunt nos. 871, 873, 874, 876.
[c] Total includes 1 goat of unknown sex.

Table 6. Harvest chronology in Unit 8, 1984-88.

Year	September			October		
	Males	Females	Total	Males	Females	Total
1984	18	15	33	14	5	19
1985	Season not open in September			15	21	36
1986	10	9	19	13	8	21
1987	3	4	7	10	5	15
1988	6	6	12	9	4	13

Table 7. Successful hunter transport in Unit 8, 1984-88.

Year	Airplane	(%)	Boat	(%)	ORV	(%)	Highway vehicle	(%)
1984	41	(80%)	10	(20%)	0		0	
1985	19	(56%)	14	(41%)	1	(2%)	0	
1986	25	(66%)	11	(29%)	0		2	(5%)
1987	17	(77%)	5	(23%)	0		0	
1988	15	(68%)	7	(32%)	0		0	

STUDY AREA

GAME MANAGEMENT UNIT: 11 (13,300 mi^2)

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

BACKGROUND

Mountain goats have been harvested in Unit 11 by hunters for at least 30 years; however, little information is available on the number of animals harvested by hunters prior to 1972 because harvest data was not collected before this date. Although seasons and bag limits were liberal, harvests before 1972 were minimal. Because of an increase in hunting pressure and harvests in the mid-1970's the season length and bag limit were reduced.

Little information is available concerning the population status of mountain goats before 1970, when the MacColl Ridge trend count area was established to obtain sex and age composition data and monitor population trends. Additional aerial survey data on mountain goats in other portions of Unit 11 have been collected in conjunction with sheep counts.

POPULATION OBJECTIVE

Maintain a prehunting season population of at least 500 mountain goats.

METHODS

An aerial survey was conducted to determine sex and age composition and population trends of MacColl Ridge, which is located north of the Chitina River in the southeastern portion of Unit 11. Additional mountain goat population data were periodically collected during aerial surveys of sheep trend count areas. Harvests and hunting pressure were controlled by registration permit. Harvests were monitored by requiring registration and check-out of all permittees at the Glennallen office.

RESULTS AND DISCUSSION

Population Status and Trend

The 1988 survey of MacColl ridge resulted in a count of 42 goats, 10% below the 1987 count of 47 (Table 1). Because of the yearly fluctuations in survey results, it is difficult to detect a

definite trend; however, the mountain goat population on MacColl Ridge appears to be declining.

Population Size:

Seven hundred mountain goats inhabit the southern Wrangell and Chugach Mountains in Unit 11 (Table 2). This estimate was obtained by combining the survey results from different count areas in Unit 11 since 1973. If a count area had been surveyed more than once, the highest count was included in the total.

Population Composition:

The ratio of kids:adults observed on MacColl Ridge during 1988 was 45:100; kids composed 31% of the goats observed (Table 1). This is the highest ratio ever observed on MacColl Ridge, suggesting high kid production as well as a decline in the number of adults in the population.

Distribution and Movements:

During past aerial surveys, approximately 400 mountain goats have been observed in that portion of the Wrangell Mountains north of the Chitina River between the Chesnina River and the Canadian Border. Within this area the Kennicott, Hawkins, and Barnard Glaciers, MacColl Ridge, and McCarthy Creek support the largest number of animals. Close to 300 goats have been counted south of the Chitina River in that portion of the Chugach Mountains from the Copper River east to the Canadian Border.

Information on movements is limited because radio collars have not been utilized. Major rutting and kidding areas are unknown. Field observations suggest seasonal altitudinal movements occur; goats often utilize lower elevations during the winter. East-west movements also occur, because animals have been observed traveling between the Kotsina and Kuskalana Rivers and between Kennicott Glacier and McCarthy Creek.

Mortality

Seasons and Bag Limits:

The open season for resident and nonresident hunters is 1 September to 30 November; the bag limit is 1 goat by registration permit only.

Human-induced Mortality:

Hunters killed 15 mountain goats during the 1988 season, equalling the average annual harvest since 1980 (i.e., when the registration permit hunt was initiated; Table 3). Over the 16 years that harvest data have been collected, substantial fluctuations have been reported in the yearly take. From 1972 to 1974 (10 August opening date and a 2-goat bag limit), the average

annual harvest was 49 goats. In 1975 the bag limit was reduced to 1 goat and the season opening delayed until 1 September. As a result, the reported average annual harvest from 1975 to 1979 declined to 23 goats.

