Alaska Department of Fish and Game
Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
Survey - Inventory Management Report
1 July 1991 - 30 June 1993

MOUNTAIN GOAT

Mary V. Hicks, Editor

Grant W-23-5,
W-24-1, W-24-2
Study 12.0
December 1994

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
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DIVISION OF WILDLIFE CONSERVATION
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LOCATION

Game Management Unit: Unit 1A (5,000 mi^2)

Geographical Description: Ketchikan area including mainland areas draining into Behm and Portland Canals.

BACKGROUND

Densities of mountain goats in Unit 1A have remained moderately high and stable throughout the past decade. Although indigenous populations of goats are only on the mainland portion of the subunit, introduced populations now exist on Revillagigedo Island as a result of transplants to Swan Lake (17) in 1983 and Upper Mahoney Lake (15) in 1991 (ADF&G unpubl. data, Ketchikan). The Swan Lake population has grown substantially during the past decade and is now estimated over 150. Between August 1991 and May 1993, 105 relocations were obtained for 7 goats radiocollared as part of the Upper Mahoney Lake transplant. Like the Swan Lake population, the Mahoney Lake population is increasing. To date, only 1 of 7 collared goats is known to have died and a minimum of 7 kids were observed in the Upper Mahoney Lake area during summer 1993.

Harvests from Unit 1A averaged just over 45 goats per year during 1972-1988. However, the average annual harvest dropped to just over 20 during the past 4 seasons as a result of 1989 legislation requiring nonresident goat hunters to hire and hunt with registered guides.

Nearly every year since the late 1960s, fall surveys have been conducted from a PA-18 Super-cub in trend count areas established throughout Unit 1A. While survey results generally seem to reflect population trends, weather conditions can greatly influence goat observability.

MANAGEMENT DIRECTION

Management Objectives

The management objective for Unit 1A goats is to maintain goat population densities above 20 goats per hour of survey time during fall surveys.

METHODS

Up to 10 trend count areas (TCAs) are surveyed each fall as weather and schedules allow. TCAs vary in size from 23 to 200 mi^2. Surveys are generally flown during September or early October between 1700-1900 hours under similar conditions each year. A PA-18 Supercub with

a pilot and observer is used to search for goats. Both the pilot and observer search for goats, and the observer records goat locations on 1:63,360 scale topographic maps. Goats are classified as either adults or kids. No effort is made to ascertain sex or distinguish any other age groups.

We collect harvest and hunter information through a mandatory hunt report which is part of a required registration permit. Data collected includes areas and numbers of days hunted, hunter success, dates of hunts and kills, and transport methods and commercial services used. Successful hunters who obtain a second goat permit are treated as separate hunters in calculating hunt and harvest figures.

RESULTS AND DISCUSSION

Population Status and Trend

Survey data for most of Unit 1A trend count areas is available through 1990 (Table 1). However, inclement weather and scheduling conflicts precluded formal surveys during 1991 and 1992. An informal helicopter survey flown in the vicinity of Swan Lake during August 1992 resulted in a count of 84 goats (42 goats per hour), the highest count on any survey of that area to date (Table 2). This fact, together with incidental staff and hunter observations, and observations made while searching for and capturing goats for the Mahoney Lake transplant during July and August 1991, indicates the Unit 1A population has continued to remain stable at relatively high levels.

As reported previously (Larsen 1992), 10 nannies and 5 billies were transplanted to Upper Mahoney Lake on 10 August 1991 (ADF&G unpubl. data, Ketchikan). Seven of the 15 transplanted goats were radiocollared before release (2 billies, 5 nannies). During this report period, we obtained 105 relocations for these collared goats. Only one radiocollared goat is known to have died. The skeleton of nannie #006 was recovered from the 2,200' elevation of Twin Peaks on Revillagigedo Island on 3 March 1992. Based on tooth wear and loss and the fact bones were mostly intact, it appeared the goat had died of poor health rather than predation. In fact, photographs taken of nannie #006 by a backpacker on August 24, 1991, indicated she was extremely thin through the hips, indicating poor nutritional condition even at that time.

In addition to nannie #006, the skull from an adult billy was found during early spring 1993 by snowmachiners traveling above Harriet Hunt Lake. The snowmachiners subsequently gave me the skull. I believe the skull was from one of the 3 uncollared billies released at Upper Mahoney Lake in August 1991. Cause of death is unknown.

According to the radio collar manufacturer (Telonics, Inc.), collars had a 2-year life expectancy when they were deployed. At least one of the deployed collars (nannie #002's) is believed to have prematurely ceased transmitting during this report period.

Population Size: Population estimates for goats inhabiting Unit 1A were developed during 1990 using survey data and a sightability correction factor developed by Smith and Bovee (1984). After delineating the percent of each Wildlife Analysis Area (WAA) containing usable goat habitat, a survey-derived estimate of 1.27 goats/mi^2 was applied to these percentages, resulting in a mainland estimate of 7,376-10,282 goats (ADF&G unpubl. data, Ketchikan). If Smith and Bovee's (1984) correction factor of 33%-46% is applied to the 84 goats observed near Swan Lake during 1992, that population could include 182-254 goats. However, this is probably higher than the actual figure. Inflated estimates can result from higher than usual goat observability during surveys.

I estimate that the recently created Upper Mahoney Lake population consists of 16-20 goats. This estimate is made with three assumptions: 1) 6 of the original 7 radiocollared goats are still alive; 2) 7 of the original 8 uncollared goats are still alive; and 3) 3-7 of the 7 kids observed during summer 1993 are still alive.

Population Composition: Productivity estimates of 32 kids per 100 adults were obtained during 1990 surveys (Larsen 1992). In the only survey conducted since then, we observed 35 kids per 100 adults near Swan Lake during August 1992 (Table 2).

Distribution and Movement: Goats continue to inhabit the mainland portion of Unit 1A from the southwestern tip of the Cleveland Peninsula to the eastern border of the subunit with Portland Canal. Survey information for the Swan Lake population on Revillagigedo Island indicates these goats have primarily remained within a 6-mile radius of the original release site. However, movement beyond this distance was documented on 12 October 1992. On that date 2 unmarked goats were observed with nannie #009 at Upper Mahoney Lake. This constituted a distance of approximately 12 miles from the original Swan Lake transplant site and about 17 miles from nannie #009's release site. Given these movements, I consider it likely goats from the 2 releases will eventually intermingle and create one population islandwide. With the exception of nannie #009, all radiocollared goats from the Upper Mahoney Lake introduction have remained within 4 to 5 miles of their original release site.

Mortality

Season and Bag Limit:

Unit 1A, Revillagigedo Island		No Open Season
Remainder of Unit 1A	Aug. 1-Dec. 31	2 goats by registration permit only (Hunt #801).

Hunter Harvest: Ten male, 5 female, and 1 goat of unreported sex were reported harvested from Unit 1A by 96 hunters who spent a combined total of 272 days hunting during 1991 (Table 3). In 1992, 99 hunters spent 289 days hunting and reported harvesting 17 males and 6

females (Table 3). A billy taken during the 1991 season had horns scoring 54 2/8 Boone and Crockett points, tying it with 5 other billies for 10th place in the Boone and Crockett all-time record book. Another billy, taken in October 1992, scored 50 0/8, qualifying it for the B&C record book.

Permit Hunts: Goat hunting in Unit 1A has been regulated through registration permits for the past 13 years. Second permits are available (since 1982) to hunters who killed goats and returned their first permit hunt reports. During the 1991 season, 241 first and 4 second permits were issued from the Ketchikan office (Table 3). We issued 235 first and 11 second permits from the Ketchikan office during the 1992 season (Table 3). No hunters took 2 goats in 1991 or 1992.

