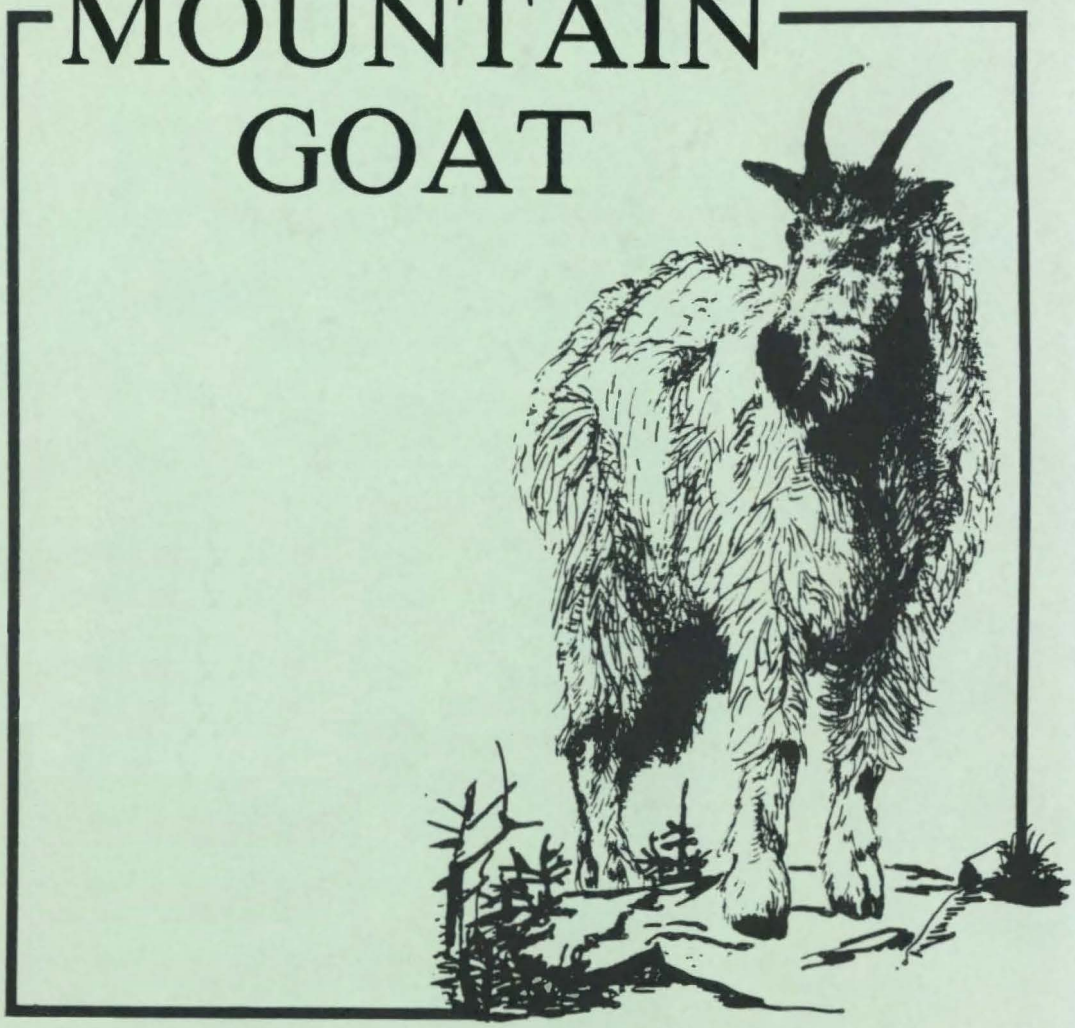
Alaska Department of Fish and Game
Division of Wildlife Conservation
Federal Aid in Wildlife Restoration
Annual Report of Survey—Inventory Activities
1 July 1987—30 June 1988

MOUNTAIN GOAT



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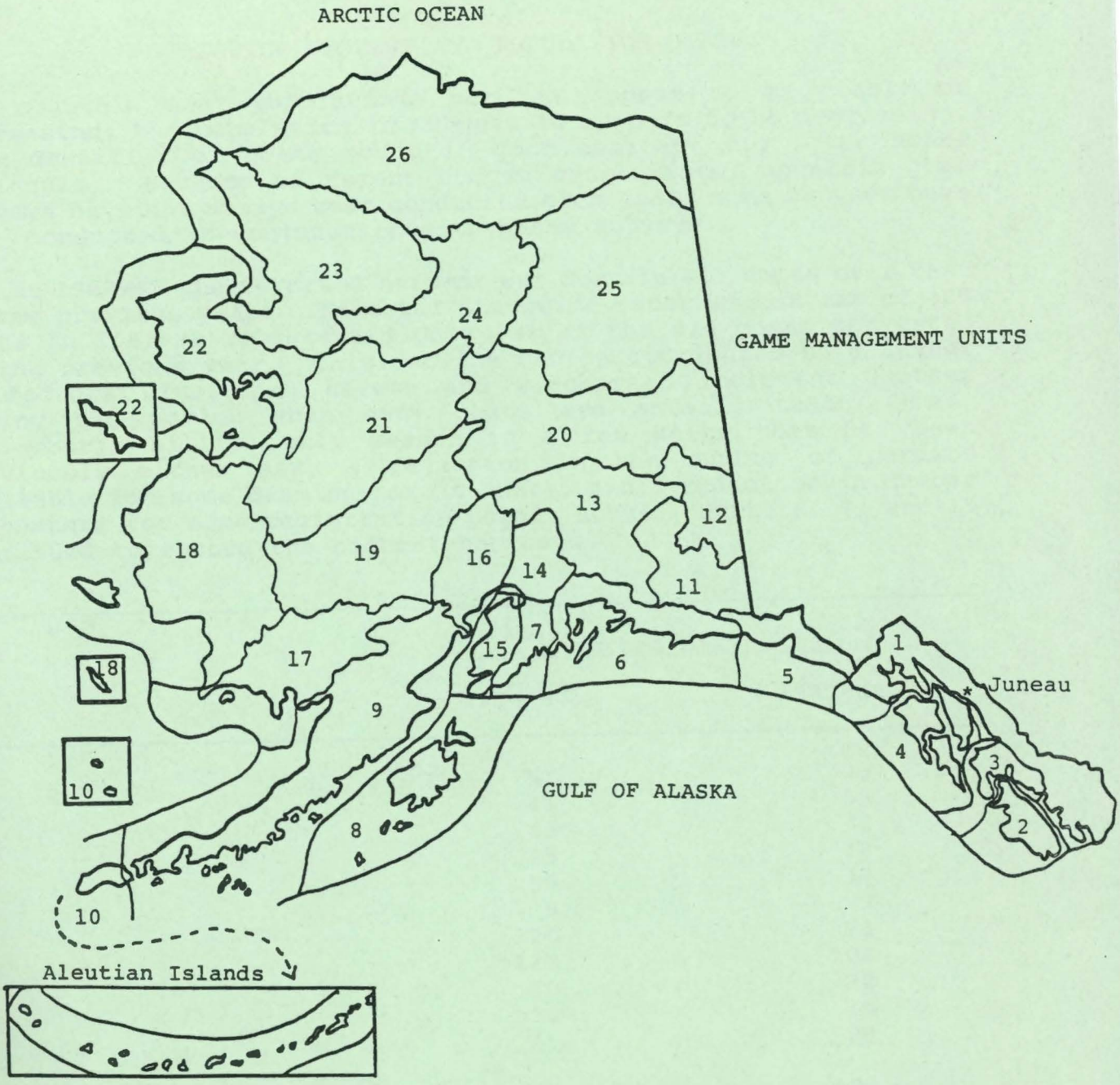
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STATEWIDE HARVEST AND POPULATION STATUS

All mountain goat populations but one appear to be stable or increasing; the population in Subunit 1D appears to be decreasing. High densities of goats occur in good habitat; e.g., the Kenai Peninsula. Because of recent budget constraints, mountain goat surveys have not always been conducted each year; some surveys have been conducted in conjunction with sheep surveys.

During 1987-88 the reported harvest was down in all units over that of the previous year. The total statewide reported harvest of 405 goats in 1987-88 represented only 70% of the 576 goats harvested in the previous year. This decline can be attributed to a number of factors, including severe and widespread inclement weather during the period when many goats are usually taken (i.e., September), billies only season in a few units that had been previously either sex, a reduction in the number of permits available for some drawing-permit hunts, and a reduction in number of hunters for some registration permit hunts. Units 6, 7, and 15 continued to record the highest harvests.

	Reported Harvest	
Unit	1986-87	1987-88
1A	51	28
1B	41	38
1C	43	32
1D	25	18
4	50	37
5	9	3
6	120	71
7 & 15	118	108
8	40	22
11	30	19
13D & 14	49	29
Totals	576	405

Steven R. Peterson
Senior Staff Biologist

STUDY AREA

GAME MANAGEMENT UNIT: 1A (5,000 mi²)

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

BACKGROUND

Goat populations in Subunit 1A, which were at very high levels in the mid- to late 1960's, fell to very low levels in the mid-1970's following a series of hard winters. Since about 1981 goat populations have increased to high, relatively stable levels.

Until recently, goats in Subunit 1A were found only on the mainland. Since 1983, when 17 goats were transplanted to Revillagigedo Island, the population there has been steadily increasing.

The harvest has changed little in recent years. Since 1980 hunters have harvested an average of 57 goats annually; of these, nonresidents have accounted for approximately 25%. Most goats were killed in September, and the harvest was fairly well distributed throughout the subunit. Aircraft transportation was used by most successful hunters; boats were utilized by the remainder.

The fall surveys that have been conducted almost every year since the late 1960's seem to accurately represent population trends. Initiated in 1982, the limited spring surveys to assess overwinter kid survival also seem to be fairly accurate.

POPULATION OBJECTIVES

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

METHODS

Up to 9 areas are surveyed in the fall, depending on weather conditions. Aerial surveys are conducted over specific routes that are flown under comparable conditions from year to year (Table 1). In the Ketchikan area surveys are generally conducted in the evening with a Piper Super Cub in late August or early September. 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. The same areas are surveyed each year, and they overlap portions of several fall survey routes. Timing of the surveys is more critical than in the fall because of changing green-up dates. In the spring of 1987, a ground survey was attempted; a boat was

utilized, and goats were observed in slide areas and other openings with a spotting scope.

As part of the registration permitting process, all permit holders are required to complete and return an informational report to ADF&G. Compliance is strictly enforced, and reporting rates are over 95%. Collected data include hunter success, area hunted, number of days hunted, date of hunt and harvest, and transportation used. Successful hunters may obtain a 2nd permit upon returning their 1st one. Second permittees 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 5 years. Fewer fall surveys have been conducted during the past 3 years (1984-86); however, the number of goats observed per hour of flight time has remained about the same. The number of kids:100 adults has generally declined since the early 1980's; i.e., 40% since 1980.

Population Size:

Population levels are indexed against the number of goats observed per hour of survey time. Table 2 shows fall survey data since 1968. It is not possible to say with certainty what proportion of the population is observed during a survey, but I believe we have seen between one-third and one-half of the goats present.

Population Composition:

There was a significant difference between the 21 kids:100 adults observed in September 1987 and the 4 kids:100 adults observed in the spring of 1988. This is the first time since the spring surveys were started in 1982 that the difference has been so large. Snow depths at low elevations were normal during the winter, but the accumulation of heavier snows at the higher elevations caused fairly heavy kid mortality.

Mortality

Season & 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 8 years. For the past 6 years, a

2nd permit has been available to those hunters who have killed goats (i.e., in portions of Subunits 1A and 1B) and returned their 1st hunting report. A total of 189 1st permits and six 2nd permits were issued from the Ketchikan office for the 1987 season (Table 3). For these calculations, 2nd-permit holders are considered as separate hunters. Within Subunit 1A, 88 hunters killed 28 goats (14 males, 13 females, and 1 unknown) in 332 hunter days. Success was 32%, and 11.9 hunter days were expended per goat harvested. Forty-three percent of the harvest was taken by nonresident hunters (Table 4).

The 1987 season has been the poorest since initiation of the registration permits in 1980. Because inclement weather conditions grounded aircraft during most of September and the 1st half of October, very few hunters were able to fly into the alpine lakes where most of the hunting occurs. This factor affected the harvest chronology (Table 5) as well as the hunter's means of transportation (Table 6).

Illegal and unreported harvests are generally low or nonexistent (Table 7). Essentially, all hunter reports are returned and some loss of goats occurs because the carcasses are unretrievable.

The area where the heaviest harvests occurred (i.e., 30%) was from Yes Bay to Eagle River. The area from Chickamin River to Rudyerd Bay produced 22% of the harvest, and the other 3 areas accounted for 8% to 15% of the goats harvested in 1987. The harvest was fairly well distributed over the accessible goat range.

CONCLUSIONS AND RECOMMENDATIONS

The current goat population in Subunit 1A appears to be moderately high. The harvest in 1987 remained low and was fairly well distributed over a wide portion of the subunit. Moderately heavy mortality in the kid segment of the herd may have occurred during the 1987-88 winter, but confirmation of this won't come until September 1988 surveys have been completed.

The mountain goat transplant to Revillagigedo Island in the summer of 1983 appears to be successful. Radio collars placed on 15 of the goats are no longer functioning, but as of May 1985 only 1 known mortality had been indicated. Incidental observations have shown goats to be present over most of the original release site; uncollared adults with kids have also been sighted.

For several years, spring surveys of goat populations have been attempted using a boat rather than an aircraft. Results have been promising. Because it may provide more reliable results for less cost, this method should be tested further.

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SUBMITTED BY:

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Table 1. Mountain goat composition surveys in Subunit 1A, September 1987

Area	Date	No. of adults	No. of kids	Total goats	Hours of survey time	No. goats observed/hr.	Kids:100 adults	Survey rating
K-3	(no survey)							
K-4	8 Oct 87	69	17	86	0.78	110	25	Fair
K-5	(no survey)							
K-6	(no survey)							
K-7	(no survey)							
K-8	(no survey)							
K-9	(no survey)							
K-10	23 Sept 87	92	18	110	0.97	114	20	Good
K-11	23 Sept 87	21	4	25	0.28	88	19	Good
Totals		182	39	221	2.03	109	21	
Means								

Table 2. Goat survey data for Subunit 1A, 1968-1987.