The 1988 harvest was composed of 9 (60%) males and 6 (40%) females, compared with 14 (74%) males and 5 (26%) females in 1977. During the last 3 years hunters have been more selective for males; this apparent selectivity may reflect an increase in the number of guided hunts. From 1980 to 1985 the sex ratio of the harvest was 50:50.

Hunter Residency and Success. Sixty-nine registration permits were issued in 1988; 44% of the 34 permittees who reported hunting were successful (Table 3). Hunting pressure and average number of hunters were similar to those in 1987 and since 1980, respectively. Successful hunters reported spending 2.1 days afield compared with 2.8 days for unsuccessful hunters. Residency data for all permittees are presented in Table 4. Since 1984 nonresidents have taken about half (49%) of the harvest and experienced a higher success rate (69%) than residents (57%).

Permit Hunts. Currently, an unlimited number of registration permits are issued for the mountain goat hunt on a first-come, first-served basis. Permits are available only in Glennallen, and all hunters must report results there also. Harvest guidelines provide for a yearly harvest rate of approximately 10% of the estimated population. The season may be closed by Emergency Order, if the reported harvest exceeds harvest guidelines.

Harvest Chronology. During 1988, 60% (9) of the harvest occurred during the first 2 weeks of the season (Table 5). A similar pattern was observed in 1986 and 1987. Prior to 1986, harvests occurring later in the season were generally larger, especially in October before winter set in. The change in harvest chronology was attributed to an increase in the number of nonresident hunters seeking a combination sheep and goat hunt during September. Goats killed later in the season are usually taken by state residents who are specifically seeking a goat.

Transportation Methods. Transportation means used by goat hunters in Unit 11 have not changed much since 1984 (Table 6). Most (60-85%) hunters utilized aircraft; highway vehicles were the second-most popular method.

Natural Mortality:

Sources of natural mortality common for most mountain goat populations include accidents and starvation during periods of deep snow or icing. Wolf predation has also been observed in portions of the unit. Reports by trappers and local residents

suggest wolf predation may be common; however, predation rates have not been determined.

Habitat Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. Because favorable habitat is limited, goats tend to congregate in those areas that best provide their habitat requirements. Goats occur in substantial numbers north of the Chitina River from east of the Lakina River to the Canadian border. The remainder of the Wrangells Mountains west of the Lakina River is considered to be only marginal goat habitat. The habitat in the Chugach Range south of the Chitina River may be more suitable, because goats appear to be more evenly distributed there.

Game Board Actions and Emergency Orders

In 1975 the Board shortened the mountain goat season by moving the opening date from 10 August to 1 September and reduced the bag limit from 2 goats to one. This action was taken to reduce the annual harvest, effectively closing the goat season during the first 20 days of sheep season when the heaviest hunting pressure occurs. By maintaining a 1 September opening, the Board still provided some opportunity for hunters to take both sheep and goats (i.e., 1-20 September).

In 1980 goat hunting put was permitted by registration permit only. This action was necessary because much of Unit 11 was included in Wrangell-Saint Elias National Park/Preserve, concentrating sport hunting pressure on goats located on lands designated as preserve. In 1986 the goat season was reduced by 31 days, closing at the end of November, to better align closing dates with those in adjacent Unit 6.

CONCLUSIONS AND RECOMMENDATIONS

Average counts for mountain goats in the MacColl Ridge trend area appear to be lower over the past 3 years (1986-1988) than those previously observed. The reduced numbers may have been due to incomplete counts. Mountain goats are among the most difficult big game species to enumerate because of rugged terrain; however, the same factors have affected previous surveys, when the number of mountain goats were higher. Because kid production has remained high, the reduction in adults may be attributable to overwinter mortality, predation, hunting mortality, or a combination of these factors.

The mountain goat population north of the Chitina River is considered stable; trends south of the Chitina River are unknown, because all available data were collected in only 1 year. Although population estimates derived from survey data collected

over a period of years have limited application, it appears that the population objective is being met. Mountain goats are only numerous in limited areas where habitat conditions are favorable. Overall, goat densities in Unit 11 are much lower than in areas with more favorable habitat; e.g., the Kenai Peninsula.