Hunter Residency and Success: No nonresident hunters hunted goats in Unit 1A during 1991 and 2 hunted during 1992 (Table 4). Most 1991 (94%) and 1992 (74%) goat harvesting was by hunters residing within the subunit (Table 4). Seventeen percent and 20% of local resident hunters were successful during 1991 and 1992, respectively. Twelve percent and 38% of the nonlocal residents were successful during 1991 and 1992, respectively, and 50% of the nonresidents were successful in 1992 (Table 4). Overall, 17% and 23% of the 1991 and 1992 hunters were successful, respectively, and the average number of hunting days per goat by all hunters (successful and unsuccessful) was 17.0 in 1991 and 12.6 in 1992. Successful hunters averaged 3.1 days per goat in 1991 and 2.2 days per goat in 1992.

Harvest Chronology: The 1991 and 1992 goat harvests were fairly evenly distributed throughout the season, with the highest harvests during August (Table 5). The scarcity of snow throughout the falls of 1991 and 1992 enabled hunters to get afield later than usual.

Transport Methods: Before the nonresident guide requirement went into effect in 1989, airplanes were routinely used more frequently than boats to access hunting areas. This was due to the fact most nonresidents chartered aircraft to transport them into hunting areas. In the absence of nonresident hunters and since many resident hunters use boats to travel to the mainland, the use of airplanes and boats became fairly evenly divided during 1989-1991 (Table 6). In 1992, however, airplanes were unexplainably used substantially more than boats (Table 6).

Nonregulatory Management Problems and Needs

We received a proposal calling for the introduction of goats to Prince of Wales Island during this report period. As a result of cooperative meetings and fieldwork with U. S. Forest Service staff, the proposal was rejected. Details of the proposal, evaluation, and conclusions were documented (ADF&G unpubl. rep., Ketchikan).

CONCLUSIONS AND RECOMMENDATIONS

The Unit 1A mountain goat population remained stable at relatively high levels during this report period. Harvest was low during the past 4 seasons and fairly evenly distributed throughout the subunit. Winters have not significantly affected adult or kid survival.

As a result of state legislation effective July 1989, all nonresident goat hunters are required to be accompanied by a registered guide or by an Alaska resident over 19 years of age within the second degree of kindred. This law has essentially eliminated the nonresident segment of the harvest.

The Swan Lake goat population should be regularly surveyed to ascertain status and trend of the population, including times of harvestable surplus. Depending on survey results, a limited number of hunt permits may be justifiable within the next few years. The recently introduced Upper Mahoney Lake goat population should be radiotracked as long as transmitters remain active. Once all transmitters are off, we should consider annual surveys of goats on the ridges above Ketchikan.

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Table 1. Unit 1A. Mountain goat composition counts, 1968-1992.

Survey[a] dates	No. of kids	No. of adults	Total goats	Kids: 100 adults	Count time (Hrs.)	Goats/ hour
Aug. 20-Sept. 18, 1968	162	553	715	29	4.92	145
Sept. 13-Sept. 16, 1971	111	357	468	31	3.88	121
Aug. 16-Sept. 16, 1973	35	149	184	23	2.50	74
Aug. 27-Sept. 21, 1974	14	50	64	28	1.83	35
Aug. 12-Sept. 11, 1975	84	270	354	31	7.63	46
Sept. 1-Sept. 11, 1976	73	283	356	26	8.01	44
Aug. 31-Sept. 6, 1977	165	354	519	47	6.33	82
Sept. 5-Sept. 9, 1978	126	404	530	31	5.17	103
Sept. 18-Sept. 21, 1979	62	238	300	26	3.78	79
Aug. 20-Sept. 12, 1980	215	617	832	35	9.63	86
Aug. 26-Sept. 21, 1981	153	461	614	33	5.98	103
Aug. 29-Sept. 18, 1982	167	515	682	32	6.87	99
Aug. 30-Sept. 23, 1983	177	658	835	27	7.55	111
Sept. 5-Sept. 24, 1984	174	666	840	26	7.09	118
Sept. 12-Sept. 15, 1986	64	359	423	18	4.05	104
Sept. 23-Oct. 8, 1987	39	182	221	21	2.03	109
Sept. 3-Sept. 19, 1988	104	304	408	34	4.37	93
Sept. 10-Sept 13, 1989	124	415	539	30	5.55	97
Sept. 6-Oct. 3, 1990	193	603	796	32	9.30	85

[a] Most comparable data is from 1975-1990. No surveys were flown in 1991 or 1992.

Table 2. Unit 1A. Swan Lake (Revillagigedo Island). Mountain goat composition counts, 1989-1992.

Date[a]	Number adults	Number kids	Total goats	Hours of survey time	No. goats observed/hr	Kids:100 adults
09/--/88	29	14	43	1.2	36	48
10/03/90	31	13	44	1.7	26	42
08/20/92	62	22	84	2.0	42	35

[a] The 1988 and 19990 surveys were conducted using fixed-wing aircraft. The 1992 survey was conducted using a Bell 206 Jet Ranger helicopter.

Table 3. Unit 1A. Harvest data by permit hunt, 1985-1992.

Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	M	F	U	Total
1985	261	122	88	51	29	22	-	51
1986	244	122	71	51	16	33	2	51
1987	195	107	61	27	14	13	1	28
1988	201	87	66	33	14	19	-	33
1989	182	87	56	23	14	9	-	23
1990	208	90	81	20	14	6	-	20
1991	245[b]	128	80	16	10	5	-	16[c]
1992	246	120	76	23	17	6	-	23

[a] Number of permits issued from the Ketchikan office. Second permit holders are treated as separate hunters.
[b] Three permits not returned.
[c] The sex of 1 goat was not reported.

Table 4. Unit 1A. Hunter residency and success, 1985-92.

	Successful				Unsuccessful			
Year	Local[a] res.	Nonlocal res.	Nonres.	Total	Local[a] res.	Nonlocal res.	Nonres.	Total
1985		30	21	51		67	21	88
1986		39	12	51		48	23	71
1987	14	2	12	28	44	3	14	61
1988	19	0	14	33	35	0	31	66
1989	18	4	1	23	45	10	1	56
1990	17	3	0	20	75	6	0	81
1991	15	1	0	16	73	7	0	80
1992	17	5	1	23	67	8	1	76

[a] Local and nonlocal residents combined during 1985-86. Local resident hunters reside in Unit 1A.

Table 5. Unit 1A. Harvest chronology by number and percent, 1985-92.

Year	Aug	Sept	Oct	Nov	Dec
1985	7 (14)	25 (49)	15 (29)	0	4 (8)
1986	8 (16)	30 (59)	4 (8)	1 (2)	8 (16)
1987	9 (33)	8 (30)	6 (22)	3 (7)	2 (7)
1988	8 (24)	19 (58)	5 (15)	1 (3)	0
1989	4 (17)	7 (30)	4 (17)	3 (13)	5 (22)
1990	9 (45)	8 (40)	2 (10)	1 (5)	0
1991	5 (31)	3 (19)	4 (25)	1 (6)	3 (19)
1992	7 (30)	6 (26)	6 (26)	4 (17)	0

Table 6. Unit 1A. Transportation methods used by successful goat hunters, 1985-92.