Survey[a] dates	No. of kids	No. of adults	Total goats	Kids per 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	482	31	3.88	124
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. 9 to Sept. 20, 1985	75	311	386	24	3.30	117
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

[a] Data is most comparable from 1975-1987.

Table 3. Permit hunt harvest data in Subunit 1A, 1983-87.

Hunt No.	Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	M	F	Total
801	1983	245	98	81	66	36	30	66
	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	60	28	14	13	28

[a] Second permit holders are treated as another hunter.

Table 4. Hunter residency and success in Subunit 1A, 1983-1987.

	Successful				Unsuccessful			
Year	Local[a] res.	Nonlocal res.	Nonres.	Totals	Local[a] res.	Nonlocal res.	Nonres.	Totals
1983	49		17	66	64		17	81
1984	33		20	53	66		22	88
1985	30		21	51	67		21	88
1986	39		12	51	48		23	71
1987	16	0	12	28	43	3	14	60

[a] Local and nonlocal resident are combined for 1983-86.

Table 5. Harvest chronology (% per month) in Subunit 1A, 1983-87.

Year	Aug	Sept	Oct	Nov	Dec
1983	15	52	15	16	0
1984	21	62	11	0	6
1985	14	49	29	0	8
1986	16	59	8	2	16
1987	33	30	22	7	7

Table 6. Successful hunter transportation methods in Subunit 1A, 1983-87.

Year	Airplane (%)	Boat (%)
1983	76	24
1984	81	19
1985	90	10
1986	82	18
1987	64	36

Table 7. Annual harvest and accidental death in Subunit 1A, 1983-87.

	Hunter harvest					
	Reported			Estimated		
Year	M	F	Total	Unreported	Illegal	Total
1983	36	30	66	0	0	66
1984	34	19	53	0	0	53
1985	29	22	51	0	0	51
1986	16	33	51	0	0	51
1987	14	13	28	0	0	28

STUDY AREA

GAME MANAGEMENT UNIT: 1B (3,300 mi²)

GEOGRAPHICAL DESCRIPTION: Southeast mainland from Cape Fanshaw to Lemesurier Point

BACKGROUND

Mountain goats are distributed throughout appropriate habitat in Subunit 1B, inhabiting 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 need for relatively snow-free areas for obtaining food also causes the utilization of adjacent forests and beaches. Limited information suggests an 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 caused significant reductions in the population. The mild winters of the mid-1970's to the present have reduced the natural mortality rates of the goat populations in Subunit 1B, and they are currently experiencing ideal conditions for population growth. Both direct and indirect data are insufficient at this time to make a meaningful estimate of the number of goats in Subunit 1B.

Accessibility by hunters dictates the distribution of hunting pressure in Subunit 1B. Because accessible areas receive a disproportionate share of harvest, they must be closely monitored, while little or no harvest occurs in relatively inaccessible areas. Average annual harvests during the most recent three 5-year periods (i.e., 1973-77, 1978-82, 1983-87) were 25, 28, and 36 goats, respectively.

POPULATION OBJECTIVES

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

METHODS

Aerial surveys within established trend count areas were scheduled to obtain population data (i.e., kids:100 adults ratio). The harvest was closely monitored through administration of the registration permit system.

RESULTS AND DISCUSSION

Population Status and Trend

The data are insufficient to determine the population trend of goats in Subunit 1B. I believe the population is stable, if not slightly increasing, because of the mild winters in recent years.

Population Composition:

The most recent age composition data from aerial trend counts are shown in Table 1. Large differences in sample size resulted from inclement weather, which makes 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 and methodology make it difficult to interpret indices of goat abundance (i.e., goats/trend count area or goats/hour of search time). Also, lack of information about seasonal goat 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, including drainages into the north shore of 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 1987 harvest of 38 goats was close to the 5-year (i.e., 1983-87) average of 36 that, in turn, was substantially higher than those for the 2 previous 5-year periods (i.e., 1973-77 and 1978-87 = 25 and 28 goats, respectively). The data in Table 2 suggest a trend of increasing harvest that, if continued unchecked, may result in localized overharvesting in the most accessible areas. Interestingly, even though no goats were taken from the Horn Cliffs area (Hunt No. 807), the total harvest did not notably decrease, suggesting that the billy-only harvest restrictions shifted additional hunting pressure to adjacent areas. This phenomenon must therefore be given careful consideration during future regulatory changes. During the most recent 3 seasons, the sex ratio of the harvest stabilized at about 42% males and 58% females; however, large deviations from this harvest ratio have occurred (e.g., 76% females in 1984).

Hunter Residency and Success. During the past 3 years (1985-87), local residents have taken an increasingly larger share of the harvest, and their success rate has increased from 22% to 35% (Table 3). Harvest by nonlocal residents dropped substantially in 1987. During the past 2 seasons, the overall hunter success rate was 38%.

The number of hunters in Subunit 1B has remained relatively constant during the past 5 years, varying from 86 to 112 (Table 4). The public attitude toward the males-only restriction on hunting

in the Horn Cliffs area (Hunt No. 807) is not clear at this time, but that restriction will be reviewed during the fall meeting of the Board of Game.

Hunter Chronology. September has been the most-active month for goat hunting; August has been the second-most-active month (Table 5). October has been very erratic, because inclement weather is normal then and, although harvests have tended to be low (e.g., 1983, 1985, and 1986), they have jumped dramatically when the weather improved enough to allow hunters access to the mountains (e.g., 1984 and 1987). This suggests that if unusually mild weather occurs during the fall a larger-than-normal number of goats could be killed in any given year.

Transport Methods. Transportation methods of goat hunters in Subunit 1B (Table 6) remained relatively stable during the most recent 5-year period (1983-87). Notably, there were fewer successful hunters using boats; however, this may have been caused, in part, by the lack of any harvest at Horn Cliffs. Before the regulation was changed in 1987, hunters using boats normally harvested from 2 to 3 goats.

Game Board Actions and Emergency Orders

No Emergency Orders were issued during the past 5 years; however, 2 regulatory changes have occurred. The bag limit for Subunit 1B, including all of the Cleveland Peninsula, was increased from 1 to 2 goats for the 1984 season. 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 for the 1987 season. The Board of Game decided that localized hunting pressure at Horn Cliffs was excessive and that a "billy only" season would be a way to reduce the harvest while continuing to provide hunting opportunity.

The Horn Cliffs regulation may not be tenable in the future. Public comment has been overwhelmingly in opposition to the regulation, because of the difficulty in distinguishing between male and female goats. It may be more practical to close the area to hunting until the population has recovered enough to support it.

CONCLUSIONS AND RECOMMENDATIONS

The current population objective should be restated to elimi nate ambiguous interpretation of its meaning. I recommend the following objectives: (1) maintain a 5-year average success rate for hunters of at least 33% and (2) maintain goat population densities in Subunit 1B above 20 goats per hour of survey time, until population density objectives can be established on an individual trend count area basis.

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Table 1. Age composition of goats observed during aerial surveys of trend count areas in Subunit 1B, 1983-87.

Date	No. adults	No. kids	Total goats	Kids:100 adults	% kids
1983	314	69	383	22	18
1984	438	130	568	30	23
1985	69	5	74	7	9
1986	78	22	100	28	22
1987	138	43	181	31	24

Table 2. Reported harvest of goats in Subunit 1B (Permit Hunt No. 801), including the Horn Cliffs area (Permit Hunt No. 807), 1983-87.

Date	Male	Female	Total
1983	13	15	28
1984	10	32	42
1985	14	19	33
1986	17	24	41
1987	16	22	38
Horn Cliffs	0	0	0
Remainder of 1B	16	22	38

Table 3. Hunter residency and success for goat hunting in Subunit 1B, 1985-87.

	Successful				Unsuccessful			
Date	Loc. res.	Nonloc. res.	Non-res.	Unk.	Loc. res.	Nonloc. res.	Non-res.	Unk.
1985	10	15	8	0	35	32	12	0
1986	16	16	9	0	50	8	9	0
1987	19	8	11	0	21	13	14	0
Horn Cliffs	0	0	0	0	15	0	0	0
Other	19	8	11	0	6	13	14	0

Table 4. Permit issuance data for goat registration hunt Nos. 801 and 807 (Horn Cliffs) in Subunit 1B, 1983-87.

Date	Permits issued	No. of hunters	Successful hunters	% successful hunters
1983	188	103	28	27
1984	169	104	42	40
1985	202	112	33	29
1986	195	109	41	38
1987	171	86	38	54
Horn Cliffs	59	15	0	0
Other	112	71	38	54

Table 5. Chronology of goat harvest in Subunit 1B, 1983-87.

	Aug.		Sep.		Oct.		Nov.		Dec.	
	M	F	M	F	M	F	M	F	M	F
1983	2	5	4	6	2	1	2	2	2	1
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

Table 6. Transportation means of successful goat hunters in Subunit 1B, 1983-87.

Year	Airplane	Boat	ORV
1983	9	19	0
1984	27	15	0
1985	18	15	0
1986	26	15	0
1987	27	9	2

STUDY AREA

GAME MANAGEMENT UNIT: 1C (6,500 mi²)

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

BACKGROUND

Mountain goats arrived in Southeast Alaska from southern refugia sometime after the retreat of Pleistocene glaciation (Klein 1965). Mountain goats now inhabit most of the coastal range of Southeast Alaska, where the steep, forested slopes broken by rock outcrops that are important components of their winter range are common.

A popular species for both local sport hunters and trophy hunters from around the world, mountain goat populations in easily accessible areas near Juneau have been reduced significantly from historic high numbers. It is for this reason that the area between Taku Glacier and Eagle River has been closed to hunting since 1985.

POPULATION OBJECTIVES

To maintain goat population densities that result in the observation of at least 30 goats per hour of fall survey time in the Eagle and Antler River drainages and in the Chilkat Range north of the Endicott River.

To maintain 50 goats per hour in the area south of Taku Inlet.

To retain 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, including hunter effort, success, transportation, and date, sex, and location of kill were obtained from returned registration permits for the 1987 fall hunt. No aerial surveys were conducted during this reporting period.

RESULTS AND DISCUSSION

Population Status and Trend

Without survey data for this period, estimates of population status are tenuous; however, hunter success rates, goats harvested per

unit of effort, and the percentage of females in the harvest may give some indications of population trends. The 1987 goat hunter success rate of 32% was below the 5-year (1983-87) average of 41%. Additionally, the average numbers of days of hunting required to bag a goat increased from 3.1 days in 1986 to 3.8 days in 1987 (i.e., 18%); this figure has gradually increased since 1982, but the largest single-year rise was observed in 1987. The percentage of females in the harvest increased from an average of 42% for the 1982 through 1986 seasons to 52% in 1987. This parameter may be a less-reliable indicator of population status, because it has fluctuated in recent years. Harvest data alone suggest that the population may be in a slight decline; however, survey data for the past 5 years suggest a stable one (Table 1).

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 Lyn 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 reported harvest for 1987 is summarized in Table 2. Only 3 females were harvested in Hunt Area No. 802, while 15 males, 13 females, and 1 unknown were harvested in Hunt Area No. 803. The total harvest of 32 goats was somewhat below the 5-year mean of 38.

Hunter Residency and Success. Twenty-five of the goats harvested in 1987 were taken by local residents, three by other Alaskan residents, and four by nonresidents (Table 3). Approximately one-third of the local residents that hunted were successful, compared with the 50% and 25% success rates for other Alaskans and for nonresidents, respectively. There is no apparent trend in nonresident or nonlocal resident participation or success rates.

Permit Hunts. Following the initial decrease in hunter participation after a large portion of Hunt Area No. 802 was closed in 1985, the number of hunters applying for permits has continued to grow over the past 4 years. Interest in the hunt is still only about half of that observed during the years before the closure (Table 4). The number of permits issued for Hunt Area No. 803 (i.e., 163) remained high; the percentage of permittees that actually participated also increased slightly.

Harvest Chonology. During the 4-month season (i.e., Hunt No. 803), harvest continued into November; i.e., 44% (n = 14) (Table 5). Of the remaining harvest in Subunit 1C, 13%, 6%, and 22% were taken in August, September, and October, respectively. The preponderance of late-season harvests reflects hunters' preference for goats in prime winter pelage.

Transport Methods. There are few transportation changes from past years. Approximately two-thirds of the hunters used boats and one-third used aircraft.

Natural Mortality:

There is little data available concerning natural mortality. Holroyd (1967) cited several instances of goats being killed in falls, rock slides, and avalanches. While black bear, brown bear, and wolves frequent the areas used by goats, no predation has been documented. Many wolf fecal samples collected between Eagle River and the Mendenhall Glacier in the early 1980's contained goat hair, but whether the animals had been killed or scavenged could not be ascertained (ADF&G files). Eagles have been known to harass goats (Holroyd 1967), and cases of very young kids being carried off by eagles have been documented (Casebeer et al. 1950).

Habitat Assessment

Winter and summer goat range within Subunit 1C is extensive. Goat numbers are probably well below carrying capacity in most parts of the subunit, with the possible exception of the Tracy and Endicott Arm areas. Some loss of important winter range is expected, if proposed mining in the Berner's Bay drainage becomes a reality. There is presently no timber harvest planned that would impact goats.

CONCLUSIONS AND RECOMMENDATIONS

Given the trends in success rate and hunter effort per goat harvested, intensive aerial surveys should be conducted in the coming year to determine population composition and status. It is not yet clear what effect the current closure has had on goat numbers in those areas. Factors such as predation and forms of natural mortality (e.g., accidental deaths because of falls or avalanches) that may be suppressing population recovery should be examined.