Although harvests and hunting pressure during the 1970's were greater than more recent ones, goats were hunted throughout their range. Because of restrictive National Park regulations, goat hunting is now concentrated around McCarthy, MacColl Ridge, and the Hawkins and Barnard Glaciers. MacColl Ridge receives some of the heaviest hunting pressure in the unit, especially for guided hunts. During the past 5 years, 29 goats (i.e., 31% of the unit's harvest) have come from MacColl ridge. The average annual harvest has been 6 goats, or 14% of the observed population. Barnard and Hawkins Glaciers are popular sheep hunting areas for trophy rams, and because combination hunts are popular, goats also receive heavy pressure. Guides are active in these areas; over the past 5 years (1984-1988), 18 (19%) and 10 (11%) goats have been taken from Barnard and Hawkins Glaciers, respectively. The average annual harvest rate over the past 5 years on these glaciers has been 10% of the observed population.

Because Unit 11 goats appear able to sustain yearly harvest rates of 10% of the population, the average annual harvesrt (i.e., 15) is considered sustainable; however, heavy harvests from MacColl Ridge will result in a decline in the goat population in that area. Therefore, I recommend that the hunting season be closed by Emergency Order as soon as the combined harvests from MacColl Ridge and Hawkins and Barnard Glaciers exceed 12 goats or 10% of the known number of goats present. The total annual harvest from Unit 11 should not exceed 35 goats for more than 1 year; if it does, further reductions in the length of season should be implemented. In addition to the yearly trend count on MacColl Ridge, goats should be surveyed in heavily hunted areas; e.g., Hawkins and Barnard Glaciers.

PREPARED BY:

Robert W. Tobey
Wildlife Biologist III

SUBMITTED BY:

Gregory N. Bos
Survey-Inventory Coordinator

Table 1. Mountain goat sex and age composition in the MacColl Ridge trend area, 1970-88.

Date	Adults	Kids	Total	Kids:100 adults	% Kids
1970	--	--	28	--	--
1973	33	10	43	30.3	23.2%
1974	41	3	44	7.3	6.8%
1975	--	--	--	--	--
1976	12	1	13	8.3	7.7%
1977	39	14	53	35.9	26.4%
1978	26	9	35	34.6	25.7%
1979	43	10	53	23.0	19.0%
1980	37	10	47	27.0	21.0%
1981[a]	55	10	65	18.0	15.0%
1982	38	11	49	29.0	22.0%
1983	41	3	44	7.3	6.8%
1984	41	11	52	26.8	21.2%
1985	51	12	63	23.5	19.0%
1986	27	7	34	25.9	20.5%
1987	36	11	47	30.5	23.4%
1988	29	13	42	44.8	30.9%

[a] Helicopter and ground count.

Table 2. Historical mountain goat sex and age composition in Unit 11, 1973-84.

Count area	Date	Adults	Kids	Total goats	Kids:100 adults	% Kids
15	1981	103	27	130	26	21%
16	1984	76	12	88	16	14%
17	1983	12	6	18	50	33%
18	1983	2	1	3	50	33%
21	1981	55	10	65	18	15%
22	1984	46	7	53	15	31%
23E	1983	20	2	22	10	9%
23W	1981	10	3	13	30	23%
Total, all areas:						
North of Chitina River	1981-84	324	68	392	21	17%
South of Chitina River	1973	230	66	296	29	22%

Table 3. Mountain goat harvests in Unit 11, 1972-88.

Regulatory year	No. males	No. females	No. unknown	Total harvest	No. hunters	Percent success
1972[a]	13	24	0	37	64	50%
1973	36	23	0	59	94	60%
1974	27	24	1	52	105	42%
1975[b]	11	6	0	17	49	35%
1976	16	10	1	27	65	42%
1977	19	11	2	32	63	51%
1978	9	12	0	21	46	46%
1979	10	8	0	18	22	82%
1980[c]	4	2	0	6	20	30%
1981	9	1	0	10	23	43%
1982	4	4	0	8	21	38%
1983	6	10	0	16	44	36%
1984	9	9	0	18	52	35%
1985	3	10	0	13	34	38%
1986	25	5	0	30	50	60%
1987	14	5	0	19	32	59%
1988	9	6	0	15	34	44%

[a] Bag limit 2 goats.