Year	#(%) Using Airplanes	#(%) Using Boats
1985	46 (90)	5 (10)
1986	42 (82)	9 (18)
1987	17 (64)	11 (36)
1988	28 (85)	5 (15)
1989	11 (48)	12 (52)
1990	12 (53)	8 (47)
1991	8 (49)	8 (51)
1992	20 (87)	3 (13)

LOCATION

Game Management Unit: Unit 1B (3,000 mi^2)

Geographical Description: Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point

BACKGROUND

Mountain goats are indigenous to Unit 1B and are distributed throughout appropriate habitat. Goats reside in alpine and subalpine areas from spring until fall. During winter goats use steep or windblown slopes with little snow cover and retreat to timbered areas during severe weather, often descending to coastal shorelines. Although scarce, data indicate goat populations are stable with the exception of the late 1960s and early 1970s when severe winters reduced the herd.

Hunters have limited access to goat habitat so that hunting pressure is focused near access points, requiring us to monitor harvest closely. The kill has ranged from 17 to 50 goats in the last 5 years.

MANAGEMENT DIRECTION

Management Goals:

Preliminary management goals are to maintain population levels to accommodate an annual harvest of 35 goats and a 35% hunter success rate.

METHODS

We flew fixed-wing aerial surveys within established trend count areas to obtain data on the numbers of goats and the proportion of kids in the population. We established trend count lines to make surveys more consistent from year to year. We monitored harvest closely through a registration permit system. All permit holders were required to report and those that hunted reported the location and duration of the hunt, transportation used, date of kill, and sex of kill. We recorded anecdotal information from hunters and guides.

RESULTS AND DISCUSSION

Population Status and Trend

Data are insufficient to determine precise population trends in Unit 1B. The population is probably stable or increasing slightly.

Population Composition: Table 1 shows the past 5 years of age composition data from aerial trend counts. Differences in sample size occur because of inclement weather which makes complete surveys difficult. Survey data do not indicate any trend in kid production. Estimating goat abundance is difficult because of annual differences in survey intensity (i.e., minutes/mile search time) and methods, as well as lack of information about seasonal goat movements.

Mortality

Harvest:

Season and Bag Limit.

Unit 1(B), that portion north of the Bradfield Canal and the north fork of the Bradfield River	Aug. 1-Dec. 31	One goat, by registration permit, except kids or nannies with kids.
Remainder of Units 1A and 1B	Aug. 1-Dec. 31	Two goats by registration permit only.

Board of Game Actions and Emergency Orders. One emergency order was issued in 1992 to close a small portion of Unit 1B. This closure, at Frosty Bay on the Cleveland Pennisula, was issued to prevent excessive harvest during logging operations. The closure was for the protection of an isolated group of about 20 goats and will be rescinded when logging is completed and logging roads are closed. Registration permit area #807 (Horn Cliffs) was eleminated and permit area #804 established by the Board of Game. This change established a 1 goat area for all of Unit 1B north of the Bradfield Canal and the north fork of the Bradfield River. It extended the protection of kids and nannies with kids to this area.

The Federal Subsistance Board retained a 2 goat bag limit for a portion of Permit area 804 and requires a Federal Subsistance permit for the taking of a second goat.

Hunter Harvest. The 1991 harvest of 17 goats and 28 in 1992 for Unit 1B is considerably lower than previous years (Table 2). Bad weather accounts for most of the decrease in harvest as indicated by the number of hunters and permits issued. Reducing the bag limit to 1 goat for almost all of Unit 1B also was a factor even though fewer than 10 hunters per year took a second

goat from this hunt area in previous years (ADF&G files). The male component of the harvest was still greater than 50%, although this data is solely from hunters' reports and is not verified.

We encouraged hunters to select only males and distributed literature designed to help hunters identify male goats. This information and encouragement may have influenced Unit 1B hunters to be more selective.

Federal and State regulations are now in conflict in a portion of Unit 1B. Not included in this report are the goats, 1 in 1991 and 2 in 1992, killed under federal permits. In 1992 both goats were killed illegally. Federal regulations require a state permit for a first goat and a federal permit to take a second goat. The 1992 hunters did not have a state permit before taking their first goat. They did not kill a second goat in hunt area #804.

Hunter Residency and Succes. Fewer permits were issued in 1991 than in any year since 1985 (Table 2). More permits were issued in 1992 but still less than in previous years. Petersburg and Wrangell residents, defined as local, continue to be the largest group of successful and unsuccessful hunters (Table 3). Fewer nonresident hunters are participating than in years before the mandatory guide regulation.

Harvest Chronology. Harvest chronology changed slightly compared to previous years (Table 4). In 1991 more goats were taken in September as usual, but more than normal were taken in October. In 1992 hunters took a greater proportion of goats in August and fewer in September; they increased their December take.

Transport Methods. Transportation methods of goat hunters in Unit 1B remain relatively stable (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

Goat populations seem stable in Unit 1B. Over the past 2 years, reported harvest is lower, but this does not indicate lower populations. I recommend no change in state regulations.

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Table 1. Unit 1B. Mountain goat composition counts, 1985-92.

Regulatory year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
1985/86	67	(93)	5	(7)	0	7	74	na
1986/87	78	(78)	22	(22)	0	28	100	29
1987/88	138	(76)	43	(24)	0	31	181	39
1988/89	141	(77)	42	(23)	0	30	183	39
1989/90	84	(75)	28	(25)	0	33	112	32
1990/91	122	(67)	50	(33)	0	41	182	28
1991/92	67	(83)	14	(17)	0	21	81	35
1992/93	117	(70)	50	(30)	0	43	167	72

[a] Different portions of area flown in different years so data is not directly comparable.

Table 2. Unit 1B. Mountain goat harvest by permit hunt, 1985-92.

Hunt No.	Reg. Year	Permits issued	Percent[a] did not hunt	Percent[b] unsuccessful hunters	Percent[b] successful hunters	Males	(%)	Females	(%)	Unk.	Illegal	Total harvest
801[c]	1985/86	202	44	71	29	14	(42)	19	(58)	0	0	33
	1986/87	194	44	62	38	17	(41)	24	(59)	0	0	41
	1987/88	169	51	57	43	16	(44)	20	(56)	0	0	36
	1988/89	155	46	61	39	22	(67)	10	(30)	1	0	33
	1989/90	159	50	54	46	25	(65)	13	(35)	0	0	38
	1990/91	190	59	53	47	19	(54)	16	(46)	0	0	35
	1991/92[c]	19	0	68	32	3	(50)	3	(50)	0	0	6
	1992/93	37	38	57	43	3	(30)	7	(70)	0	0	10
807[d]	1987/88	59	75	100	0		(0)	0	(0)	0	0	0
	1988/89	81	58	82	18	6	(100)	0	(0)	0	0	6
	1989/90	87	61	75	25	7	(87)	1	(13)	0	0	8
	1990/91	112	67	59	41	10	(67)	5	(33)	0	0	15
804[e]	1991/92	140	55	80	20	7	(64)	4	(36)	0	0	11
	1992/93	178	65	70	30	14	(78)	4	(22)	0	0	18
Combined												
	1985/86	203	44	71	29	14	(42)	19	(58)	0	0	33
	1986/87	194	44	62	38	17	(41)	24	(59)	0	0	41
	1987/88	228	57	63	37	16	(44)	20	(56)	0	0	36
	1988/89	236	50	67	33	28	(72)	10	(26)	1	0	39
	1989/90	246	54	63	37	32	(70)	14	(30)	0	0	46
	1990/91	302	62	54	46	29	(58)	21	(42)	0	0	50
	1991/92	159	48	71	29	10	(59)	7	(41)	0	0	17
	1992/93	215	60	65	35	17	(61)	11	(39)	0	0	28

[a] Of permittees
[b] Those hunting
[c] Area redefined in 1991
[d] New in 1987; eliminated in 1991
[e] New area defined in 1991

Table 3. Unit 1B. Hunter residency and success, 1985-92.