If local conservation groups raise sufficient funds, an effort will be made in the near future to reestablish mountain goats to the Mount Juneau and Mount Roberts area. Such a reintro duction would provide viewing opportunities for both Juneau residents and tourists. The proposed release sites are within the area currently closed to goat hunting.

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Table 1. Mountain goat composition counts in Subunit 1C, 1982-87.

Year	Kids	Adults	Kids: 100 adults	Total goats	Goats /hr.
1983	28	105	27	133	42
1984	31	129	24	160	43
1985	75	260	28	335	140
1986	55	192	22	247	42
1987[a]	--	---	--	---	--

[a] No surveys flown in 1987.

Table 2. Mountain goat harvest by sex in Subunit 1C, 1982-87.

Year	Males	Females	Unknown	Other[a]	Total
1983	23	18	1	2	44
1984	15	14	0	1	30
1985	19	16	0	2	37
1986	33	10	0	2	45
1987	15	16	1	2	34

[a] Includes estimates of illegal and unreported kill, and goats shot but not retrieved.

Table 3. Hunter residency and success in Subunit 1C, 1982-87.

	Sucessful				Unsuccessful			
Year	Local res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1983	28	5	9	42	28	24	8	60
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	41
1987	25	3	4	32	52	3	13	68

Table 4. Harvest data by permit hunt in Subunit 1C, 1982-87.

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	212	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

Table 5. Harvest chronology in Subunit 1C, 1982-87.

Year	Aug	Sept	Oct	Nov
1983	5	9	14	14
1984	4	9	6	10
1985	4	5	4	22
1986	6	11	2	18
1987	9	2	7	14

Table 6. Successful hunter transport methods in Subunit 1C, 1982-87.

	Percent		
Year	Airplane	Boat	Highway vehicle
1983	11	31	0
1984	11	18	0
1985	7	28	0
1986	15	25	3
1987	11	21	0

STUDY AREA

GAME MANAGEMENT UNIT: 1D (2,600 mi²)

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, the smallest of the 3 areas, is bounded by the Taiya River, Yukon and White Pass Railroad, and the Canadian border. It was closed by Board of Game in 1984 because of an apparent sharp decline in goat numbers, as evidenced by fewer sightings, reduced hunter success, and a greater proportion of females in the harvest. Recent composition counts suggest that the goat population in Hunt Area No. 804 has not stabilized, despite the closure.

In the remainder of Subunit 1D, mountain goat populations in the 1980's have remained well below those of the late 1960's and 1970's. Success rates for goat hunters have declined since 1982. Poor success rates have contributed to the decrease in hunter participation between 1984 and 1987.

Hundertmark et al. (1983) examined winter habitat utilization by mountain goats in the Chilkat Valley. They felt that increased access afforded by logging, mineral development, and related road construction would result in increased hunting pressure and illegal harvests. This added hunting pressure and the ability to access previously unhunted areas were considered to be detrimental to goat populations as well as to the habitat; i.e., loss resulting from logging and mining.

POPULATION OBJECTIVES

To increase the goat population in Hunt Area No. 804 (i.e., Skagway) to 100 animals.

To increase estimated population in Hunt Area No. 805 (i.e., Haines North) from 600 to 1000 goats and maintain hunter success of 25%.

To increase estimated population in Hunt Area No. 806 (i.e., Haines South) from 300 to 500 goats and maintain hunter success of 25%.

METHODS

Aerial age composition surveys were conducted in 3 separate portions of Subunit 1D during the reporting period. Harvest parameters, including hunting pressure and hunter success rates,

were jointly determined for Hunt Areas Nos. 805 and 806 because a single registration permit was used for both hunts.

RESULTS AND DISCUSSION

Population Status and Trend

While it is difficult to determine trends for individual hunt areas or drainages, goat populations throughout Subunit 1D appear to be decreasing. On 5 August 1987 an abbreviated aerial survey was conducted in Hunt Area No. 804. Poor weather conditions caused the flight to be terminated before the survey had been completed. The population of that area has exhibited a steady decline since the early 1980's, despite the current hunting closure. Although this year's survey was incomplete, only 11 goats per hour were observed, representing a sharp reduction from those seen during previous years (Table 1).

On the same day, a survey of that portion of Hunt Area No. 806 (i.e., lying on the east side of Lynn Canal) was conducted under poor-to-fair conditions. During 55 minutes of survey time, 16 adults and 1 kid (19 goats/hr) were observed between Kasidaya Creek and White Pass Fork. The last time this portion of the hunt area had been surveyed was in the fall of 1983, when 11 adults and 2 kids were observed during 28 minutes of survey time (28 goats/hr). A 22 July 1987 aerial survey of Tahkin Ridge (Hunt Area No. 806) showed the most dramatic drop in goats observed per hour of flight time (Table 1). Although total goats observed, as well as goats per hour, have decreased since the 1985 survey, the ratio of kids to adults has not significantly changed, suggesting that mortality is not age-specific.

Population Size:

Survey data for the reporting period is incomplete and many of the surveys were conducted under less-than-ideal conditions, resulting in tenuous population estimates. It is likely that the population of Hunt Area No. 804 has declined from more than 150 goats in 1981 to between 40 and 60 goats. Survey figures for the Tahkin Ridge (Hunt Area No. 806) suggest that between 30 and 80 goats remain, down 50% from the 1983 estimate.

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 18 goats were taken in Subunit 1D during 1987. Of these, eight were males, nine were females, and the sex of one was not specified. The total harvest of 18 goats was the second-lowest since 1978 (Table 2).

Hunter Residency and Success. Hunters were issued 169 registration permits for Hunt Nos. 805 and 806 in 1987 (Table 5). Eighteen (25%) of 72 hunters participating were successful. While this success rate represented a decrease from that in 1986, it was identical to the 1982-1986 average. Most (76%, n = 129) of the permit registrants were residents of Subunit 1D. Nonresidents composed 8% (n = 13) of all permittees and 11% (n = 2) of the successful hunters (Table 4).

The number of persons taking part in the hunt has declined annually since 1985. Data from the previous 2 years (i.e., 1985-86, 1986-87) also suggests a decline; however, the change from 3 separate permits (Nos. 804, 805, and 806) to 1 combined permit after 1984 makes comparisons difficult. The decline in participation is especially noteworthy, in light of the moose season closure of 1986 and the limited moose hunt of 1987. Increased hunting pressure on alternative species, such as mountain goat, could have been reasonably expected.

Harvest Chronology. Goats can be hunted in Subunit 1D from 1 August until 31 December. Most goats (89%, n = 16) were taken during September, October, and November; the harvest was evenly split between these 3 months (Table 5).

Transport Method. Of goat hunters reporting, most reached the hunting area by boat (55%) or highway vehicle (28%). Lesser numbers reported using aircraft (5%), foot (8%), and off-road vehicle or snowmobile (3%). Of successful hunters, 67%, 22%, and 11% reported using boats, highway vehicles, and other means, respectively (Table 6).

Habitat

Given the apparent decrease in goat numbers in Subunit 1D, it is unlikely that goat populations are near carrying capacity. It is probable that years of heavy snow accumulations in the early 1980's and human-induced mortality have combined to cause the decline. Goats are also susceptible to other forms of human disturbance, including hikers and low-flying air craft; both of these will increase as tourist use of the Haines and Skagway areas grows. Possibly the greatest threat to goat habitat is timber harvesting. Goats are known to be dependent on forested areas during the winter (Schoen and Kirchhoff 1982). Hundertmark et al. (1983) recommended

that (1) timber sales within the Haines State Forest be evaluated in terms of their impact on resident goat populations and (2) harvests be deferred in areas of high goat concentrations such as the Kelsall Valley. As timber prices rebound from a slump of several years, timber sales can be expected to increase. Cooperation between the Departments of Natural Resources and Fish and Game will be necessary to minimize conflicts between resource development and mountain goats.

CONCLUSIONS AND RECOMMENDATIONS

The stated management objective of a 25% hunter success rate for Hunt Areas Nos. 805 and 806 was met in 1987. It is more difficult to measure progress toward attaining the stated population level goals because of incomplete survey data and the difficulty in comparing current and historic data.

Although a few areas, such as Tahkin Ridge, have been surveyed consistently, much of Subunit 1D has not be surveyed recently. Standardization of survey routes and consistent timing of aerial population composition flights would allow for more accurate trend estimates.

Population levels in most of Subunit 1D are probably below management objectives. Goats observed per hour of flight time suggest a decline in goat numbers for both Hunt Area No. 804 and Tahkin Ridge. This trend is especially disturbing for Hunt Area No. 804, which has been closed to hunting since 1985. Department staff expected the recent series of generally mild winters to increase recruitment; however, in the Tahkin Ridge area in particular, the opposite appears to be true; goat numbers appeared to be down substantially.

Every effort will be made to survey the entire subunit in 1988, and standardized flight routes for each hunt area will be established. Beginning in the fall of 1988, hunters will be requested to voluntarily bring horns in for aging so that data on age structure of the harvest can be obtained. If funds allow, selected areas of goat winter range will be visited in the spring of 1989 to locate winter kills and attempt to ascertain causes of overwinter mortality not related to hunting. Aerial surveys in the spring of 1989 followed by standard fall surveys would allow us to make estimates of kid production and survival. If counts continue to suggest a downward trend in goat numbers, harvest restrictions will probably be needed in the near future.

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Table 1. Mountain goat composition counts by hunt area in Subunit 1D, 1983-87.

Area	Year	No. of kids	No. of adults	Kids:100 adults	Total goats	Count time (hrs)	Goats/ hr
804	1983	5	26	19	31	0.6	52
	1984	13	27	48	40	1.1	36
	1985	3	29	10	32	1.3	25
	1986	6	31	19	37	1.4	26
	1987	0	7	0	7	0.7	10
805	1983	11	29	38	40	0.8	50
806	1984[a]	--	--	--	--	--	--
	1985	13	41	32	54	0.8	68
	1986[b]	--	--	--	4	0.5	8
	1987	4	14	29	18	1.6	11

[a] No surveys conducted.
[b] Survey aborted because of weather.

Table 2. Mountain goat harvest by sex in Subunit 1D, 1983-87.

Year	Males	Females	Unknown	Total
1983	19	12	1	32
1984	12	18	0	30
1985	10	5	0	15
1986	9	13	3	25
1987	8	9	1	18

Table 3. Harvest data by permit hunt in Subunit 1D, 1983-87.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unknown	Total
804	1983	24	15	5	4	2	2	0	4
	1984	0	--	--	--	--	--	--	--
	1985	0	--	--	--	--	--	--	--
	1986	0	--	--	--	--	--	--	--
	1987	0	--	--	--	--	--	--	--
805	1983	158	73	62	23	23	9	1	23
	1984	198	118	55	25	10	15	0	25
806	1983	105	85	20	5	4	1	0	5
	1984	138	102	31	5	2	2	1	5
805	1985	165	81	69	15	10	5	0	15
806[a]	1986	143	64	54	25	9	13	3	25
	1987	169	99	52	18	8	9	1	18

[a] Beginning in 1985 a single permit was used for Hunt Areas 805 and 806.

Table 4. Hunter residency and success in Subunit 1D, 1983-87.

Year	Successful				Unsuccessful			
	Local res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1983	27	4	1	32	78	8	1	87
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

Table 5. Harvest chronology in Subunit 1D, 1983-87.

Year	Aug	Sept	Oct	Nov	Dec
1983	0	8	12	12	0
1984	1	19	5	11	2
1985	0	5	5	4	1
1986	0	9	13	2	1
1987	1	6	6	4	1

Table 6. Successful hunter transport methods in Subunit 1D, 1983-87.

	Percentage		
Year	Boat	Highway Vehicle	Other
1983	12	11	4
1984	18	7	4
1985	8	4	3
1986	9	15	1
1987	12	4	2

STUDY AREA

GAME MANAGEMENT UNIT: 4 (5,700 mi²)

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

BACKGROUND

In Unit 4 a huntable population of mountain goats is found only on Baranof Island (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 by 1937, and the 1st hunting season was held in 1949 (Burris and McKnight 1973). Average annual harvests on Baranof Island have varied from 28 to 75 goats, since the goat registration permit system was implemented in 1976.

Chichagof Island, immediately north of Baranof Island, was also the recipient of transplanted mountain goats; 25 goats were released there by the U.S. Fish and Wildlife Service in the mid-1950's (Burris and McKnight 1973). Sightings have been sporadically reported since 1957 (ADF&G files, Sitka); the latest 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 remote areas of the island. Other than hunters, the only other potential predators present on the 2 islands are brown bears and bald eagles, both of which have been suspected of goat predation elsewhere (Chadwick 1983).

Admiralty Island has no indigenous or introduced mountain goat populations. No other goat populations are known to exist 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 unlimited. An average of 147 permit holders have hunted annually since 1976. Successful permit holders are required to report goat harvests within 10 days, and unsuccessful hunters and permittees who did not hunt are required to report within 15 days of the close of the season. Mountain goats have not been surveyed on Baranof Island since 1985. A helicopter survey is scheduled for the fall of 1988.

RESULTS AND DISCUSSION

Population Status and Trend

Baranof Island goats have been surveyed by helicopter in recent years. A triennial survey schedule was established in 1982. The most recent survey was conducted in September 1985 (Table 1); the goat population was still increasing at that time. Only a portion of the goat habitat was surveyed, because much of the goat range is inaccessible to hunters (Johnson 1987). A Jet Ranger helicopter with 2 observers was used to survey Baranof Island north of Lake Diana. During the survey, 534 goats were counted and classified (Johnson 1987).

Population Composition:

During the 1985 aerial survey, kids composed 14% of the population (17 kids:100 adults). Regulations do not prohibit the harvesting of kids or nannies. Billies tend to be solitary during hunting season, while kids and nannies are gregarious. Groups of females and young goats are more likely to be spotted by hunters. In 1987, 20 (54%) of the goats killed were males, 16 (43%) were females, and the sex of one (3%) was not reported.

There is no legal requirement for hunters to present horns for examination, but hunters have been encouraged to submit horns for measurement and age determination. The average age of 21 goats harvested in 1987 was 5.3 years for females (n = 10) and 4.4 years for males (n = 11).