[b] Bag limit 1 goat initiated.

[c] Registration Permit Hunt No. 880 initiated: 1 goat by permit.

Table 4. Hunter residency and success in Unit 11, 1984-88.

Year	Permits issued	Successful			Unsuccessful			
		Local res.	Nonlocal res.	Nonres.	Total	Resident	Nonres.	Total
1984	73	4	9	5	18	32	2	34
1985	75	3	4	6	13	17	4	21
1986	97	6	9	15	30	14	5	19
1987	64	2	4	13	19	10	3	13
1988	69	4	3	8	15	11	8	19

Table 5. Harvest chronology in Unit 11[a], 1984-88.

Year	Season dates	September				October				Other	Total
		1-7	8-15	16-23	24-30	1-7	8-15	16-23	24-31		
1984	1 Sept.-31 Dec.	1	6	1	2	1	3	4	--	0	18
1985	1 Sept.-31 Dec.	4	3	--	--	--	3	2	--	1	13
1986	1 Sept.-31 Dec. by E.O.	11	9	3	3	--	2	--	--	2	30
1987	1 Sept.-30 Nov.	9	4	4	2	--	--	--	--	0	19
1988	1 Sept.-30 Nov.	6	3	0	2	3	1	--	--	0	15

[a] Number by time period.

Table 6. Mountain goat hunter transport methods in Unit 11, 1984-88.

Year	Airplane		Horse		Boat		3 or 4-wheeler		Snowmachine		Off-road vehicle		Highway vehicle	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1984	34	(65)	5	(10)	--	--	--	--	1	(2)	--	--	12	(23)
1985	18	(60)	1	(3)	2	(7)	4	(13)	4	(13)	--	--	1	(3)
1986	38	(85)	--	--	2	(4)	--	--	2	(4)	--	--	3	(7)
1987	19	(63)	2	(7)	--	--	3	(10)	1	(3)	1	(3)	4	(14)
1988	23	(68)	1	(3)	--	--	1	(3)	--	--	--	--	9	(26)

STUDY AREA

GAME MANAGEMENT UNIT: 13D and 14 (12,640 mi^2)

GEOGRAPHICAL DESCRIPTION: Talkeetna Mountains and northwestern Chugach Mountains

BACKGROUND

The 1st comprehensive goat survey in Unit 14 was conducted in 1972, and additional surveys have been conducted sporadically since. The 1st survey in Subunit 13D was conducted in 1959.

The mean annual harvest from the Talkeetna and northwestern Chugach Mountains was 25 goats for the period 1980-1988. The lowest harvest occurred during the 1980 season when only 1 animal was killed; the highest, during the 1986 season when 50 animals were killed. More than 85% of the harvest has come from the Lake George area in Subunit 14C.

Seasons and bag limits have ranged from a respective 10 August through 31 December and 2-goat limit in all of Units 14 and 13 during the mid-1960's to a restrictive drawing-permit seasons and 1-goat bag limits during the late 1970's and early 1980's in Subunits 14B, 14C, and portions of 14A, with Subunits 13D and portions of 14A closed. Hunting in Unit 14 is regulated by registration permit. In 1987 a drawing-permit hunt was reinstated in Subunit 13D after a 10-year closure.

POPULATION OBJECTIVES

To maintain a prehunting season population of at least 100 goats in Unit 13.

To maintain a prehunting season population of at least 60 goats in Subunits 14A and 14B.

To maintain a population of 500 goats to sustain an annual harvest of 25 goats composed of at least 60% males in Subunit 14C.

METHODS

Sex and age composition and trend were monitored through aerial surveys conducted during August 1987 in Subunits 13D and 14A and during August 1988 in Subunit 14C.

RESULTS AND DISCUSSION

Population Status and Trend

Aerial surveys were conducted throughout most known goat ranges within the Talkeetna and northwestern Chugach Mountains. In Subunit 14C, 370 goats were observed, while 12 were seen in Subunit 14B, 53 in Subunit 14A south of the Matanuska River, and 116 in Subunit 13D, compared with 459 and 515 in Subunit 14C during 1987 and 1986 and 24, 63, and 134, observed during 1986 in the remaining subunits, respectively.