Regulatory year	Successful					Unsuccessful					Total Hunters
	Local[a] resident	Nonlocal resident	Nonres.	Total	(%)	Local[a] resident	Nonlocal resident	Nonres.	Total	(%)	
1985/86	10	15	8	33	(30)	35	32	12	79	(70)	112
1986/87	16	16	9	41	(38)	50	8	9	67	(62)	108
1987/88	19	8	11	38	(44)	21	13	1	448	(56)	86
1988/89	25	1	13	39	(33)	51	13	15	79	(67)	118
1989/90	29	11	6	46	(42)	42	20	2	64	(58)	110
1990/91	43	6	1	50	(44)	40	20	4	66	(56)	114
1991/92	9	5	3	17	(23)	38	18	0	56	(77)	73
1992/93	17	7	4	28	(33)	34	18	4	56	(67)	84

[a] Residents of Petersburg and Wrangell

Table 4. Unit 1B. Harvest chronology, 1985-92.

Regulatory year	August	September	October	November	December
1985/86	8(24)	16(48)	3(9)	3(9)	3(9)
1986/87	13(32)	22(54)	3(7)	2(5)	1(2)
1987/88	7(19)	12(33)	15(42)	2(6)	0(0)
1988/89	8(21)	18(46)	6(15)	3(8)	4(10)
1989/90	14(30)	15(33)	7(15)	8(17)	2(4)
1990/91	7(14)	17(34)	11(22)	3(6)	12(24)
1991/92	3(18)	8(47)	5(29)	1(6)	0(0)
1992/93	11(39)	10(36)	4(14)	0(0)	3 (11)

Table 5. Unit 1B. Successful hunters transport methods, 1985-92.

Regulatory year	Airplane	Boat	Other
1985/86	18(55)	15(45)	0(0)
1986/87	26(63)	15(37)	0(0)
1987/88	25(71)	9(24)	2(5)
1988/89	21(54)	18(46)	0(0)
1989/90	20(43)	26(56)	0(0)
1990/91	11(22)	39(78)	0(0)
1991/92	7(41)	8(47)	2(12)
1992/93	14(50)	14(50)	0(0)

LOCATION

Game Management Unit: Unit 1C (7,600 mi^2)

Geographical Description: That portion of the Southeast Alaska mainland from Cape Fanshaw to the latitude of Eldred Rock

BACKGROUND

Mountain goats inhabited Southeast Alaska after the retreat of Pleistocene glaciation (Chadwick, 1983). Because mountain goats utilize alpine and subalpine zones in the summer and the upper reaches of coniferous forests in the winter, the coastal mountains of British Columbia and Alaska have promoted range expansion rather than acted as a barrier. Mountain goats now are in most of the coastal range of Southeast Alaska where steep forested slopes broken by rock outcrops are common.

A popular species for both local sport hunters and trophy hunters from around the world, mountain goat populations in easily accessed areas near Juneau have been reduced significantly from historical high numbers. In the immediate vicinity of Juneau, goat populations may have declined early in this century as mining activity increased. Sport hunting of the already depleted populations contributed to further declines. Low goat numbers prompted the Board of Game's decision to close goat hunting in the area between Taku Glacier and Eagle Glacier/River in 1985. In an effort to boost local goat numbers, a re-introduction of mountain goats from the Whiting River drainage to Mount Juneau occurred in the summer of 1989. No goats marked during the reintroduction were located on Mt. Juneau during the report period. However, small numbers of mountain goats have been sighted both on Mt. Juneau and on Heintzelman Ridge above urban Juneau.

MANAGEMENT DIRECTION

Management Objectives

Population management objectives identified by staff for Game Management Unit 1C are as follows:

- Maintain goat densities resulting in the observation of at least 30 goats per hour during fall surveys in the area between Eagle River/Glacier and the Antler River and in the Chilkat Range north of the Endicott River;

- Maintain goat densities resulting in the observation of at least 50 goats per hour during fall surveys in the area south of Taku Inlet; and

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

METHODS

We collected harvest data from registration permit returns for the 1991 and 1992 fall hunts. No aerial surveys were conducted during the reporting period due to poor fall weather and changes in area staff.

RESULTS AND DISCUSSION

Population Status and Trend

Little information is available on mountain goat populations within Unit 1C other than anecdotal information gathered from hunters. Goat capture and telemetry flights made at 2 Juneau mine sites give some indication about populations. Mountain goats are at mid densities over most range that is hunted, although some people have reported finding few goats in areas traditionally productive for hunters. These reports mention abundant wolf sign, although mild weather could also contribute to low goat numbers at low altitudes. Little sign of contagious ecthyma has been seen during the reporting period, although hunters attributed facial lesions to the disease. The "orf" outbreak that occurred in this subunit in the years preceding this period has seemingly diminished. No goats handled during the period were observed to have symptoms of ecthyma, and none tested positive for the disease.

Reproduction and survival of kids seemed satisfactory for areas covered by mining impact studies at the Kensington and A-J Mines near Juneau.

Mortality

Harvest:

Season and Bag Limit.

Unit 1C, that portion draining into Lynn Canal and Stephens Passage between Antler River and Eagle Glacier and River	Oct. 1 - Nov. 30	One goat by registration permit only.
Unit 1C, that portion draining into Stephens Passage and Taku Inlet between Eagle Glacier and River and Taku Glacier, and	No open season	

all drainages of the Chilkat Range south of the Endicott River.		
Remainder of Unit 1C.	Aug. 1 - Nov. 30	One goat by registration permit only.

Hunter Harvest. The reported harvest during the 1991 and 1992 hunting seasons is summarized in Table 2. A total of 22 goats were harvested in Unit 1C in 1991 (14 males and 8 females), and 39 were taken in 1992 (27 males and 12 females). The harvests during the reporting period compared to a 5-year mean (1988-92) of 32. Poor weather probably contributed to the low harvest in 1991, the rainiest year on record.

Permit Hunts. Registration Permit Hunts 802 and 803 have been covered under a single permit since the 1988 season. In 1991, 145 permits were issued for Unit 1C goat hunts, increasing slightly to 151 in 1992. Compliance with hunt reporting requirements has generally been good.

Hunter Residency and Success. Fourteen of the goats harvested in 1991 were taken by local residents, 3 were taken by other Alaska residents, and 5 by nonresidents (Table 3). Approximately 29% of the local residents, 43% of the nonlocal residents, and 63% of the nonresidents that hunted were successful. In 1992, 22 goats were taken by local residents, 5 by nonlocal residents, and 12 by nonresidents. Forty-five percent of local residents, 38% of nonlocal residents, and 100% of nonresidents who hunted were successful in 1992.

In 1991 success rates and harvest per unit effort were low for the portion of the unit open to goat hunting. The overall success rate of 35% was the lowest during the most recent 5-year period, when the mean success rate for all hunters during that period was 48%. The success rate improved in 1992 to 53%. The average number of days hunting required to bag a goat, which had steadily increased since the early 1980s to a high of 3.6 hunter days per goat in 1987, dropped to 2.2 in 1991 and to 3.2 in 1992. The percentage of females in the harvest in 1991 and 1992 (36% and 31%, respectively) remained lower than in 1987 and 1988, when more nannies were taken than billies. This parameter may be an ureliable indicator of population status given the difficulty of identifying goats by sex in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4-month season with 50% of the take in 1991 and 44% in 1992 (Table 5). The preponderance of late season kills probably reflects both the availabilty of goats at lower altitudes and hunter desire to take an animal in prime winter pelage.