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:

In 1987 sport hunters harvested a total of 37 mountain goats; the 1986 harvest was 50 (Table 2). The harvest of 37 goats represents 7% of the observed 1985 population (i.e., 534). This harvest appears to be conservative, especially when considering that it is unlikely the entire goat population was seen by the surveyors.

Hunter Residency and Success. Alaska residents accounted for 89% (33) of the goats harvested in Unit 4, while nonresident hunters accounted for 11% (4). Eighty percent of all permit holders listed Sitka as their place of residence. Twenty-nine (78%) of the Alaskan hunters who killed goats in 1987 were Sitka residents, two

(5%) were residents of Port Alexander, one (3%) was from Nome, and one (3%) was from Anchorage. Hunter residency since 1983 is provided in Table 3.

Successful hunters expended an average of 2.8 days to harvest a goat in 1987, compared with 2.3 days in 1986. This variation may be due to weather or other factors unrelated to changes in the goat population. Of the 136 permit holders who actually hunted, 37 (27%) were successful and 99 (73%) were unsuccessful (Table 4). All permit reports were returned.

Harvest Chronology. The winter of 1987-88 was extremely mild in Southeast Alaska; very little snowfall occurred. Hunters in the Sitka area were able to easily pursue goats in December; 32% of the goats harvested were taken in December, 32% in August, 19% in October, 11% in September, and 5% in November (Table 5).

Transport Methods. Boats were used more than any other transportation means by goat hunters in Unit 4. A total of 54% of the hunters used boats, 29% used airplanes, and 14% walked into the hunting area from the Sitka road system (Table 6).

CONCLUSIONS AND RECOMMENDATIONS

Both population objectives were met during 1987. Sport hunters harvested a total of 37 mountain goats in Hunt Area No. 815; 27% of the hunters who actually hunted were successful. The goat season in Unit 4 lasts for 5 months to compensate for poor weather conditions that can stymie efforts to hunt goats. The goat population seems healthy, but accessible areas should be monitored to insure that overharvesting does not occur. Should restrictive measures be required, a shortening of the season would probably result in a smaller harvest.

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Table 1. Mountain goat survey in Unit 4, 1977-1985.

Date	No. kids	No. adults	Total goats	Kids:100 adults	Goats/ hour	Observer	Aircraft type
Aug 1977	148	393	541	38	73	Johnson - ADF&G	Hughes 500 helicopter
Aug 1979[a]	76	321	397	24	79	Johnson - ADF&G	Hughes 500 helicopter
Aug 1980[b]	106	367	473	29	71	Johnson - ADF&G	Alouette II helicopter
Sep 1982[c]	84	422	506	20	77	Johnson - ADF&G	Alouette II helicopter
Sep 1985[b]	76	458	534	17	69	Johnson - ADF&G	Jet Ranger helicopter

[a] North of Medvejie Lake - Baranof River only.

[b] North of Lake Diana only.

[c] North of Vodopad River only.

Table 2. Mountain goat harvest data for Unit 4, 1983-1987[a].

Year	Reported harest M	F	U	Estimated Total	total harvest
1983	34	27	0	61	61
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

[a] Some data are different than listed in previous S & I reports; past years' data were 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, 1983-1987.

	Successful				Unsuccessful			
Year	Local res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1983	55	3	3	61	119	25	6	150
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

Table 4. Harvest data by permit hunt No. 815 for Unit 4, 1983-1987.

Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Nonreporting	M	F	U	Total
1983	390	176	150	61	3	34	27	0	61
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

Table 5. Harvest chronology for Unit 4, 1983-1987.

Year	Aug	Sept	Oct	Nov	Dec	Total
1983	17	19	13	5	7	61
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

Table 6. Successful hunter tranport methods in Unit 4, 1983-1987.

Year	Airplane	Boat	Walked
1983	25	30	6
1984	30	19	0
1985	14	24	3
1986	20	25	5
1987	11	22	4

STUDY AREA

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

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

BACKGROUND

Mountain goats have been present in the eastern Alaska Gulf coastal region since historical records have been kept. Klein (1965) surmised that goats extended north and west from a southern refugium and that the present northern and western limits of distribution may be the result of relatively recent arrivals. Unlike moose, bears, and other large mammals in the Yakutat Forelands area, mountain goats may have come up the coast, rather than down the Tatshenshini and Alsek River corridor.

Alaska Natives used mountain goats for food and their hides for clothing and other domestic purposes. Recreational hunting occurred during the early 1970's; however, it probably began earlier because Yakutat was the site of a large Army base during World War II.

Aerial surveys were first conducted by the Alaska Department of Fish and Game in 1971, when 283 goats were enumerated between Gateway Knob and Harlequin Lake in the Brabazon Mountains. By 1973 Division biologists had observed a significant decline in goat numbers in the area, attributing it to severe winter weather. The population in Subunit 5A increased somewhat over the years, and the population estimate for the Icy Bay portion of Subunit 5B is currently higher than the area recorded in the early 1970's.

POPULATION OBJECTIVES

To increase the population from an estimated 850 to 1,250 goats.

To maintain a hunter success rate of 25%.

METHODS

Aerial surveys of a portion of the summer range in Unit 5 were conducted in August 1987 (Tables 1 and 2). Goats were classified as kids or adults, which included yearlings; the number of goats per hour and rate of kids:100 adults were calculated. Hunters were required to obtain registration permits from local ADF&G offices; these permits allowed in-season monitoring of harvest effort and intensity. Anecdotal information was gathered from hunters, ADF&G field personnel, and staff from other agencies.

RESULTS AND DISCUSSION

Population Status and Trend

Unlike surveys conducted in 1983 and 1984, those in 1987 did not include most of the summer range (Table 2). Furthermore, 1987 surveys were conducted on clear, warm days, causing reduction in the sightability of goats; therefore, the counts are not entirely comparable over the 5-year period and the population trend is uncertain. However, the healthy ratio of 35 kids:100 adults in the Brabazon Range and the overall ratio of 34 kids:100 adults for Subunit 5A suggest a stable or growing population.

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 harvest in 1987 of 3 mountain goats was the lowest since statehood (i.e., 1959); the 5-year (1983-87) average was 10 goats (Table 3). Since 1983, when 23 goats were harvested, the harvest has been significantly reduced; the 1972-86 average harvest was 15 goats. Most of this reduction in harvest appears to be due to decreased effort, rather than a reduced success rate. The wettest autumn on record (i.e., 97 in of rain in September and October 1987) undoubtedly contributed to the reduced success. While illegal harvests remain unquantified, they are probably low because of the small size of the community where word of illegal activity spreads quickly.

Hunter Residency and Success. The hunter success rate has varied considerably over the previous 5 years (Table 4); in 1983 it was 56%, while only 15% of those hunting in 1987 were successful. Inclement weather was probably responsible for most of this reduction.

All successful hunters in 1987 were nonresidents (Table 4). In the previous 4 years, nonresidents took as little as 29% of the annual harvest. While no goats were harvested by local and nonlocal Alaska residents in 1987, they have been responsible for up to 50% and 43% of the harvest respectively, since 1983.

Permit Hunts. Since 1985 the number of registration permits issued for this area has been almost constant (Table 5); 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. From 1983 to 1987 no goats have been harvested in August, and very few have been harvested in December (Table 6). Most of the harvest has occurred in September and October; in 1987, 100% of the harvest occurred during those months.

Transport Methods. All 3 successful goat hunters used aircraft in 1987 (Table 7). The percentage of hunters using this form of transportation has ranged from 50% to 78% over the previous 4 years (1984-87); boats were used by nearly all other successful hunters.

CONCLUSIONS AND RECOMMENDATIONS

While observations during aerial surveys in Subunit 5A suggest a depressed population, it is probably an artifact of survey conditions. The survey data from Subunit 5B and the kids:100 adults ratio in Subunit 5A suggest the populations are stable.

Extensive surveys should be conducted throughout Unit 5 during the next 2 years; these surveys will be especially important if planned U.S. Forest Service logging roads between Harlequin Lake and Alsek River are built. The ready access that roads would provide for hunters could precipitate reductions in goat numbers.

No changes in season or bag limit are recommended at this time.

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Table 1. Mountain goat age composition in Unit 5, summer, 1987.

Date	Location	No. of adults	No. of kids	Total goats	Kids Per adults	Goats/ hour
8/24/87	Gateway Knob to Harlequin Lake	57	20	77	35	45
8/24/87	Harlequin Lake to Mt. Unana	32	10	42	31	30
8/25/87	Chaix Hills	45	12	57	27	81
8/25/87	Karr Hills	62	11	73	18	192

Table 2. Mountain goat composition counts (1983-87) and subunit composition (1987) in Unit 5.

Year	No. of adults	No. of kids	Total goats	Kids:100 adults	Percent kids	Goats/ hour
1983	332	99	431	30	23	67
1984	327	100	427	31	23	74
1985[a]						
1986	36[b]	11	47	31	23	40
1987	196	53	249	27	21	60
Subunit						
A	89	30	119	34	25	38
B	107	23	130	21	18	120

[a] No surveys conducted.
[b] Harlequin Lake to Mount Pinta only.

Table 3. Annual harvest and accidental death in Unit 5 (1983-87) and harvest and accidental death (1987) for Subunits 5A and 5B.

Year	Reported Harvest M	F	Unk	Estimated Total Harvest
1983	13	10	0	23
1984	2	4	1	7
1985	2	6	0	8
1986	5	4	0	9
1987	2	0	1	3
Subunit				
5A	2	0	1	3
5B	0	0	0	0

Table 4. Hunter residency and success in Unit 5, 1983-87.

Year	Successful				Unsuccessful			
	Local res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1983	8	6	9	23	11	4	3	18
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

Table 5. Harvest data by permit hunt in Unit 5, 1983-1987.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Billies	Nannies	Total
817	1983	89	46	18	23	13	10	23
	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

Table 6. Harvest chronology in Unit 5, 1983-87.

Year	Aug	Sept	Oct	Nov	Dec
1983	0	5	8	8	2
1984	0	2	3	0	2
1985	0	2	4	0	2
1986	0	2	3	2	2
1987	0	1	2	0	0

Table 7. Successful hunter transport methods in Unit 5, 1983-87.

Year	Airplane	Horse	Boat	3- or 4 wheeler	Snowmachine	Off-road vehicle
1983	13	0	10	0	0	0
1984	5	0	2	0	0	0
1985	4	0	4	0	0	0
1986	7	0	2	0	0	0
1987	3	0	0	0	0	0

STUDY AREA

GAME MANAGEMENT UNIT: 6 (14,300 mi^2)

GEOGRAPHIC DESCRIPTION: Prince William Sound and north gulf coast

BACKGROUND

Mountain goats are endemic to the mainland mountains of the study area as well as Bainbridge, Culross, and Knight Islands. In 1785 Captain Cook misreported mountain goat hides from Prince William Sound as polar bear hides (Beaglehole 1966). Edmund Heller (1910) observed goats while investigating Orca Inlet, Valdez Arm, and Eaglik Bay in 1908, but he did not observe goats while visiting Port Nellie Juan. In 1938 Clarence Rhodes, Wildlife Agent for the Alaska Game Commission, reported that goats were "numerous in north Prince William Sound and in the Yakataga beach region (ADF&G files). In 1952 Fred Robards, a U.S. Fish and Wildlife Agent, estimated 4,350 goats between Cape Fairfield and Bering Glacier (ADF&G files). In 1961 Art Sheets, a Game Biologist with ADF&G, reported that there was evidence that goat populations in Port Wells and Puget Bay had been dramatically reduced by military personnel stationed in Whittier and Seward, respectively, during the 1940's and 1950's (ADF&G files).

Mountain goat populations probably suffered during the severe winters of 1971 and 1975, and some subpopulations were unable to recover because of pressures from predators (Reynolds 1981) and hunters. Heavy hunting pressure during the early 1980's caused additional subpopulations to decline (Griese 1988a), while predator pressure increased and predators expanded their range of impact (Griese 1988b).

Nichols (1985) reported that goats on the Kenai Peninsula ranged into the western side of Prince William Sound. Populations in Unit 6 may be shared with adjacent units on the Kenai Peninsula.

Previous management efforts were limited to extensive aerial composition surveys and harvest monitoring efforts that began in 1969 and 1982, respectively. Comparable count areas (subareas) were defined in 1986 (Griese 1988a). Although individual subareas have been surveyed about once every 6 years, the full extent of goat habitat in Unit 6 has not been surveyed. Harvest data were collected from hunters using harvest reports between 1972 and 1979; however, in 1980 hunters were required to report successful efforts on permit reports. By 1986 hunters were required to report all effort after Griese (1987) discovered that as many as 30% of the successful goat hunters were not reporting.

The management goals established for Unit 6 in 1976 ranged from providing a maximum opportunity to hunt goats to providing the opportunity to hunt or photograph goats under aesthetically pleasing conditions. Unit goals were modified beginning in 1986.

The assumption that a stable or increasing population at moderate-to-high densities would provide maximum hunting opportunity, aesthetic hunting conditions, and observation opportunities was informally adopted. Goat populations were monitored by subareas unitwide to reach those goals. While hunters are still given substantial opportunity to hunt goats, conservative harvest quotas have now been established to encourage subpopulation recovery or stability.

POPULATION OBJECTIVES

To increase the population to a minimum of 4500 mountain goats and sustain an annual harvest of 160 goats (i.e., a maximum of 30% females and an average male age of 6.0 years) by the year 2000.

METHODS

Composition and trend counts were conducted in 9 of 50 subareas during 1987. Counts were conducted from a Piper PA-12 or Piper PA-18 between 25 August and 29 September. Goat habitat between elevations of 1000 and 3000 feet was extensively surveyed. Observations of goats were recorded on USFS 1:125,000 maps, the numbers of adults and kids were recorded, and a range in population size was estimated. Goat hunters registered for permits that required reporting of success and effort as well as hunt location and transportation methods. All permittees were given a handout (Appendix A) that provided methods for differentiating sexes of goats at a distance as well as the benefits of selectively harvesting males. 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.