The 1986 survey was the most extensive survey ever conducted in a single year, and the number of goats observed in Subunits 14A, 14C, and 13D was the highest on record. Although fewer goats were observed in the individual subunits in 1987, compared with 1986, variations in count conditions and movement could easily account for the lower numbers. In 1988 the total in Subunit 14C was down again; however, these surveys were conducted in the early morning. Late-evening surveys are best for observing goats; e.g., the largest numbers of goats observed in Subunit 14C were during 1984 (476) and 1986 (515), when the counts were conducted in the evening. Efforts will be made to conduct future counts during the evenings. Goat populations in the Talkeetna and Western Chugach Mountains are considered stable.

Population Size:

Aerial survey data collected over the past several years indicate that a minimum of 750 goats inhabit the Talkeetna and northwestern Chugach Mountains. Estimates of goat population size by subunit are as follows: Subunit 13D, 110-130; Subunit 14A, 80-100; Subunit 14B, 15-25; and Subunit 14C, 500-600. Although current population objectives are being met, careful monitoring should be continued, especially in light of the moderately severe winter of 1987-1988.

Population Composition:

Complete annual composition data are only available for Subunit 14C. Because of budget constraints, a number of surveys of goats in Subunits 14A, 14B, and 13D were either not conducted or were incidental to aerial sheep surveys. Tables 1A, 1B, 1C, and 1D present composition data for the previous 5 years for these subunits.

Distribution and Movements:

Goat distribution during summer months has been documented from aerial surveys. The greatest densities of goats occur in the Lake George and Twentymile River drainages in Subunit 14C. Subunit 14A south of the Matanuska River also contains a fair number of goats. Goats are seldom found far from escape cover, which includes broken, rocky, steep terrain. During summer

months, goats tend to be found feeding in early morning and late evening on open grassy slopes, often adjacent to glaciers or snowfields. During midday, they seek relief from the heat in dense shrub cover and under rocky outcrops. Little is known about precise winter distribution patterns or kidding or rutting areas.

Mortality

Season and Bag Limit:

The open season for resident and nonresident hunters in Subunit 13D is 10 August to 20 September. The bag limit is 1 male (billy) goat by drawing permit only; up to 30 permits will be issued. There is no open season in Subunit 14A. The open season for resident and nonresident hunters in the remainder of Unit 14 is 1 September to 31 October. The bag limit is 1 goat by registration permit only; however, from 16 to 31 October goats may be taken by bow and arrow only.

Human-induced Mortality:

With the exception of Subunit 14C, the goat harvest in the Talkeetna and northwestern Chugach Mountains has remained relatively consistent for the past 5 years (Table 2). A season in Subunit 13D was initiated in 1987, after having been closed since 1978. Those portions of Unit 14 open to goat hunting were changed from a drawing-permit hunt to a registration permit hunt in 1984; resulting in a substantial increase in the harvest. The majority of this increase occurred in the Lake George drainage, because it supports a high density of goats and is easily accessible by aircraft.

In Subunit 13D, where only billies can be taken, 2 goats each were killed during 1987 and 1988. During the 1988 season 1 of the 2 goats killed was a female. The horns of this animal had the characteristics typically used to identify male goats.

In 1987 and 1988 the harvest in Subunit 14C was approximately one-half of those observed in each of the previous 3 years, a result of a 1-month reduction in season (from 1 September-30 November to 1 September-31 October). Moreover, the last 2 weeks of October (16-31 October) were restricted to archery only, and no goats were killed during that time in either 1987 or 1988.

Hunter Residency and Success. Tables 3A, 3B, 3C, 3D, and 3E summarize hunter residency and success. With the exception of the Lake George drainage in Subunit 14C, few nonresidents hunt in the Talkeetna and northwestern Chugach Mountains. In the Lake George area over the past 3 years, nonresidents composed 41% of all successful goat hunters, including 62% in 1988 (Table 3E). Legislation was passed in 1989 requiring all nonresident hunters to be accompanied by a guide-outfitter or an Alaskan resident

within the 2nd degree of kindred. This requirement will probably reduce the harvest in the Lake George area.