Transport Methods. Table 6 reports transportation methods for successful hunters. Most hunters continue to use boats to reach the hunt area.

Other Mortality:

There is little data available concerning natural mortality. Holroyd (1967) cited several instances of goats killed in falls, rock slides and avalanches. Up to 50% of deaths of radiocollared goats in a study conducted near Haines, Alaska could be attributed to falls (Dinneford pers. commun.). Several collared study goats near Juneau have died in circumstances which may have involved accidents, although abundant wolf sign at the carcass location generally makes it impossible to tell whether the animal succumbed to falls or predation. We received several reports of wolf packs traveling through alpine areas in close proximity to goat herds near Juneau during the summer of 1992.

Habitat

Assessment:

Winter and summer goat range within the subunit is extensive. Currently, in most parts of the subunit, goat numbers are probably well below carrying capacity.

Some loss of critical winter range could be expected if proposed mining projects in Unit 1C are developed. The proposed A-J Mine stands to have the most impact in the near-term. The damming of a large portion of the Sheep Creek valley for A-J tailings disposal would cause direct loss of winter range, although we have been unable to document use of this area in recent years.

Development of the Kensington Mine north of Berners Bay would remove old-growth timber which serves as winter goat habitat. In addition, activities at the mine may displace goats using the Lion's Head Mountain area.

CONCLUSIONS AND RECOMMENDATIONS

No aerial surveys were completed during the reporting period. Hunter effort was similar to preceding seasons, but success in 1991 was low, possibly because of poor weather. Conversly, the time it took to take a goat that year was also low, possibly indicating animals taken were found in easily accessible places; longer hunts were precluded by arduous terrain. The 1992 hunt was similar in effort and success to seasons preceding 1991. In both years hunters did a good job selecting for males.

We should continue efforts to conduct aerial surveys because survey information is sparse. As weather and funding permit, surveys should be conducted to determine population composition and status. Wolf predation and habitat quality are possible limiting factors in both closed areas. Goats added to the Juneau area population via the Mt. Juneau re-introduction have not been obvious contributors to population expansion, although goat numbers within the closed area near Juneau have increased somewhat.

Easily accessed areas such as Tracy and Endicott arms may be receiving excessive hunting pressure in relation to the subunit. For this reason, fine scale management of goat populations

through harvest guidelines for hunt subareas is being used for northern Southeast Alaska. This allows monitoring of harvest pressure in discrete areas within permit hunt boundaries. To minimize the complexity of hunting requirements, we will continue to administer hunts in Unit 1C under 1 registration permit.

Although the percentage of nannies in the kill was substantially lower during the report period than in previous years, we should place continued emphasis on directing hunting pressure away from females. Provided to all permittees, educational materials encouraged hunters to select for billies. In each permit hunt area, harvest guidelines valuing females twice as much as males will continue to be used and should encourage hunters to select for males.

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Table 1. Unit 1C. Mountain goat composition counts, 1986-92.

Year	Kids	Adults	Kids: 100 adults	Total Goats	Goats /hr.
1986	55	192	22	247	42
1987[a]	--	---	--	---	--
1988[b]	26	81	32	107	26
1989	169	514	33	683	51
1990[a]	--	---	--	---	--
1991[a]	--	---	--	---	--
1992[a]	--	---	--	---	--

[a] No survey
[b] Survey limited due to weather, not representative of entire Unit.

Table 2. Unit 1C. Mountain goat harvest by sex, 1988-92.

Year	Males	Females	Unknown	Total
1988	14	19	3	26
1989	28	11	3	42
1990	19	10	1	30
1991	14	8	0	22
1992	27	12	0	39

Table 3. Unit 1C. Hunter residency and success, 1988-92.

	Successful				Unsuccessful			
Year	Local Res.	Nonlocal Res.	Nonres.	Total	Local Res.	Nonlocal Res.	Nonres.	Total
1988	30	3	3	36	39	2	3	44
1989	25	9	8	42	32	2	3	37
1990	16	4	10	30	20	4	1	25
1991	14	3	5	22	34	4	3	41
1992	22	5	12	39	27	8	0	35

Table 4. Unit 1C. Harvest data by permit hunt, 1988-92.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unknown	Total
802/	1988	169	89	44	36	14	19	3	36
803	1989	173	94	37	42	28	11	3	42
	1990	140	85	25	30	19	10	1	30
	1991	145	82	41	22	14	8	0	22
	1992	151	77	35	39	27	12	0	39

Table 5. Unit 1C. Harvest chronology, 1988-92

Year	Aug	Sept	Oct	Nov
1988	6	7	8	15
1989	11	5	6	20
1990	1	6	7	15
1991	4	5	2	11
1992	5	2	15	17

Table 6. Unit 1C. Successful hunter transport methods, 1988-92.

Year	Airplane	Boat	Highway Vehicle	Other
1988	5	26	2	
1989	10	25	2	5
1990	2	26	0	2
1991	3	19	0	0
1992	7	32	0	0

LOCATION

Game Management Unit: Unit1D (2,700 mi^2)

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

BACKGROUND

There are 3 separate registration permit hunt areas (804, 805, and 806) in Unit 1D. Hunt area 804 is the smallest of the three areas and is bounded by the Taiya River, the Yukon and White Pass Railroad, and the Canadian border. This area was closed by Game Board action in 1984 because of a sharp decline in goat numbers as evidenced by fewer sightings, reduced hunter success, and a greater proportion of females in the harvest. Aerial composition counts between 1983 and 1992 indicate the Hunt 804 population did not recover despite the closure. In the rest of the Unit, mountain goat populations in the 1980s remained below levels of the late 1960s and 1970s.

Hundertmark et al (1983) examined winter habitat use by mountain goats in the Chilkat Valley. They felt that increased access afforded by timber and mineral development would result in increased hunting pressure and illegal harvest. This added hunting pressure and the ability to access previously unhunted areas were considered as detrimental to goat populations as the habitat loss from logging and mining.

MANAGEMENT DIRECTION

Management Objectives

Population management objectives identified by staff for Unit 1D are as follows:

Hunt 804 (Skagway) - Increase population to 100 animals.

Hunt 805 (Haines North) - Increase estimated population from 600 to 1000 goats. Maintain hunter success rate of 25%.

Hunt 806 (Haines South) - Increase estimated population from 300 to 500 goats. Maintain hunter success rate of 25%.

METHODS

Aerial surveys were not conducted within the Unit during 1991 because of extended periods of bad weather. We conducted a survey in the eastern portion of the area along previously established routes in August 1992. Harvest parameters, including hunting pressure and hunter success rates, were determined for areas 805 and 806 jointly, as a single registration permit was used for both hunts.

RESULTS AND DISCUSSION

Population Status and Trend

Infrequent surveys result in imprecise population estimates. Survey data from recent years indicated goat numbers decreased in easily accessed areas receiving heavy hunting pressure. However, an exceptional survey flown in 1989 documented animals at a rate far surpassing previous surveys (Table 1). It is unknown whether these data result entirely from fortuitous survey conditions or from a population change. Despite being closed to hunting since 1987, the 804 hunt area has shown no significant population increase. Other areas in northern Southeast Alaska have exhibited similar low growth rates, even after several years of protection.