RESULTS AND DISCUSSION

Population Status and Trend

Goat populations in northern and western Prince William Sound were surveyed for the first time. Data were also collected at the Goat Mountain goat observation area for the first time since 1977. The population estimate for the subareas surveyed in western Subunit 6D ranged from 93 to 120 goats (Table 1). The Columbia Glacier population in northern Subunit 6D (subareas 6D10 and 6D11) was estimated at 345 to 390 goats. The estimate for the Goat Mountain observation area in Subunit 6B was 225 to 275 goats.

Only 3 subareas surveyed this year can be compared with historical survey data: 6D10 1981 and 6B3 and 6B2 1977. The survey counts suggested a stable population in subarea 6D10 (Table 2) and a substantially increased population in Subunit 6B. Sixty-nine goats were counted in that portion of Subunit 6B in 1972, and only 12 were counted in 1977; 153 goats were counted during this reporting period.

When the population surveys conducted between 1980 and 1987 in Unit 6 (Table 2) were compared, four of 9 subunit zones appeared to have increasing populations, while one displayed a decline, another was stable, and three had insufficient counts to assess a trend. Population densities appear to be increasing from Bering Glacier in Subunit 6A west to and including Subunit 6C as well as populations in southwestern Subunit 6D. Northern Subunit 6D appeared to have stable goat numbers. Goat numbers in Subunit 6D east of Valdez Arm and Shoup Glacier appeared to be decreasing.

Population Size:

Composition counts were conducted for the 1st time in northern and western Subunit 6D, enabling us to provide better estimates of the Subunit 6D and overall Unit 6 populations. The estimated population in Subunits 6A, 6B, 6C, and 6D ranged from 1000 to 3000, 330 to 360, 160 to 180, and 1600 to 1800 goats, respectively. The resulting unitwide population was 3100 to 3700 goats.

Population Composition:

During composition counts of Subunits 6B and 6D, a mean of 19% kids (Tables 1) were identified from all goats observed. This percentage is within the normal range of the historical counts; i.e., 20% for 1986 and 19% for the period 1969-1985 (Griese 1988a).

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 humters in the remainder of Unit 6 is 1 September to 20 November; the bag limit is 1 goat by registration permit only.

Human-induced Mortality:

The reported harvest of 71 goats in 1987 was the lowest since 1971 (Table 3). In the last 5 years (1984-88) harvest levels (Table 3) and number of permits issued (Table 4) have steadily declined, probably reflecting declining goat numbers.

There were 71 goats harvested during the reporting period: 65% males, 28% females, and 7% unknown. Female goats represented 30% of the known sex harvest, the lowest percentage recorded in Unit 6 since 1974 (29%). The average percentage of females in the harvest between 1972 and 1986 was 36%.

The average ages of 44 male and 19 female goats were 5.5 years (range = 1.3-12.3 years) and 5.6 years (range = 1.3-11.3 years), respectively. These average ages represent a slight decline from those of the previous year.

Illegal, unrecovered, and unreported harvests were estimated to range from 15% to 24% of the total unit harvest over the past 5 years (Table 3). Beginning in 1985 hunters were specifically asked to report goats killed but not recovered; they were assured that they would incur no legal repercussions. Hunters have since reported up to 7% of the total harvest in that category.

Hunter Residency and Success. Residents of Unit 6 reported the lowest goat harvest on record, accounting for only 3% of the total harvest and 8% of the hunter success. In 1986 residents of Unit 6 accounted for 22% of the harvest and 30% of the success (Table 4). Nonresidents accounted for 57% of the total harvest in 1987, substantially higher than the previous 4-year average of 36%. This change is believed to be the result of hunt area closures near Valdez, Cordova, and Whittier. The difficulty in access and costs to reach more distant open-hunting areas reduced efforts to local residents. Nonresident hunter effort changed little during the same period. Hunter success over the last 3 years has averaged 33% (Table 4).

Permit Hunts. The number of permits issued to goat hunters has steadily declined over the past 5 years. In 1987, 463 registration permits and 14 drawing permits were issued. A 40% decline in issued permits has occurred since 1983 (Table 4). Emergency orders closing goat hunt subareas have occurred for the 2nd consecutive year. Conservative harvest levels in popular registration permit hunt areas will inevitably cause the use of Emergency Orders as a standard procedure in future seasons.

Harvest Chronology. September recently replaced August as the dominant month for harvesting goats (Table 5). Hunters killed 60% of the reported kill in September 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 believed to be responsible for reduced harvest levels between November and January.

Transport Methods. The only important changes in transport methods over the last 5 years have been 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 recent years in Unit 6 has been questionable; precipitation levels were high, while temperatures were moderate at sea level. Elevations above 1000 feet accumulated substantial snow depths in

1987. Few reports of natural mortality were received to verify winter severity; however 2 goat carcasses in western Subunit 6A were reported by spring bear hunters. The hunters thought the deaths were due to wolf predation.

Habitat Assessment

No additional winter range was identified. Inability to specify winter range of goat populations in Unit 6 continued to be a major problem, when responding to people involved in land management plans.

Game Board Actions and Emergency Orders

The game regulations have changed in recent years. Localized high harvest levels and declining goat populations have prompted reduced season lengths in 1987, following the first emergency closure in October 1986. Lack of any population data for much of western and northern Subunit 6D indicating depressed local populations near community centers prompted season-long closures for those areas in 1987. Goat populations in the Ragged Mountains (Subunit 6B) and Don Miller Hills (Subunit 6A) exhibited substantially increased populations since they were closed in 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 (1) did not qualify as rural residents and (2) could not participate in subsistence seasons established in Subunits 6C and 6D for all other residents of those subunits for 1987.

Reported goat harvest levels reached allowable upper harvest limits established for portions of Subunit 6D in October 1987. These areas were popular goat hunter destinations and were likely to receive additional hunter pressure before the normal season closure. On 15 October an Emergency Order was issued closing those portions of the subunit.

CONCLUSIONS AND RECOMMENDATIONS

The population objectives calling for up to a 45% increase by the year 2000 were partially attained. The sex composition objectives were accomplished for the harvest, while those for age composition and total harvest were not. Future population estimates should be expected to fluctuate as more current survey data are collected.

The number of individuals hunting goats in Unit 6 has declined because of reduced hunting opportunity (i.e., reduced season length and increased subarea closure) and success. Reduced hunter success probably resulted from reduced goat numbers and the necessity to hunt them in more inaccessible areas. 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 increased efforts in completing subarea surveys and identifying the winter habitat of goats. The average time between surveys in individual subareas should be reduced to minimum average of 4 years. Effort should be made to survey all subareas not yet surveyed.

Winter distribution of goats in Unit 6 is not well known. Proposed timber harvest plans and private developments pose a substantial threat to important goat populations, if winter goat habitat is not protected. The lack of information on specific wintering areas hampers our ability to make sound recommendations. Relocating positions of radiotransmitters placed on a sample of goats in potentially developed areas would provide information on the distribution of winter habitat and essential data supporting population distribution and integrity.

Allowable harvest levels for Unit 6 subareas (Griese 1988a) need to be adjusted annually. Harvest levels for any 1 subarea should be adjusted according to the previous year's harvest composition, winter severity, amount of predation (if known), and population status and trend. Frequent surveys and diligent harvest monitoring will be essential.

Hunter education is also essential to meet population objectives. Under current regulations hunters may take goats of either sex. 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 the benefits of selectively harvesting males. This was the 1st year that all registrants were provided such briefings. Harvest composition for this period suggested initial success.

Changes to existing hunting season dates and bag limits are not recommended at this time.

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Table 1. Mountain goat population status in Unit 6, by subarea, as determined from aerial surveys, August-September 1987.

	6B2	6B3	6B subtotal	6D10	6D11	6D13	6D14	6D15	6D subtotal	Total
No. goats observed	126	27	153	174	112	41	4	32	363	516
Estimated population	145-165	80-110	225-275	210-235	135-155	50-60	5-15	38-45	435-510	663-785
% kids observed	20	7	18	21	18	20	0	16	19	x = 19

Table 2. Mountain goat composition counts in Unit 6, 1980-87.

Subunit[a]	Year	Subareas	Adults	Kids	n	Kids: 100 adults	% kids	Goats /hr.
Eastern 6A	1984	6A1-2	187	56	243	30	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
6C	1983	6C3	30	2	32	7	6	22
	1985	6C1-3	128	17	145	13	12	41
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	20	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	17	16

Table 2. continued.

Subunit	Year	Subareas	Adults	Kids	n	Kids: 100 adults	% kids	Goats /hr.
Southwestern 6D	1980	6D17	90	33	123	37	26	60
	1983	6D17	137	33	170	24	19	52

[a]Eastern 6A = Icy Bay to Clear Creek, subareas 6A1-2Central 6A = Clear Creek to Bering Glacier, subareas 6A3-6 Western 6A = Bering Glacier to Katalla River, subareas 6A7-116B = Katalla River to Copper River, subareas 6B1-36C = Copper River to Rude River, subareas 6C1-4Eastern 6D = Rude River to Shoup Glacier, subareas 6D1-9 Northern6D = Shoup Glacier to Harvard Glacier, subareas 6D10-12 Western 6D = Harvard Glacier to Kings Bay,subareas 6D13-15 Southwestern 6D = King Bay to Cape Fairfield, subareas 6D16-17

Table 3. Annual mountain goat harvests in Unit 6 from 1983 to 87 and by subunit in 1987.

Year	Reported harvest				Other[a]	Estimated Total
	Male	Female	Unknown	Total		
1983	82	54	2	138	44	182
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
Subunit						
A	12	4	2	18	6	24
B	1	0	0	1	0	1
C	1	0	0	1	2	3
D	32	16	3	51	10	61

[a] Includes unreported, unrecovered, and illegal harvests.

Table 4. Mountain goat hunter residency and success in Unit 6, 1983-87.

Permits Year	Successful					Unsuccessful[a]			
	Unit issued	Nonlocal res.	res.	Nonres.	Total	Unit res.	Nonlocal res.	Nonres.	Total
1983	796	35	59	39	138	--	--	--	--
1984	722	24	43	51	130	--	--	--	--
1985	611	24	37	33	95	66	111	53	231
1986	548	25	43	50	120	50	63	77	192
1987	477	2	28	41	71	18	79	74	171

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

Table 5. Mountain goat harvest chronology in Unit 6, 1983-87.

Year	Aug	Sept	Oct	Nov	Dec	Jan
1983[a]	36	29	26	24	10	8
1984[a]	36	29	29	5	9	12
1985	25	18	27	8	5	10
1986	16	57	44	1	1	0
1987	0	42	23	4	0	1

[a] Does not include harvest from count area 6D17; 3 and 11 goats were killed in 1983 and 1984, respectively.

Table 6. Successful mountain goat hunter transport methods in Unit 6, 1983-87.

Year	Airplane	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle
1983[a]	64	28	0	4	7	15
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

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

STUDY AREA

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

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

BACKGROUND

Mountain goats are the most abundant and widely distributed alpine ungulates on the Kenai Peninsula (Units 7 and 15). They occur along the entire length of the Kenai Mountains, which represents the western-most extension of the species' 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, because of its proximity to a large human population and the relative accessibility of goat populations. By the late 1970's managers recognized that general seasons with bag limits of 2 goats had led to some local overharvesting, particularly in accessible ranges. Hunting-permit systems were implemented in 1978 to reduce harvest and more evenly distribute hunters. Since 1982 goat harvests have been managed by a combination of drawing- and registration permit hunts. In 1985 the Alaska Board of Game authorized subsistence hunting of mountain goats by residents of Port Graham and English Bay in hunt areas 852 (Brown Mountain), 863 (Port Dick), 864 (Seldovia), and 865 (English Bay). Hunting has been prohibited within the Kenai Fjords National Park (KFNP) since 1980.

Most goat range on the Kenai Peninsula is contained within federal or state conservation land management units and remains unaffected by human development. There are 2 areas of 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, the Department has intensively monitored the number, sex-age composition, and distribution of mountain goats along the Bradley River drainage since 1985 (Holdermann 1986). Second, during the next decade there is a potential for extensive logging on Native corporation lands in Blying Sound and Kachemak Bay that could adversely effect goat populations wintering along the coast.

POPULATION OBJECTIVES

To maintain the existing population level of approximately 3,000 mountain goats.

METHODS

The Kenai Peninsula goat range, excluding KFNP, is subdivided into 31 count areas (Figure 1). Since the early 1970's, goat populations in these areas have been routinely monitored by a rotation of midsummer aerial surveys according to the techniques of Lentfer (1955). Surveys were flown using a PA-18 Super Cub 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 Iintervals of 500-600 feet. Within each area, 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 1986). Three goat population trend areas, each consisting of 2 or 3 contiguous count areas, were formed in each of the Blying Sound, West Slope, and Upper Kachemak Bay regions of the Kenai Mountains (Figure 2). The 3 new areas became the primary sampling units for monitoring trends in goat production and abundance within and between Kenai Mountain regions. Aerial surveys of individual count areas, although of a lesser priority, remain an important part of the overall population monitoring program.

For the purposes of this report, 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 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 estimated by combining a range of population 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 count 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 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 show that a population of approximately 300 goats remained stable from 1968-1971, declined slightly by the mid-1970's and then steadily increased to at least 458 goats by 1983 (Table 1). The 1987 survey revealed that the population had stabilized at approximately the the 1983 level of 460 goats. Minimum density in this trend area has varied between 3.1 and 4.8 goats/mi^2 of suitable alpine range; it 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 began increasing 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; this increase strongly suggests the population was still below carrying capacity. Since 1968, minimum density has ranged between 0.01 and 0.5 goat/mi^2 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 between those of Blying Sound and the West Slope. The distributions of goats and Dall 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 in about 1985, and appears to have declined slightly between 1985 and 1987. Minimum density has ranged between 1.4 and 2.7 goats/mi^2 of suitable range (Table 1).