Permit Hunts. The number registration permits issued for Unit 14 has fluctuated substantially over the past 4 years (Tables 4A, 4B, 4C, and 4D). Applicants for registration hunts peaked in Unit 14 during 1984, because the unit had been under a drawing-permit system during the previous 6 years. The following year (1985) confusion caused by a court ruling regarding subsistence hunting may have caused some hunters not to participate. The reduction in permits issued during 1987 and 1988, compared with those for 1986, was caused by a shorter season and an archery-only restriction during the last 2 weeks of the season. Subunit 13D was opened to hunting by drawing permit only (Table 4E); goat hunting within the subunit had been closed since 1978.

Harvest Chronology. In the Lake George area of Subunit 14C (Hunt No. 869), harvest chronology is highly variable between years and no discernable trend is apparent. Harvests in Subunits 13D, 14A, 14B, and the Twentymile River drainage in Subunit 14C are too small for evaluating chronology. Weather generally plays an important role in the timing of hunts, as do season dates for other big game species. For example, during the 1986 hunting season, there was a substantial goat harvest during the 2nd half of October, after most other big game seasons had closed and as good weather conditions prevailed.

Transport Methods. In 1988 all successful hunters used aircraft as primary transportation for hunting goats in Unit 14 (except the Twentymile River drainage) and Subunit 13D. In the Twentymile River drainage boats and highway vehicles were used by 78% of successful hunters (Tables 5A, 5B, 5C, 5D, 5E).

Natural Mortality:

Although annual survey results have varied dramatically over the years, significant natural mortality has not been observed.

Game Board Actions and Emergency Orders

A number of changes to mountain goat hunting regulations have been made since 1983. All of Unit 14 was reglated by drawing permits in 1983, and 100 permits were issued. Under this system, the number of goats harvested was below sustainable harvest levels, and the regulations for Unit 14 were changed in 1984 to provide for registration permit hunts (i.e., 1 September-30 November season). The harvest increased substantially during the 1984, 1985, and 1986 seasons. In 1986 an Emergency Order was issued to close the Lake George area in Subunit 14C on 26 October because the harvest had exceeded the objective. Because of increased harvests, the season was shortened in Unit 14 beginning in 1987 (i.e., 1 September-31 October) and the last 16 days restricted to harvests by bow and arrow only. In 1988 an Emergency Order was issued to close the Twentymile River area on

7 October because the harvest had exceeded the management objective.

Based on data obtained during aerial surveys in Subunit 13D during 1986, 2 drawing-permit hunts were established for the 1987 and 1988 seasons; 25 permits were issued for each year.

CONCLUSIONS AND RECOMMENDATIONS

Surveys were conducted during early morning hours in Unit 14 during this reporting period, and fewer goats were observed than in previous years when evening surveys had been flown. I recommend that surveys take place during the last 2 hours of daylight, when goats are out feeding and are more easily observed. Helicopter tours of the Lake George area, which included overflights and landings, may have caused goats to move to other areas and/or caused them to seek cover when aircraft approached. Goats located near a preferred helicopter landing location were extremely excitable when approached during aerial surveys. These helicopter activities should be more closely monitored.

In light of the decreased number of goats observed in the Lake George and Twentymile areas in 1987, regular surveys should be continued. Current season and bag limits appear to be functioning successfully. The 1987 reduction in season length in Unit 14 successfully reduced the goat harvest; however, the billy only restriction in Subunit 13D may be too stringent, considering the existing harvest level. A change to an either-sex season is recommended. Harvests may be reduced beginning in 1989, particularly in the Lake George area, as a result of the new guide-outfitter requirement for nonresidents. If such reductions occur, an increase in season length and/or removal of the archery-only restriction during the late portion of the season may be appropriate.

PREPARED BY:

Michael G. McDonald
Wildlife Biologist II

SUBMITTED BY:

Gregory N. Bos
Management Coordinator

Table 1A. Sex and age composition as determined from aerial surveys in Subunit 13D, 1984-1988.