Population Size: Conservative estimates based on the 1989 survey data yield a minimum population of 350 goats in the 805 hunt area and 290 goats in the 806 area. The 1992 survey of a portion of Hunt 805 was conducted in sunny, hot weather, and few animals were seen during the latter half of the flight. Therefore, lower numbers seen in 1992 do not contradict the earlier flights. It is likely that the population of hunt area 804 has remained at low numbers (between 40 and 60 goats) since declining in the early 1980s.

Mortality

Harvest:

Season and Bag Limit.

Unit 1D, that portion lying east of Taiya Inlet and River between the Chilkoot Trail and the White Pass and Yukon Railroad		No open season
Unit 1D, that portion lying north of the Katzehin River and east	Sept. 15-Nov. 30	One goat by registration permit only.

of the Haines Highway

Remainder of Unit 1D.	Aug. 1 - Dec 31	One goat by registration permit only.

Board of Game Actions and Emergency Orders. Use of hunt harvest guidelines to establish safe levels of harvest continued during the reporting period. In 1991 and 1992 the number of goats killed in areas accessed from the Haines Highway and roads around Chilkoot Lake approached guideline levels. Accordingly, the area north of the Haines Highway and west of the Ferebee River/Glacier was closed by emergency order for the final weeks of both seasons. In both years, a disproportionate harvest of females precipitated closure in this area, since the harvest guidelines weigh nannies twice as heavily as billies.

Hunter Harvest. Totals of 25 and 23 goats were taken in Unit 1D during 1991 and 1992, respectively (Table 2). In 1991 18 were male and 5 female with 2 animals reported as unknown sex; in 1992 more females (11) were killed than males (9) with 3 goats of unknown sex. The 1991 and 1992 harvests were lower than the 31 taken in 1990 and were similar to the 5-year average (24) (Table 3).

Permit Hunts. Mountain goat hunting within the Unit occurred under 2 registration permit hunts during the period. Both Hunt 805 and Hunt 806 were combined on a single permit (a practice that began before 1991) to reduce paperwork required for each hunter. Hunt reports were combined for the two hunts. The primary reason for maintaining two hunts in the Unit is to allow for different season dates for different accessabilities. Hunt 804, covering the area between the Taiya River and the White Pass & Yukon Railroad, remained closed.

Hunter Residency and Success. Hunters were issued 154 and 130 registration permits for Hunts 805/806 in 1991 and 1992, respectively (Table 4). In 1991, 34% of the 73 who hunted were successful, as were 33% of 70 who hunted in 1992. The mean success rate for the 5-year period 1988-1992 was 30%.

In 1991, 53 (73%) of the participating hunters were residents of Unit 1D. Twenty (27%) other Alaskan residents and no nonresidents hunted. In 1992, 59 (84%) of the people who hunted were local residents, with 10 nonlocal state residents (14%) and 1 nonresident (1%) participating.

Local residents took 84% of the Unit 1D goat kill in 1991 and 91% the following year. Nonlocal Alaskans accounted for 16% of the kill in 1991 and 9% in 1992. The 1 nonresident hunter was unsuccessful.

Harvest Chronology. Goats can be hunted in Unit 1D from August first until the end of December. Traditionally most goats were taken between September and November. For the first time in recent years goats were killed during December (Table 5). Emergency orders

were issued in 1991 and 1992, closing a highway-accessible portion of Hunt 805 for the later part of the season, which restricted the November and December harvest.

Transport Methods. Of successful hunters, 52% (1991) and 39% (1992) reported using boat transportation. Thirty six percent (1991) and 22% (1992) used highway vehicles, and 9% (1991) and 39% (1992) used other (or unknown) means of conveyance (Table 6).

CONCLUSIONS AND RECOMMENDATIONS

Finer scale management of mountain goats is becoming necessary as hunting pressure increases. The two open permit hunt areas (805 and 806) have been further subdivided, with harvest guidelines developed for each subarea. In order to meet the division's goal of simplification of regulations and permits, a single permit will continue to be used for multiple hunts within Unit 1D. However, the use of the permits for harvest monitoring becomes more complex as we attempt to track the harvest in various hunt subareas. Careful population and harvest monitoring is necessary and closures may be required to avoid excessive harvest in areas where hunting pressure is concentrated.

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Table 1. Unit 1D mountain goat composition counts by hunt area, 1986-92.

Hunt Area	Regulatory Year	No. of kids	No. of adults	Kids:100 adults	Total goats	Count time (hrs)
804	1986	No Survey				
	1987	0	7	0	7	0.7
	1988	No Survey				
	1989	6	17	35	23	0.7
	1990	No Survey				
	1991	No Survey				
	1992	0	0	--	0	0.4
805	1989	48	128	38	176	4.3
	1990	No Survey				
	1991	No Survey				
	1992	10	30	33	40	2.1
806	1986	No Survey				
	1987	4	14	29	18	1.6
	1988	No Survey				
	1989	33	111	30	144	1.4
	1990	No Survey				
	1991	No Survey				
	1992	No Survey				

Table 2. Unit 1D. Mountain goat harvest by sex, 1988-92.

Year	Males	Females	Unknown	Total
1988	9	10	0	19
1989	14	9	0	23
1990	18	12	1	31
1991	18	5	2	25
1992	9	11	3	23

Table 3. Unit 1D. Hunter residency and success, 1988-92.

	Successful				Unsuccessful		
Year	Local Res.	Nonlocal Res.	Nonres.	Total	Local Res.	Nonlocal Res.	Nonres.
1988	12	1	6	19	43	13	1
1989	20	2	0	23	41	13	0
1990	20	9	2	31	60	11	0
1991	21	4	0	25	32	16	0
1992	21	2	0	23	38	8	1

Table 4. Unit 1D. Harvest data by permit hunt, 1988-92.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Total hunters
805/	1988	168	92	57	19	76
806	1989	156	80	54	22	76
	1990	193	91	72	31	103
	1991	154	81	48	25	73
	1992	130	60	47	23	70

Table 5. Unit 1D. Harvest chronology, 1988-92 (known kill date only).

Year	Aug	Sept	Oct	Nov	Dec
1988	0	10	5	4	0
1989	6	8	8	0	0
1990	2	6	10	13	0
1991	2	9	9	1	3
1992	0	3	10	6	2

Table 6. Unit 1D. Successful hunter transport methods, 1988-92.

Year	Boat	Highway vehicle	Other
1988	6	7	6
1989	8	2	12
1990	15	7	9
1991	13	9	3
1992	9	5	9

LOCATION

Game Management Unit: Unit 4 (5,800 mi^2)

Geographical Description: Admiralty, Baranof, Chichagof, and adjacent islands

BACKGROUND

A huntable population of mountain goats was established on Baranof Island through the 1923 transplant of 18 animals from the Southeast Alaska mainland (Burris and McKnight 1973). Hunting was initiated in 1949, and seasons have continued to date. In 1976, a registration permit system was instigated. Since that time the harvest has ranged from 28 to 75 animals.

In the mid 1950s, goats were translocated to Chichagof Island (Burris and McKnight 1973), but a huntable population has not resulted. The last report of a goat sighting on the island was in 1978 (Johnson 1981). Mountain goats are not present on Admiralty or any other island in the Unit. The present numbers and distribution of goats probably represents carrying capacity for the species.

Severe winters have not occurred in recent years but may have reduced goat numbers in the past. Throughout most goat habitat, hunter access is difficult and weather greatly determines harvest.

MANAGEMENT DIRECTION

Management Objectives

- Maintain a population sufficient to provide an annual harvest of at least 35 goats.
- Maintain a mountain goat population sufficient to provide an annual hunter success rate of at least 25%.