Population Size:

There are 3300-4000 goats on the Kenai Peninsula, including approximately 800 within KFNP (B. Rice, National Park Service, pers. commun.; Adams 1985).

Population Composition:

Within trend areas during the period 1968 to 1987, kids:100 older goats and the percentage of kids observed in the population sample ranged from 24 to 48 and 19% to 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 consisting of 19-23% kids were associated with stable or declining populations.

Mortality

Season and Bag Limit:

The open season for subsistence hunting in Subunit 15C, the English Bay hunt subarea, is 10 August to 31 October; the bag limit is 1 goat by registration permit only. The open season for subsistence hunters in Unit 7 and Subunit 15C, the Brown Mountain, Seldovia and Port Dick hunt subareas is 10 August to 31 October; the bag limit is 1 goat by registration permit only. The open seasons for resident and nonresident hunters in Unit 7 and Subunit 15C, the Brown Mountain, Seldovia, and Port Dick hunt subareas are 10 August to 30 September and 15 October to 30 November; the bag limits are 1 goat by drawing permit only in the 10 August to 30 September season or 1 goat by registration permit in the 15 October to 30 November season. The open seasons for resident and nonresident hunters in the remainder of Unit 7 and subunit 15 are also 10 August to 30 September and 15 October to 30 November. The bag limits are 1 goat by drawing permit only in the 10 August to 30 September season or 1 goat by registration permit only in the 15 October to 30 November season.

Human-induced Mortality:

In 1987 sport and subsistence hunters reported taking 108 mountain goats on the Kenai Peninsula. During the early drawing-permit season, 160 hunters killed 67 goats (42% success rate) in 25 hunt areas, including 49 males (73%), 17 females (25%), and 1 goat of unspecified sex (2%) (Table 2). A registration permit season that followed provided for 155 hunters in 10 hunt areas, and 39 goats were killed (25% success), including 26 males (67%) and 13 females (33%) (Table 3). Subsistence hunters from the villages of Port Graham and English Bay reported taking an additional 2 goats at Koyuktolik Bay (i.e., Dogfish Bay) in Hunt Area 865 W.

Game Board Actions and Emergency Orders

During the 1980 and 1981 seasons, goat hunting was regulated by drawing permit only. Since 1982 mountain goat harvests have been managed by drawing-permit hunts during August and September in nearly all hunt areas and by registration permit hunts during October and November in a limited number of the same areas. During 1985 and 1986 these seasons were replaced by registration hunting seasons in most hunt areas to bring goat hunting into compliance

with the State's subsistence law. Subsistence goat hunting in hunt areas 852, 863, 864, and 865 for the residents of Port Graham and English Bay was introduced by the Board of Game in 1986.

The 8-year-mean annual total harvest and harvest range were 92 goats and 28-135 goats, respectively. Drawing-permit seasons provided goat hunting in an average of 25 hunt areas per year, compared with 11 hunt areas per year for registration permit seasons (1985 and 1986 harvest data excluded). Annual drawing-permit harvests yielded between 65 and 71 goats during years when 320 to 355 permits were issued (Table 4). In contrast, a 15 October-30 November registration permit season resulted in annual harvests of between 18 and 70 goats (Table 5). In 1985 and 1986 registration permit seasons provided greater hunting opportunities, resulting in larger harvests than same-year drawing-permit hunts (i.e., 204 vs. 40 goats).

The first 2 subsistence goat seasons have resulted in light hunting pressure and small annual harvests (Table 6). To date, subsistence hunting activity has been primarily focused on Koyuktolik Bay (Dogfish Bay) in Hunt Area 865 W. Annual rates of hunting mortality for mountain goats during 1980-1987 were estimated at 4-7% in Bying Sound, 1-2% along the West Slope, and 2-7% in Upper Kachemak Bay (Table 8).

Hunter Residency and Success. Residents composed 96% of the hunters during both the drawing- (n = 160) and registration (n = 152) permit hunts in 1987.

Harvest Chronology. Since 1980 the sex ratio of harvested mountain goats has differed substantially between drawing-permit seasons (August-September) and registration permit seasons (October-November) (Table 7). Drawing-permit harvests (n = 333) were composed of 71% males, 27% females, and 2% goats of unspecified sex. In contrast, registration permit harvests (n = 286) were composed of 56% males, 42% females, and 2% goats of unspecified sex. These data show that twice as many nannies/100 billies were killed during October-November registration permit seasons (76/100) as during August-September drawing-permit seasons (38/100). The 1987 drawing-permit season resulted in 35 nannies/100 billies in the harvest.

Transport Methods. Between 1980 and 1987, mean drawing-permit hunter success was 42%, ranging from 33% to 58%, compared with a mean registration permit hunter success of 35% and a range of 19% to 44%. Hunter success was highest for both season types in 1986, when the uniform season dates were 6 September-31 October (Table 4).

CONCLUSIONS AND RECOMMENDATIONS

Kenai Peninsula mountain goat populations generally increased and, in some areas, attained high levels of abundance during the late 1970's to the mid-1980's. A series of mild winters during this

period improved kid and yearling survival, resulting in population increases. Relative rates of population growth and minimum population densities were variable. Mountain goats were most stable and reached highest densities in Blying Sound, fluctuated between near absence and relatively low numbers along the West Slope, and attained intermediate densities with respect to these 2 extremes in Upper Kachemak Bay. Blying Sound, Upper Kachemak Bay, and the West Slope fit along an environmental gradient of coastal-to-interior ecotypes, respectively. Smith (1984) also reported that "forest-oriented", coastal goat populations in Southeastern Alaska reached higher densities than "alpine-oriented" populations in interior British Columbia (McCrory et al. 1977). Geographic differences in Kenai Peninsula goat populations will be important in formulating appropriate harvest strategies in the future.

Rates of sustainable hunting mortality for mountain goat populations in Alaska have not been determined. However, as pointed out by Swenson (1985), it is now generally accepted that mountain goats are susceptible to overharvesting because of late sexual maturity, generally low rates of kid production and/or survival, either-sex harvesting, and high vulnerability to hunters in accessible areas. Evidence also strongly suggests that hunting is an additive rather than compensatory form of mortality in native mountain goat populations (Hebert and Turnball 1977, Kuck 1977, Smith 1986). Notwithstanding these limitations, mountain goats can sustain additive mortality under certain conditions. In Southeast Alaska, Smith (1986) found that goats increased rapidly when annual adult hunting mortality was 4% or less and natural mortality was low. He concluded that the appropriate management strategy for native goat populations was to monitor the rate of population growth and apply a harvest-tracking strategy.

During the 1980's a system of mountain goat harvest management similar to the one recommended by Smith (1986) evolved on the Kenai Peninsula. Goat populations were monitored in count areas throughout the range; particular emphasis was placed on 3 trend areas that were representative of the range's main climatic-ecological regions. Allowable goat harvests were determined by count area, and hunting permits were allocated by hunt area to permit hunting mortality up to the allowable level. Because of the difficulties associated with determining rates of population increase, a subjective assessment of population trend within count or trend areas was substituted. Allowable harvest for increasing populations was set by hunt area at 4-8% of the number of goats observed during the most recent aerial survey.

It is assumed that 70% and 90% of the goats present in trend areas were observed. Estimated annual harvest rates were 4-7% for Blying Sound, 1-2% for the West Slope, and 2-7% for Upper Kachemak Bay (Table 8). Mountain goat populations peaked at high levels of abundance in Blying Sound and Upper Kachemak Bay in 1987 and 1986, respectively; whereas, a low-density population along the West Slope continued to increase. Assuming that hunting mortality is

additive for goats, it appears that these harvest rates were appropriate for increasing populations. However, now that trend area survey data indicate that goat populations have peaked in Blying Sound and Upper Kachemak Bay, it is recommended that allowable harvests and subsequent harvest rates be lowered in these areas to track the lower numbers of goats available in the population. Additionally, since it has been clearly demonstrated on the the Kenai Peninsula that nannies are twice as vulnerable during October-November hunts as during August-September hunts, the additive effects of hunting mortality on stable or declining populations may be further minimized by reducing October-November seasons.

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 management units. Allocation of permits by hunt areas effectively disperses hunting effort, alleviating the problem of localized overharvesting in areas with easy access. 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.

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Table 1. Kenai Peninsula mountain goat trends 1968-87.

Trend area	Year	Kids: 100 older goats	% kids	Total count	Minimum density[a]	Population trend[b]
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	
	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[d]	2.7	+97
	1987	28	22	301	2.4	-11

[a] Minimum density expressed as goats/mi² of suitable summer range.

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

[c] 00.1 goat/mi².

[d] Only count areas 858 and 860 were actually flown. Total count derived by estimating 125 goats in count area 851.

Table 2. Kenai Peninsual mountain goat drawing-permit hunt summary, 1987[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
831	2	0					0
833	8	8	25%	1	1		2
834	4	3	67%	2			2
835	4	2	100%	2			2
836	20	11	18%	1	1		2
837	3	3	33%	1			1
839	16	10	40%	2	1	1	4
840	15	1	0%				0
842	8	5	80%	3	1		4
843	2	2	50%	1			1
844	26	8	0%				0
845	38	15	73%	9	2		11
846	40	16	38%	3	3		6
847	12	4	0%				0
852	20	12	33%	3	1		4
854	8	4	75%	1	2		3
855	4	3	33%		1		1
856	2	2	50%		1		1
857	10	4	75%	3			3
858	8	3	100%	3			3
859	16	6	33%	2			2
860	20	14	36%	5			5
861	18	9	33%	2	1		3
862	10	6	0%				0
863	16	5	60%	3			3
864	10	4	100%	2	2	4	
Totals	340	160	42%	49	17	1	67

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

Table 3. Kenai Peninsula mountain goat registration permit hunt summary, 1987[a]

Hunt area	Number permits issued	Number of hunters	Percent success	Harvest			Total
				Male	Female	Unknown	
840	10	1	0%				0
844	36	13	15%	1	1		2
845	56	21	48%	5	5		10
846	111	51	14%	5	2		7
847	23	12	17%	2			2
858	7	4	100%	3	1		4
859	8	7	57%	2	2		4
862	31	19	26%	5			5
863	15	6	50%	2	1		3
864	23	16	0%				0
Totals	327	155	25%	26	13	0	39

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

Table 4. Summary of mountain goat drawing permit season harvest for the Kenai Peninsual, 1980-87.

Year	Season dates	No. permits issued	No. hunters	% success	Harvest M	F	U	Total
1980	10 Aug-30 Nov	185	73	38	17	11	0/	28
1981	10 Aug-30 Nov	185	93	33	25	6	0/	31
1982	10 Aug-30 Sept	320	162	44	50	20	1	71
1983	10 Aug-30 Sept	320	149	344	45	20	1	66
1984	10 Aug-30 Sept	355	169	38	50	14	1	65
1985	10 Aug-30 Sept	16	11	45	2	3	0/	5
1986	6 Sept-31 Oct	130	60	58	21	14	0/	35
1987	10 Aug-30 Sept	340	160	42	49	17	1	67
Totals and Means		1851	877	42	259	105	4	368

Table 5. A summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1982-87.

Year	Season dates	No. permits issued	No. hunters	% success	Harvest M	F	U	Total
1982	15 Oct.-30 Nov.	172	96	19	6	11	1	18
1983	15 Oct.-30 Nov.	--[a]	--[a]	--[a]	21	14	0/	35
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	0/	39
Totals and Means		1715[b]	946[b]	35[b]	212	148	6	366

[a] Data not available.

[b] Total or mean does not include data for 1983.

Table 6. Kenai Peninsula subsistence harvest, 1986-87.

Year	Season dates	No. permits issued	No. hunters	% 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
	Totals and Means	22	11	45	2	3	0	5

Table 7. Kenai Peninsula harvest sex ratios compared by month, 1980-85 and 1987.

Hunting Period	Males	Females	Females: 100 males	Total
August - September	238	91	38	329
October - November	160	121	76	281
Totals and Means	398	212		610

Table 8. Estimates of annual hunting mortality for mountain goat populations in 3 trend areas of the Kenai Mountains.

Trend area	Year	Range of estimated mountain goat population 90%	70%[a]	Total annual harvest	% estimated annual hunting mortality 70%		90%[a]
Blying Sound	1983	509	654	24	4	-	5
	1987	512	659	34	5	-	7
West Hope	1981	33	43	0	--		--
	1983	49	63	0	--		--
	1987	100	129	2	1	-	2
Upper Kachemak Bay	1980	191	201	4			2
	1985	377	484	25	5	-	7
	1987	334	426	18	4	-	5

[a] Calculated on the assumption that 70-90% the goat population is observed during a fixed-wing survey of the trend area.

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 is estimated at over 400 animals and is stable to slightly increasing. The annual harvest from 1983 to 1987 ranged from 15 to 55 goats (mean = 33.6 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 conducted in August by fixed-wing aircraft. Known goat habitat in the Kizhuyak, Terror, northern Ugak, northern Uganik, and selected Chiniak Bay drainages was covered. Harvest data were collected from mandatory hunter reports and by examining horns of hunter-killed goats.

RESULTS AND DISCUSSION

Population Status and Trend

Goats have expanded their range to include suitable habitat in most drainages of Kodiak Island, with the exception of extreme western areas. Overall, the population appears to be stable to slightly increasing. In northern drainages a decline in the population had been suspected; however, the 1987 count was 20% higher than the 1986 count, and it appears that the decline was less serious than was believed. The goat population in those areas is probably stable to slightly declining.

Population Size:

The goat population was estimated at 425 animals in 1987 (Table 1), representing an extrapolation from the composition survey that covered hunt Nos. 871, 872, 873, 874 and approximately 25% of hunt No. 876. A relatively high percentage of goats was observed in 1987; therefore, confidence in the accuracy of the population estimate is high.