Year	Adults	Kids	Percent kids in population	Total goats	# Goats /hour
1984[a]	19	2	10	21	2.3
1985	--	--	--	--	--
1986[b]	109	25	19	134	6.4
1987[b]	97	19	16	116	13.3
1988	--	--	--	--	--

[a] Goats noted while doing sheep surveys.
[b] Complete survey of known mountain goat areas.

Table 1B. Sex and age composition as determined from aerial surveys in Subunit 14A, 1984-1988.

Year	Adults	Kids	Percent kids in population	Total goats	# Goats /hour
1984[a]	21	7	25	28	--
1985	--	--	--	--	--
1986	45	18	29	63	--
1987	38	15	28	53	7.5
1988	--	--	--	--	--

[a] Goats noted while doing sheep surveys.

Table 1C. Sex and age composition as determined from aerial surveys in Subunit 14B, 1984-1988.

Year	Adults	Kids	Percent kids in population	Total goats	# Goats /hour
1984	--	--	--	--	--
1985	--	--	--	--	--
1986	19	5	21	24	--
1987	12	3	25	15	--
1988	--	--	--	--	--

[a] Goats noted while doing sheep surveys.

Table 1D. Sex and age composition as determined from aerial surveys in Subunit 14C, 1984-1988.

Year	Adults	Kids	Percent kids in population	Total goats	# Goats /hour
1984	353	123	26	476	77
1985	263	63	19	326	65
1986	385	130	25	515	76
1987	330	83	20	413	76
1988	296	74	20	370	73

[a] Data include all goats observed in Subunit 14(C); S&I reports prior to 1984 included only goats in registration hunt areas.

Table 2. Annual mountain goat harvest by subunit, 1984-88.

Year	Subunit				Total
	13D[a]	14A[b]	14B[b]	14C[b]	
1984	--	0	1	43	44
1985	--	0	2	36	38
1986	--	3	2	45	50
1987[c]	2	5	2	20	29
1988[c]	2	0	1	30	33

[a] Subunit 13D was not open to goat hunting until 1987.

[b] Subunits 14A, 14B, and 14C by registration permit only.

[c] Subunit 13D by drawing permit only (billies only).

Table 3A. Mountain goat hunter residency and success in Subunit 13D west, 1987-1988.

Permit hunt No.	Year	Successful				Unsuccessful		
		Local res.	Nonlocal res.	Nonresident	Total	Resident	Nonresident	Total
827	1987[a]	0	2	0	2	2	1	3
	1988	0	1	0	1	1	2	3
828	1987[a]	0	0	0	0	8	1	9
	1988	0	1	0	1	5	1	6

[a] first year season has been open since 1978.

Table 3B. Mountain goat hunter residency and success in Subunit 14A (Hunt No. 866), 1984-1988.

Year	Successful				Unsuccessful		
	Local Resident	Nonlocal resident	Nonresident	Total	Resident	Nonresident	Total
1984	3	0	0	3	70	0	70
1985	0	0	0	0	6	0	6
1986	3	0	0	3	59	1	60
1987	4	1	0	5	35	0	35
1988	0	0	0	0	7	0	7

Table 3C. Mountain goat hunter residency and success in Subunit 14B (Hunt No. 867), 1985-1988.

Year	Successful				Unsuccessful		
	Local Resident	Nonlocal resident	Nonresident	Total	Resident	Nonresident	Total
1985	0	2	0	2	3	0	3
1986	0	1	0	1	7	0	7
1987	0	0	2	2	8	1	9
1988	0	0	1	1	2	0	2

Table 3D. Twentymile River drainage, mountain goat hunter residency and success in Subunit 14C (Hunt No. 868), 1985-1988.

Year	Successful				Unsuccessful		
	Local Resident	Nonlocal resident	Nonresident	Total	Resident	Nonresident	Total
1985[a]	--	--	0	5	--	--	60
1986	4	0	0	4	31	6	37
1987	3	0	0	3	23	1	24
1988	5	2	2	9	13	2	15

[a] Residency of successful and unsuccessful hunters not available; 56 local residents, 8 nonlocal residents and 1 unknown residency participated in the hunt.

Table 3E. Mountain goat hunter residency and success in Subunit 14C (Hunt No. 869) Lake George drainage, 1985-1988.