METHODS

Goat hunting in Unit 4 is administered under a registration permit system (Hunt RG150). Hunters receive permits free but are required to report successful hunts within 10 days of taking a goat. All other permittees are required to report their hunt effort by mid January. Information obtained from the reports includes area and days hunted, kill date, transportation used, and any use of commercial services. Successful hunters are also encouraged to bring in the horns from their goat for aging.

No aerial population surveys were accomplished during this report period.

RESULTS AND DISCUSSION

Population Status and Trend

Anecdotal information from hunters indicates the Baranof Island goat population is stable. Young (pers commun.) estimated the population at 1000 goats in 1991.

Mortality

Harvest:

Season and Bag Limit.

Unit 4	Aug. 1-Dec. 31	One goat by registration permit only.

Regulations adopted by the Federal Subsistence Board for goats were the same as the state regulations.

Hunter Harvest. In 1991, 300 permits were issued and 29 goats were harvested. Adverse weather restricted hunting effort, and only 38% of the permittees actually hunted. In 1992, with better weather, 144 of the 290 permittees hunted and 50 goats were taken. The 5-year averages for 1988-92 are: permits issued, 295; hunters afield, 128; and reported harvest, 38 goats. Hunters reported sex of goats as 62% males in 1991 and 60% in 1992. Recent harvest levels (Table 1) are below 5% of the estimated population.

Hunter Residency and Success. Residents of Baranof Island are the primary hunters of mountain goats in the Unit (Table 2). Because all nonAlaskans are required to hunt with guides, few nonresident hunters participate in the hunt.

Harvest Chronology. Harvest chronology is presented in Table 3. Most goats are traditionally taken between August and October. In years where freeze-up and snowfall make goats accessible, significant harvest can occur in December, but this did not happen in 1991 or 1992.

Transport Methods. Successful Unit 4 goat hunters continue to rely on boats as their means of transportation (Table 4). Increased use of aircraft by successful hunters reflects favorable weather conditions and generally occurs in years with the highest harvest.

CONCLUSIONS AND RECOMMENDATIONS

The interest since 1984 in hunting mountain goats on Baranof Island seems fairly stable (Figure 1). Harvest levels (Figure 2) are closely related to actual hunting effort which is regulated by weather. Although survey data are lacking, the public does not report any decline in goat density. I recommend no change in state regulations.

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Table 1. Unit 4. Harvest data by permit hunt, 1988-92.

Hunt No.	Reg. year	Permits issued	Percent did not report	Percent[a] did not hunt	Percent[b] unsuccessful hunters	Percent[b] successful hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
815	1988/89	259	1	52	70	30	22 (60)	15 (40)	0	0	37
	1989/90	322	2	58	75	25	22 (67)	11 (33)	0	0	33
	1990/91	306	1	57	67	33	24 (57)	17 (41)	1	0	42
	1991/92	300	2	60	75	25	18 (62)	11 (38)	0	0	29
	1992/93	290	1	50	65	35	30 (60)	19 (38)	1	0	50

[a] Of permittees.
[b] Those hunting.

Table 2. Unit 4. Hunter residency and success, 1988-92.

Regulatory year	Successful					Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonres	Total(%)	
1988/89	23	2	12	37	(30)	76	5	5	86 (70)	123
1989/90	31	2	0	33	(25)	82	11	5	98 (75)	131
1990/91	37	2	3	42	(33)	75	6	5	86 (67)	128
1991/92	26	2	1	29	(25)	74	9	2	8 (75)	114
1992/93	45	2	3	50	(35)	81	12	1	94 (65)	144

[a]Residents of Baranof Island.

Table 3. Unit 4. Harvest chronology, 1988-92.

Hunt No.	Regulatory year	Harvest periods August	September	October	November	December
815	1988/89	6(16)	12(32)	9(24)	0	10(27)
	1989/90	10(30)	10(30)	7(21)	3(9)	3(9)
	1990/91	7(17)	11(26)	15(36)	3(7)	6(14)
	1991/92	6(21)	5(17)	10(34)	3(10)	5(17)
	1992/93	17(34)	11(22)	8(16)	9(18)	5(10)

Table 4. Unit 4. Successful hunter transport methods, 1988-1992.

Regulatory Year	Airplane	Boat	Walked	Other
1988/89	13(35)	22(60)	2(5)	0
1989/90	6(18)	21(64)	6(18)	0
1990/91	10(24)	29(69)	3(7)	0
1991/92	5(17)	20(69)	3(10)	1(3)
1992/93	13(26)	33(66)	4(8)	0

LOCATION

Game Management Unit: 5 (6,200 mi^2)
Geographical Description: Cape Fairweather to Icy Bay, eastern gulf coast

BACKGROUND

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

Alaska natives used mountain goat hides for clothing and other domestic purposes. Recreational hunting was occurring at least by the early 1970s and probably 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. In that year 283 goats (33 kids:100 adults) were between Gateway Knob and Harlequin Lake in the Brabazon Mountains. By 1973 Game Division biologists had documented a significant decline in goat numbers in the area, attributed primarily to severe winter weather. Counts in the same part of Unit 5A increased over the years, and in the 5B portion of Icy Bay, numbers of goats are higher than those recorded in the early 1970s.

MANAGEMENT DIRECTION

Management Objectives

Management objectives identified by staff for mountain goat populations in Unit 5 are to increase the estimated population from 850 to 1250 goats and maintain a hunter success rate of 25%.

METHODS

No aerial surveys were conducted within the subunit during the reporting period. This was the result of a combination of factors including weather, staffing changes, location of the area biologist position in Juneau, and loss of the assistant area biologist position for northern Southeast Alaska. During the reporting period, hunters were required to obtain registration permits from local Fish and Game offices which allowed in-season monitoring of harvest effort and intensity. Anecdotal information was gathered from hunters, ADF&G field

Population Status and Trend

Surveys in 1989 suggested a stable or growing population. An increasing goat-per-hour value during surveys counducted up to that time indicated an expanding herd. The Unit 5 population probably numbers around 1000 animals and is slowly increasing. No information indicates population declines since that time, but predation may be increasing with suspected higher wolf numbers.

Mortality

Harvest:

Season and Bag Limit.

Unit 5	Aug. 1-Dec. 31	One goat by registration permit.

Hunter Harvest. The reported Unit 5 mountain goat harvest in 1991 was 8 (4 male and 4 female), matching the 1988-1992 average of 8 (Table 2). In 1992 there were only 4 goats taken. Since 1983, when we recorded the third highest annual harvest of 23, the kill has been significantly reduced. The reduction in kill seems due to decreased effort rather than a reduced success rate.

Illegal harvest remains unquantified, but it is probably small.

Hunter Residency and Success. The hunter success rate averaged 39 percent during the 1988-1992 period (Table 3), with the 1991 and 1992 success rates being 47% and 31%, respectively. In both seasons, 2 successful hunters were local residents. In 1991 5 successful hunters were nonlocal Alaskans and 1 was a nonresident. In 1992 2 succesful hunters were nonlocal state residents and none was nonresident. This differed from the 1986 and 1990 period, when nonresidents outnumbered Alaska residents and took most of the harvest. The relative low harvest by local and nonlocal Alaskans is partly due to low interest by local hunters and easier access to other huntable goat populations for other residents. The requirement that nonresidents be accompanied by an outfitter/guide is not believed to have affected goat hunting in the Yakutat area.

Permit Hunts. In 1991 the number of registration permits issued was 42, a decline from the 1990 figure of 46. In 1992 we issued only 35 permits.