Population Composition:

The ratio of 21 kids:100 adults was nearly the same as that recorded for the previous 2 years (Table 2). An apparent decline in kid production in the Ugak drainages since 1983 was reported in 1986. The 44 kids observed in 1987 represented a slight increase from the 38 kids counted in 1986. There are insufficient data to confirm a declining trend in productivity, but the lowest counts of kids in the past 5 years occurred in 1986 and 1987.

Distribution and Movements:

The distribution of goats observed during August composition surveys was little changed. Most goats occurred in the Ugak and Kizhuyak Bay drainages.

Mortality

Season and Bag Limit:

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 declined from 40 goats in 1986 to 22 goats in 1987 (Table 3); more males than females were killed. The mean age of males was 3.8 years (n = 13; range = 1.3-8.3) and the mean age of females was 3.4 years (n = 9; range = 1.3-8.3).

Hunter Residency and Success. For the first time in 4 years there were fewer successful local residents than successful nonlocal residents and nonresidents combined (Table 4). Interest by mainland Alaskans in hunting goats on Kodiak Island appears to be increasing. Hunter success was 41% in 1987, well below the 71% success recorded in 1986.

Permit Hunts. All goat hunting is regulated by drawing permit in Unit 8. One hundred permits were issued in 1986 and 1987, and distribution of permits between hunt areas remained the same (Table 5).

Harvest Chronology. More goats were killed in October than in September 1987 (Table 6). Because deer hunting is better in October, more hunters may have planned combined goat-deer hunting trips.

Transport Methods. Aircraft were predominantly used for access to goat hunting areas in Unit 8 (Table 7).

Habitat

The goat population is probably near carrying capacity in most areas of northern Kodiak Island.

Game Board Actions and Emergency Orders

Following a complete aerial survey of Kodiak Island in 1983 that indicated the goat population was increasing, the Department recommended and the Board of Game adopted a regulation opening hunt No. 876 by registration permit. The harvest of 28 goats in the registration hunt in 1984 was considered excessive. In 1985 the Board of Game passed emergency regulations to comply with legal directives on implementing the State's subsistence law. Under the 1985 regulations, hunt No. 872 was administered by drawing permit; participation was limited to 25 local residents. The remaining permit hunt areas were opened by registration permit; there was no limit placed on participation, with an 1-31 October season. The Department issued an Emergency Order closing the registration permit hunt 10 October 1985, when it became evident that overharvesting would occur if the hunt continued through the scheduled closing date (i.e., 31 October). The Board of Game subsequently adopted the Department's recommendation to limit the harvest by applying a drawing-permit hunt limited to 100 permits beginning in 1986.

CONCLUSION AND RECCOMMENDATIONS

The present drawing-permit hunt is effective in distributing the harvest uniformly over the goat population and in maintaining the harvest within acceptable limits. Population objectives are being met and the goat population appears to be relatively stable. No changes in regulations are recommended.

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Table 1. Mountain goat population status by hunt area in Unit 8, 1987.

	871-Wild Ck. Center Mtn.	872 Crown Mtn.	873 Hidden Basin-Terror Lk.	874-W. Terror Lk. Uganik	876-NW Kiliuda	Other areas	Total
No. goats observed	49	45	96	41	0	23	254
Estimated population	60	55	115	60	60	75	425
% kids	18%	18%	20%	15%	Not surveyed		Mean = 18%

Table 2. Mountain goat summer composition counts in Unit 8 from composition by hunt area, 1987.

Year	Adults	Kids	Kids:100 adults	Total
1983	241	66	27:100	307
1984	155	48	31:100	203
1985	295	65	22:100	360
1986	175	38	22:100	213
1987	210	44	21:100	254
Hunt Area				
871-Wild Ck. Center-Mtn.	40	9	23:100	49
872-Crown Mtn.	37	8	22:100	45
873-Hidden Basin-Terror Lk.	77	19	25:100	96
874-W. Terror Lk. - Uganik	35	6	17:100	41
876-NW Kiliuda	--	--	--	--

Table 3. Mountain goat annual harvest from 1983 to 1987 and by hunt area in 1987.

Year	M	F	Unk	Total	Illegal	Total
1983	11	4	0	15	0	15
1984	32	20	3	55	0	55
1985	15	21		36	0	36
1986	23	17	0	40	0	40
1987	13	9	0	22	0	22
Hunt Area						
871-Wild Creek-Center Mtn.	1	2	0	3		
872-Crown Mtn.	0	4	0	4		
873-Hidden Basin-Terror Lk.	4	1	0	5		
874-W. Terror Lk.-Uganik	3	1	0	4		
876-NW Kiliuda	5	1	0	6		

Table 4. Mountain goat hunter residency and success in Unit 8, 1984-87.

	Successful			
	Local res.	Nonlocal res.	Nonres.	Total
1984	44	3	8	55
1985	33	2	1	36
1986	31	6	3	40
1987	10	9	3	22
	Unsuccessful			
	Local res.	Nonlocal res.	Nonres.	Total
1984	--	--	--	--
1985	--	--	--	--
1986[a]	15	--	0	15
1987[a]	29	--	3	32

[a] Local and nonlocal lumped.

Table 5. Mountain goat harvest data by permit hunt in Unit 8, 1983-87.

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
872	1984	20	8	0	12	100%	6	6	12
	1985	20	8	0	12	86%	2	4	6
	1986	15	2	5	8	62%	4	4	8
	1987	15	8	3	4	57%	0	4	4
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
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
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

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

Table 6. Mountain goat harvest chronology in Unit 8, 1983-87.

Year	Males	Females	Total	Males	Females	Total
1983	8	2	10	3	2	5
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

Table 7. Mountain goat successful hunter transportin Unit 8, 1984-87.

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

STUDY AREA

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

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

BACKGROUND

Mountain goats have been harvested in Unit 11 by both nonresident and local resident hunters for years; however, little information is available on the number of animals taken by hunters prior to 1972 because harvest data were not collected until then. Although seasons were long and bag limits liberal, early harvests were minimal because the human population was low. By the mid-1970's, hunting pressure and harvests had increased to the point that it became necessary to reduce the season length and bag limit.

In 1970 the MacColl Ridge yearly trend count area was established for the purpose of obtaining sex and age composition data and monitoring 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

To maintain a prehunting season population of at least 500 mountain goats.

METHODS

Aerial surveys are conducted yearly to determine sex and age composition and population trends on the MacColl Ridge trend count area, which is located north of the Chitina River in the southeastern portion of Unit 11. Additional mountain goat population data are periodically collected during aerial surveys of sheep trend count areas. Harvests and hunting pressure are controlled by allowing hunting by registration permit only. Harvests are monitored by requiring all permittees to register and check out at the ADF&G office in Glennallen.

RESULTS AND DISCUSSION

Population Status and Trend

The number of mountain goats in the southern portion of the Wrangell Mountains appears to be stable. Although the total number of animals observed during aerial surveys of the MacColl Ridge trend count area fluctuates somewhat from year to year, a discernible trend is not apparent (Table 1). The 1987 count of 47 goats is 38% higher than the 1986 count of 34, but it is consistent with results from prior years. The decline in the number of goats counted in 1986 was attributed to poor survey conditions. Extreme

turbulence prevented a complete search in 1986, and a low budget precluded conducting another survey.

Population Size:

Population data collected during aerial surveys over the past 15 years suggest that a minimum of 700 mountain goats may inhabit the southern Wrangell and Chugach Mountains in Unit 11 (Table 2). This estimate was obtained by combining the survey results from every count area surveyed in Unit 11. In the few instances where a count area may have been surveyed more than once over the years, the highest count obtained is included in the total. Although sources of error in combining counts from different areas and years include movement between areas along with changes in population size, this figure represents our best estimate, given the data available.

Population Composition:

The ratio of kids:adults on MacColl Ridge during 1987 was 31:100, with kids composing 23% of the goats observed (Table 1). Results from the 1987 survey are consistent with composition data collected in prior years, suggesting little change in kid production or survival rates. It appears that kid production and survival are adequate to maintain current population levels.

Distribution and Movements:

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

Movement data are limited, as radio collars have not been placed on mountain goats in Unit 11. Major rutting and kidding areas are unknown. Field observations suggest seasonal altitudinal movements occurring and goats often utilizing lower elevations during winter. East-west movements are also thought to occur because animals have been observed traveling between the Kotsina and Kuskalana Rivers as well as between the 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 19 mountain goats in Unit 11 during the 1987 hunting season (Table 3); this harvest was 37% lower than that in 1986 (i.e., 30 goats) but 35% above the yearly average of 14 goats reported during the past 7 years. Over the past 16 years that harvest data have been collected, substantial fluctuations have been reported in the yearly harvest. Between 1972 and 1974 the average harvest was 49 goats/year, with a 10 August opening date and a bag limit of two. In 1975 the bag limit was reduced to 1 goat and the opening delayed until 1 September. As a result, the reported harvest from 1975 to 1979 declined, averaging 23 goats/year.

The 1987 harvest was composed of 14 (74%) males and 5 (26%) females, similar to the harvest of 83% (N = 25) males in 1986. During the last 2 years hunters have been able to select for males, because of an increase in the number of guided hunts. A high degree of selectivity for males has not occurred in the past; however, from 1980 to 1985 the sex ratio of the harvest was 50:50, indicating animals were either taken randomly as they were encountered or the average hunter (i.e., without a guide) was not able to distinguish a billy from a nanny.

Hunter Residency and Success. A total of 64 registration permits was issued in 1987. Thirty-two permittees reported hunting, resulting in a hunter success rate of 59%. The hunting pressure was down substantially from 1986, when 50 permitees hunted, but similar to 1985, when there were 34 hunters in the field. Successful hunters reported spending 3.4 days afield, compared with 3.7 days for unsuccessful ones.

Residency data for all permittees are presented in Table 4. The number of successful nonresidents has increased substantially over the past 5 years. Since 1983 nonresidents have been the most successful group of hunters (i.e., reported take of 41 (43%) goats), compared with 22 (23%) for local residents and 33 (34%) for nonlocal residents.

Permit Hunts. Currently, an unlimited number of registration permits are issued for the Unit 11 mountain goat hunt; i.e., hunt No. 880. Permits must be picked up, and all hunters must report hunting results at the ADF&G office in Glennallen. 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 is considered to be too high.

Harvest Chronology. During 1987, 89% (N = 17) of the harvest occurred during the first 3 weeks of the season (Table 5). A similar pattern was observed in 1986, when 77% (N = 23) of the harvest occurred during that period. Prior to 1986 a higher proportion of the harvest was taken later in the season, especially in October. The observed change in harvest chronology was attributed to an increase in the number of nonresident hunters

seeking a combination sheep and goats during September, when both seasons are open. Goats killed later in the season are usually taken by state residents specifically seeking them.

Transport Methods. Transportation means used by goat hunters in Unit 11 have not changed much since 1981 (Table 6). From between 60% and 90% of all goat hunters utilize aircraft as the principal means of transportation, followed by highway vehicles.

Natural Mortality:

Sources of natural mortality common for most mountain goat populations include accidents and starvation during periods of deep snows. In addition, evidence of wolf predation on goats has been observed; moreover, reports by trappers and local residents of wolf predation on goats also suggests it may be common throughout the unit. Predation rates, however, have not been determined.

Habitat Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains form part of northern-most extension of mountain goat range in Alaska. Because favorable habitat is often limited on the edge of a species range, goats tend to congregate in those areas that best provide all habitat requirements. North of the Chitina River, goats occur in substantial numbers east of the Lakina River to the Canadian border. The remainder of the Wrangells west of the Lakina River is considered 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 of Game shortened the mountain goat season by moving the opening date from 10 August to 1 September and reduced the bag limit from 2 to 1 goat per year. This action was taken to reduce the yearly harvest; it was effective because it closed 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 for the unique opportunity for mixed-bag hunt from 1-20 September.

No additional Board actions took place until 1980, when goat hunting was put on a registration permit only basis. This action was considered necessary because Unit 11 had been included in Wrangell-Saint Elias National Park. Park regulations prohibit sport hunting on lands classified as park, thus concentrating hunting pressure on goats located on lands designated as preserve. Further Board action occurred in 1986, when the season was reduced by 31 days, closing at the end of November. This action resulted after the 1986 season was closed by Emergency Order to correspond with the closure in Unit 6. As of the end of October, the harvest

in Unit 11 was considered too high to allow additonal goats to be taken by hunters that had been displaced by the closure in Unit 6.

CONCLUSIONS AND RECOMMENDATIONS

The mountain goat population north of the Chitina River is considered stable. Mountain goat population trends south of the Chitina River are unknown, because all available data encompasses only 1 year. Although population estimates derived from survey data collected over a period of years have limited application, it appears the current population objective is being met. Mountain goats are numerous only in limited areas where habitat conditions are favorable. Overall goat densities are much lower than those in areas with more favorable habitat, such as the Kenai Peninsula.

Harvests and hunting pressure during the 1970's, were higher than more recent ones. Because of current National Park regulations, goat hunting is now concentrated around McCarthy, MacColl Ridge, and the Hawkins and Barnard Glaciers. Since mountain goat populations in the unit appear to be able to sustain yearly harvests of up to 10% of the population, the current harvest of 19 animals is considered sustainable, especially since it was geographically distributed. Heavy harvests every year from the same location will result in a decline in goat numbers in that area.

I recommend the hunting season be closed by Emergency Order as soon as the combined harvest from MacColl Ridge and Hawkins and Barnard Glaciers exceeds 20 goats. If the annual harvest from Unit 11 exceeds 35 goats for more than 1 year, further reductions in season length should be implemented. I further recommend that, in addition to the yearly trend count on MacColl Ridge, goats be surveyed within the next year or two in heavily hunted areas; e.g., Hawkins and Barnard Glaciers.

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Table 1. Mountain goat survey data from MacColl Ridge trend area in Unit 11, 1970-87.

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			NO DATA		
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%

[a] Helicopter and ground count.

Table 2. Historical mountain goat aerial survey data from Unit 11, 1973-84.

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

Table 3. Historical mountain goat harvest data for Unit 11, 1972-87.