Year	Successful				Unsuccessful		
	Local Resident	Nonlocal resident	Nonresident	Total	Resident	Nonresident	Total
1985[b]	--	--	5	29	--	--	90
1986	17	12	12	41	35	2	37
1987	7	1	7	17[b]	25	4	29
1988	2	6	13	21	26	14	40

[a] Residency of successful and unsuccessful hunters not available; 76 local residents, 42 nonlocal residents, 5 nonresidents and 1 unknown residency.

[b] Includes unknown residency

Table 4A. Mountain goat harvest by registration permit hunt in Unit 14A (Hunt No. 866), 1984-1988.

Year	Permits issued	Did not hunt	Unsuccessful	Successful
1984	73	43	27	3
1985	27	18	6	0
1986	63	27	30	3
1987	35	26	4	5
1988	20	9	7	0

Table 4B. Mountain goat harvest by registration permit hunt in Unit 14B (Hunt No. 867), 1984-1988.

Year	Permits issued	Did not hunt	Unsuccessful	Successful
1985	16	10	3	2
1986	9	7	1	1
1987	11	6	3	2
1988	6	3	2	1

Table 4C. Mountain goat harvest by registration permit hunt in Unit 14C Twentymile River (Hunt No. 868), 1984-1988.

Year	Permits issued[a]	Did not hunt	Unsuccessful	Successful
1984	103	47	51	5
1985	64	17	40	5
1986	104	62	37	4
1987	57	26	28	3
1988	47	23	15	9

[a] Includes permittees who did not report.

Table 4D. Mountain goat harvest by registration permit hunt in Unit 14C Lake George (Hunt No. 869), 1984-1988.

Year	Permits issued[a]	Did not hunt	Unsuccessful	Successful
1984	206	90	78	36
1985	123	35	59	29
1986	130	53	31	41
1987	96	45	34	17
1988	126	65	40	21

[a] Includes permittees who did not report.

Table 4E. Mountain goat harvest by drawing permit hunt in Unit 13D, 1987-88.

Permit hunt Nos.	Year	Permits issued	Did not hunt	Unsuccessful	Successful
827	1987	10	5	3	2
	1988	10	6	3	1
828	1987	15	3	9	0
	1988	15	8	6	1

Table 5A. Successful mountain goat hunter transport methods in Subunit 13D (Hunt Nos. 827, 828), 1987-88.

Year	Airplane	Horse	Boat	3-or-4 wheeler	Snowmachine	ORV	Highway vehicle
1987	2	0	0	0	0	0	0
1988	2	0	0	0	0	0	0

Table 5B. Successful mountain goat hunter transport methods in Subunit 14A (Hunt No. 866), 1984-88.

Year	Airplane	Horse	Boat	3-or-4 wheeler	Snowmachine	ORV	Highway vehicle
1984	0	0	0	0	0	1	3
1985	0	0	0	0	0	0	0
1986	1	0	2	0	0	0	0
1987	3	0	0	0	0	0	1
1988	0	0	0	0	0	0	0

Table 5C. Successful mountain goat hunter transport methods in Subunit 14B (Hunt No. 867), 1985-1987.

Year	Airplane	Horse	Boat	3-or-4 wheeler	Snowmachine	ORV	Highway vehicle
1985	2	0	0	0	0	0	0
1986	1	0	0	0	0	0	0
1987	2	0	0	0	0	0	1
1988	1	0	0	0	0	0	0

Table 5D. Twentymile River (Hunt No. 868) successful mountain goat hunter transport methods in Subunit 14C, 1985-1988.

Year	Airplane	Horse	Boat	3-or-4 wheeler	Snowmachine	ORV	Highway vehicle
1985	2	0	1	0	0	0	2
1986	0	0	2	0	0	0	2
1987	0	0	3	0	0	0	0
1988	2	0	4	0	0	0	3

Table 5E. Lake George (Hunt No. 869) successful mountain goat hunter transport methods in Subunit 14C, 1985-1988.

Year	Airplane	Horse	Boat	3-or-4 wheeler	Snowmachine	ORV	Highway vehicle
1985	25	0	0	3	0	0	0
1986	38	0	0	2	0	0	1
1987	13	0	1	1	0	0	0
1988	21	0	0	0	0	0	0

Federal Aid Project
funded by your purchase of
hunting equipment