Regulatory year	No. males	No. females	No. unk.	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%

[a] Bag limit 2 goats. Some hunters took 2 goats.
[b] Bag limit 1 goat.
[c] Registration permit hunt 880 initiated--1 goat by permit.

Table 4. Mountain goat hunter residency and success in Unit 11, 1983-87.

Year	Permits issued	Successful				Unsuccessful		
		Local res.	Nonlocal res.	Nonres.	Total	Resident	Nonres.	Total
1983	60	7	7	2	16	--	--	16
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

Table 5. Mountain goat harvest chronology number in Unit 11 1983-87.

Year	Season dates	September				October				Other	Total
		1-7	8-15	16-23	24-30	1-7	8-15	16-23	24-31		
1983	1 Sept.-31 Dec.	5	3	1	1	--	2	1	--	3	16
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 Oct. by E.O.	11	9	3	3	--	2	--	--	2	30
1987	1 Sept.31 Nov.	9	4	4	2	--	--	--	--	0	19

Table 6. Mountain goat hunter transport methods for all hunters in Unit 11, 1983-87.

Year	Airplane		Horse		Boat		3- or 4-wheeler		Snowmachine		Off-road vehicle		Highway vehicle	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1983	26	(64)	--	--	--	--	--	--	1	(2)	1	(2)	13	(32)
1984	34	(65)	5	(10)	--	--	--	--	1	(2)	--	--	12	(23)
1985	18	(60)	1	(3)	2	(7)	41	(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)

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; additional surveys have been conducted sporadically since. The 1st surveys in Subunit 13D were conducted in 1959. The mean annual harvest from the Talkeetna and northwestern Chugach mountains since 1980 was 25 goats. The low harvest occurred during the 1980 season when only 1 animal was killed; the high harvest occurred during the 1986 season when 50 animals were killed. Over 85% of the harvest comes from the Lake George area in Subunit 14C.

During the mid-1960's the seasons and bag limits were liberal in Units 14 and 13; i.e., 10 August to 31 December and 2 goats, respectively. A more restrictive drawing-permit season was initiated during the late 1970's and early 1980's in Subunits 14B, 14C, and 14A; Subunits 13D and portions of 14A were closed. The hunting season in Unit 14 is currently regulated by registration permit. After a 10- year closure, Subunit 13D was opened to hunting in 1987; the season was regulated by drawing permit.

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 that would sustain an annual harvest of 25 goats, including at least 60% males in Subunit 14C.

METHODS

Age composition aerial surveys were completed in Subunit 13D and Unit 14 during August 1987.

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, 459 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 515, 24, 63, and 134 goats, respectively, observed during 1986. The 1986 survey was the most extensive one ever conducted in a single year, and the number of goats observed in Subunits 14A, 14C, and 13D was the highest on record. Although the number of goats observed in the individual subunits was down slightly in 1987, compared with 1986, variations in count conditions and movement of goats could easily have affected these numbers. These populations 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. Populations of goats are distributed as follows: Subunit 13D, 120; Subunit 14A south of the Matanuska River, 65-80; Subunit 14B, 15-25; and Subunit 14C, 500-600. Current population objectives are being met; however, careful monitoring should be continued, especially in light of the moderately severe 1987-1988 winter.

Population Composition:

Consistent current composition data are only available for Subunit 14C. Because of budget constraints, surveys of 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.

Distribution and Movements:

Goat distribution during summer months has been documented from aerial surveys. The greatest densities of goats occur in the Lake George drainage in Subunit 14C. The Twentymile River drainage and Subunit 14A south of the Matanuska River also contain a fair number of goats. Goats are seldom found far from escape cover, which includes broken, rocky, and 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 harvests in the Talkeetna and northwestern Chugach Mountains have remained relatively consistent for the past 5 years (Table 2). In 1987 the 1st season since 1978 was initiated in Subunit 13D. The regulation of hunting in those portions of Unit 14 were changed from an open drawing-permit to a registration permit in 1984. This action resulted in a dramatic increase in the harvest in Subunit 14C. The majority of this increase occurred in the Lake George drainage, because it is easily accessible by aircraft and supports a high density of goats.

The harvest in Subunit 14C was reduced by over one-half during 1987, compared with the previous 3 years, because of the 1-month reduction in the season (i.e., from 1 September-30 November to 1 September-31 October). In addition, the last 2 weeks of October (16-31 October) were restricted to archery only, and no goats were killed during that time.

Hunter Residency and Success. With the exception of the Lake George drainage in Subunit 14C, few nonresidents have hunted in the Talkeetna and northwestern Chugach Mountains. In the Lake George area over the past 3 years, nonresidents have composed nearly 28% of all successful goat hunters (Table 3).

Permit Hunts. The number of goat registration permits issued for Unit 14 has fluctuated substantially over the past 4 years (Tables 4A, 4B, 4C, and 4D). There was a surge of applicants for registration hunts in Unit 14 during 1984, probably because hunting there had been regulated by a drawing-permit system during the previous 6 years. In 1985 confusion caused by a court ruling regarding subsistence hunting may have caused some hunters not to participate in these hunts. The reduction in permits issued during 1987 compared with 1986 was caused by a shorter season and an archery-only restriction during the last 2 weeks of that season. Subunit 13D was open to hunting in 1987 for the first time since 1978 (Tables 4E and 4F).

Harvest Chronology. In the Lake George area of Subunit 14C (Hunt 869), harvest chronology is highly variable between years, and no discernible trend can be inferred (Table 5). Weather and the opening and closing dates of seasons for other big game species generally plays an important role in goat harvest and harvest chronology.

During the 1986 hunting season, there was a substantial goat harvest during the 2nd two weeks of October, after most other big

game seasons had closed and good weather conditions prevailed. Harvests in Subunits 13D, 14A, 14B, and the Twentymile River drainage in Subunit 14C are too small for comparison.

Transport Methods. Over 80% of successful hunters used aircraft as the primary transport means to hunt goats in Unit 14 and Subunit 13D. The only notable exception to this occurs in the Twentymile River drainage in Subunit 14C, where boats and highway vehicles are used by successful hunters 83% of the time.

Natural Mortality:

Mountain goat natural mortality is seldom documented in the Talkeetna and northwestern Chugach Mountains. Although annual surveys have varied dramatically over the years, there is little evidence that major natural mortality has occurred. The variation in year-to-year survey totals is probably caused by variable count conditions and movement by goats.

Game Board Actions and Emergency Orders

Mountain goat hunting regulations have varied since 1983. Hunting in Unit 14 was regulated by a drawing-permit system in 1983, and 100 permits were issued. Under this system, the number of goats harvested was below the sustainable harvest. The regulations for Unit 14 were changed to a registration permit system, beginning with a 1 September-30 November season in 1984. The harvests increased substantially during the 1984-1986 seasons. During the 1986 season, an Emergency Order was issued to close the Lake George area in Subunit 14C on 26 October because the harvest had exceeded the management goal. Because of this increased harvest, the season was shortened in Unit 14 to 1 September-31 October, and the last 16 days were restricted to bow and arrow only. Based on data obtained during aerial surveys conducted during 1986 in Subunit 13D, 2 drawing permit hunts were established for the 1987 season; a total of 25 permits were issued.

CONCLUSIONS AND RECOMMENDATIONS

The reduction in season length in Unit 14 successfully reduced the goat harvest there. Because weather and time of day may significantly affect aerial survey results, care should be taken when surveys are conducted. I recommend that surveys take place during either the first or last 2 hours of daylight, when goats are out feeding and more easily observed. Helicopter tours of the Lake George area, which include overflights and landings, may have caused goats to move to other areas and/or to seek cover when aircraft approached. Goats frequenting a preferred helicopter landing location were extremely excitable when approached during aerial surveys. These activities should be more closely monitored. In light of the decreased number of goats observed in the Lake George area in 1987, thorough surveys should be continued.

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Table 1A. Age composition data as determined from aerial surveys in Subunit 13D, 1983-1987.

Year	Adults	Kids	(% Kids in population)	Total	Goats /hr.
1983[a]	1	1	(8)	12	1
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

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

Table 1B. Age composition data from aerial surveys in Subunit 14A, 1983-1987.

Year	Adults	Kids	(% kids in population)	Total	Goats /hr.
1983	--	--	--	--	--
1984[a]	21	7	(25)	28	--
1985	--	--	--	--	--
1986	45	18	(29)	63	--
1987	38	15	(28)	53	7.5

[a] Goats noted while doing sheep surveys.

Table 1C. Age composition data from aerial surveys in Subunit 14B, 1983-1987.

Year	Adults	Kids	(% kids in population)	Total	Goats /hr
1983[a]	6	0	(0)	6	--
1984	--	--	--	--	--
1985	--	--	--	--	--
1986[b]	19	5	(21)	24	--
1987	12	3	(25)	12	--

[a] Goats noted while doing sheep surveys.
[b] Possible movement between 14B and 13E.

Table 1D. Goat age composition data from aerial surveys in Subunit 14C, 1983-1987.

Year	Adults	Kids	(% kids in population)	Total	Goats /hr.
1983[a]	15	8	(35)	23	--
1984	307	119	(28)	426	26
1985	243	56	(19)	296	19
1986	350	115	(25)	465	25
1987	330	83	(20)	413	20

[a] Goats noted while doing sheep surveys.

Table 2. Annual mountain goat harvest by subunit, 1983-1987.

	Subunit				
	13D[a]	14A	14B	14C	Total
1983[b]	0	1	1	6	8
1984[c]	0	0	1	43	44
1985[c]	0	0	2	36	38
1986[c]	0	3	2	45	50
1987[d]	2	5	2	20	29

[a] Subunit 13D was not open to goat hunting until 1987.
[b] Subunits 14A, 14B, and 14C by drawing permit only.
[c] Subunits 14A, 14B, and 14C by registration permit only.
[d] Subunit 13D by drawing permit only (billies only), Subunits 14A, 14B, and 14C by registration permit only.

Table 3A. Mountain goat hunter residency and success in Subunits 13D west (Hunt No. 827) and 13D east (Hunt No. 828), 1987[a].

Subunit	Successful				Unsuccessful		
	Local resident	Nonlocal resident	Nonresident	Total[b]	Resident	Nonresident	Total[b]
13D west	0	2	0	2	2	1	3
13D east	0	0	0	0	8	1	9

[a] First year season has been open since 1978.
[b] Residency not always reported.

Table 3B. Mountain goat hunter residency and success in Subunit 14A, 1983-1987 (Hunt No. 866).

Year	Successful				Unsuccessful		
	Local resident	Nonlocal resident	Nonresident	Total[a]	Resident	Nonresident	Total[a]
1983	--	--	No Data	--	--	--	--
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

[a] Residency not always reported.

Table 3C. Mountain goat hunter residency and success in Subunit 14B, 1983-1987 (Hunt Nos. 867).

Year	Successful				Unsuccessful		
	Local resident	Nonlocal resident	Nonresident	Total[a]	Resident	Nonresident	Total[a]
1983	--	--	No Data	--	--	--	--
1984	--	--	No Data	--	--	--	--
1985	0	2	0	2	3	0	3
1986	0	1	0	1	7	0	7
1987	0	0	2	2	8	1	9

[a] Residency not always reported.

Table 3D. Twentymile River drainage, mountain goat hunter residency and success, Subunit 14C, 1983-1987 (Hunt No. 868).

Year	Successful				Unsuccessful		
	Local resident	Nonlocal resident	Nonresident	Total[a]	Resident	Nonresident	Total[a]
1984	--	--	No Data	--	--	--	--
1985[b]	56	8	0	5[c]	--	--	60[d]
1986	4	0	0	4	31	6	37
1987	3	0	0	3	23	1	24

[a] Residency not always reported.
[b] Residency for all hunters listed under Successful.
[c] Total successful hunters.
[d] Total unsuccessful hunters.

Table 3E. Twentymile River drainage, mountain goat hunter residency, and success in Subunit 14C, 1983-1987 (Hunt No. 869).

Year	Successful				Unsuccessful		
	Local resident	Nonlocal resident	Nonresident	Total[a]	Resident	Nonresident	Total[a]
1983	--	No Data	--	--	--	--	--
1984	--	No Data	--	--	--	--	--
1985[b]	76	42	5	29	--	--	90
1986	17	12	12	41	35	2	37
1987	7	1	7	17	25	4	29

[a] Residency not always reported.
[b] Residency for all hunters listed under Successful.

Table 4A. Mountain goat harvest data by registration permit hunting in Subunit 14A, 1984-1987 (Hunt No. 866).

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

Table 4B. Mountain goat harvest data by registration permit hunting in Subunit 14B, 1984-1987 (Hunt No. 867).

Year	Permits issued	Did not hunt	Unsuccessful	Successful
1984	--	--	No Data	--
1985	16	10	3	2
1986	9	7	1	1
1987	11	6	3	2

Table 4C. Twentymile River mountain goat harvest data by registration permit hunting in Subunit 14C, 1984-1987 (Hunt No. 868).

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

[a] estimated number of applicants.

Table 4D. Lake George mountain goat harvest data by registration permit hunting in Subunit 14C, 1984-1987 (Hunt No. 869).

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

[a] estimated number of applicants.

Table 4E. Mountain goat harvest data by drawing permit in Subunit 13D west, 1987 (Hunt No. 827).

Year	Permits issued	Did not hunt	Unsuccessful	Successful
1987	10	5	3	2

Table 4F. Mountain goat harvest data by drawing permit in Subunit 13D east, 1987 (Hunt No. 828).

Year	Permits issued	Did not hunt	Unsuccessful	Successful
1987	15	3	9	0

Table 5A. Successful mountain goat hunter transport methods Subunit 13D, 1987.

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

Table 5B. Successful mountain goat hunter transport methods Subunit 14A, 1984-1987.

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

Table 5C. Successful mountain goat hunter transport methods Subunit 14B, 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

Table 5D. Mountain goat successful hunter transport methods in Subunit 14C, 1985-1987 (Hunt No. 868) Twentymile River.

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

Table 5E. successful mountain goat hunter transport methods in Subunit 14C, 1985-1987 Lake George (Hunt No. 869).

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

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