During the 1991 season 40% of the permitted hunters reported hunting, and in 1992 the number declined to 37%.

The registration permit format remains a viable method for effectively managing goat hunting in the unit.

Harvest Chronology. The Unit 5 goat harvest is spread throughout the season, although the greatest number of goats are usually taken during September and October (Table 5). Few goats have been taken in August. The 1991 hunting season followed this pattern. In 1992 the harvest was split between September and December. However, with the low number of goats taken that year, we see no real change in chronology.

Transport Methods. Four goats taken in 1991 were accessed via aircraft and the other 4 were reached by the use of boats. In 1992 2 goats were taken with each of these transportation modes.

CONCLUSIONS AND RECOMMENDATIONS

We should continue aerial composition counts to collect population information throughout the unit. Recent population information is not available, but hunting effort is quite low. It is likely that goat populations in the subunit are moderately high and could support additional harvest.

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Table 1. Unit 5. Mountain goat composition counts, 1986-92

Year	Number of adults	Number of kids	Total goats	Kids:100 adults	Percent Kids	Goats/ hour
1986	36[a]	11	47	31	23	40
1987	196	53	249	27	21	60
1988	140	53	193	38	27	56
1989	64	29	93	45	31	47
1990		No Survey				
1991		No Survey				
1992		No Survey				

[a] Incomplete survey

Table 2. Unit 5. Annual harvest, 1988-92.

Year	Males	Females	Unknown	Total
1988	2	3	0	5
1989	7	1	0	8
1990	11	2	0	13
1991	4	4	0	8
1992	2	2	0	4

Table 3. Unit 5. Hunter residency and success, 1988-92.

	Successful				Unsuccessful			
Year	Local res.[a]	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1988	0	2	3	5	5	1	8	14
1989	2	0	6	8	4	3	4	11
1990	3	4	6	13	3	11	3	17
1991	2	5	1	8	1	2	6	9
1992	2	2	0	4	1	2	6	9

[a] Local residents are those persons living in Unit 5.

Table 4. Unit 5. Harvest data by permit hunt, 1988-92.

Hunt No.	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Billies	Nannies	Total
817	1988	44	25	4	5	2	3	5
	1989	40	21	11	8	7	1	8
	1990	46	16	17	13	11	2	13
	1991	42	25	9	8	4	4	8
	1992	35	22	9	4	2	2	4

Table 5. Unit 5. Harvest chronology, 1986-92.

Year	Aug	Sept	Oct	Nov	Dec
1986	0	2	3	2	2
1987	0	1	2	0	0
1988[a]	1	1	2	0	0
1989	2	3	3	0	0
1990	4	2	5	0	2
1991	0	2	1	3	2
1992	0	2	0	0	2

[a] One kill date unknown.

LOCATION

Game Management Unit: 6 (10,140 mi^2)

Geographical Description: Prince William Sound and North Gulf Coast

BACKGROUND

Mountain goats inhabit the mainland mountains of Unit 6 and to Bainbridge, Culross and Knight islands. Captain Cook in 1785 (Beaglehole 1966), Edmund Heller (1910) in 1908, Clarance Rhodes (ADF&G files) in 1938, and Fred Robards in 1952 (ADF&G files) documented their presence. Robards estimated 4350 goats between Cape Fairfield and Bering Glacier, which includes most of Unit 6. The current population may be 2400 to 2800.

Several significant events have caused reductions in the population. In 1961, Art Sheets, game biologist with ADF&G, reported evidence that goat numbers in Port Wells were reduced in the 1940s by military personnel stationed in Whittier. He reported similar evidence for reductions in the Puget Bay area during the 1950s by military personnel stationed in Seward. Populations also may have suffered significant natural mortality during the severe winters of 1971 and 1975 and been unable to recover because of predation (Reynolds 1981) and hunter harvest. Hunting during the early 1980s caused additional declines in subpopulations (Griese 1988*a*), while wolf predation increased (Griese 1988*b*).

Population surveys began with aerial composition flights in 1969. Methods were not standardized until 1986, when Griese (1988*a*) improved surveys by establishing count areas that were systematically searched.

Harvest management evolved as biologists recognized the need to manage on the basis of smaller geographic units (Foster 1977) to reduce harvest and distribute hunting pressure. Long seasons with 1 or 2 goat bag limits were in effect from statehood through 1975. The bag limit was reduced to 1 goat in 1976, and the first permit hunt was established in 1980. By 1986, the present system of registration permit hunts was in place.

Harvest has been monitored since 1972 using hunter reports. Successful and unsuccessful hunters were required to report, with the exception of 1980 through 1985, when only successful hunters reported. Annual harvest reached an historic high of 182 animals in 1983/84 and declined to an historic low of 41 goats in 1989/90.

MANAGEMENT DIRECTION

Management Objectives

To maintain a minimum population of 2400 goats and no less than 70% males in the harvest.

METHODS

We did aerial surveys to estimate population size, trend and composition in permit hunt areas (Figure 1). Each area was divided into 1 or more sample units. Units were 5 to 70 mi^2 and encompassed discrete areas of goat summer/fall habitat. These generally were alpine cover types that occurred above 1,000 ft elevation. Large glaciers (>1 mi^2) were excluded from sample units. However, the edges of glaciers were searched (up to 300 ft), and any goats observed were included in the count. Where possible, sample units were separated by geographic barriers to minimize variability due to movements of goats among units. We drew boundaries on 1:63,360 scale, topographic maps.

We searched sample units using a Piper Supercub (PA-18) or Bellanca Scout aircraft on floats at 60 to 70 mph and 300 to 500 ft from slopes or cliff faces. We surveyed in the morning within 3 hours after sunrise or in the evening within 3 hours of sunset. Flight followed contours, starting at the top of a ridge and repeating passes downward in elevation. Width of the search area on the ground was limited to no more than 500 ft elevation or 1/8 mi. We generally observed goats toward steep topography. Searches were completed on a drainage by drainage basis to avoid duplicate counts and insure systematic coverage.

Flight lines were drawn on sample unit maps. Start and stop times for the survey were recorded, and search effort (minutes/mi^2) was calculated. Goat observations were plotted on sample unit maps. Numbers recorded for each group included: total, goats older than kids, kids, and unidentified goats.

We also recorded environmental conditions during the survey to evaluate survey quality as excellent, good or poor. We made notes concerning: cloud cover, turbulence, wind speed, and light type and intensity. Excellent conditions were overcast skies, soft light, and no turbulence (Nichols 1980). Good conditions were combinations of partly cloudy to clear skies, direct light, and mild turbulence. Poor conditions were combinations of clear skies, bright light, and mild to severe turbulence.

We summarized survey results by hunt area, subunit and unit as: total goats observed, number of goats older than kids, number of kids, percent kids, and kids:100 older goats. Total numbers were also estimated by assuming 70 to 90% of goats were seen during surveys.

A conservative maximum allowable harvest (MAH) for each year was established for each permit hunt area. It was calculated as a percent of goats observed during the most recent

survey. The percent applied ranged from 2% to 6%, depending upon population trend, estimated mortality, and elapsed time since the last survey. For example, areas with decreasing population trend, high mortality, and survey data several years old had a MAH of not more than 3% of goats observed in the last survey. Rate of harvest was consistent with a recommendation of $\leq$6% take for the Kenai Peninsula (Del Frate 1992), but was more conservative than the 7% kill recommended for the Sawatch Range in Colorado (Adams and Bailey 1982).

We monitored harvest through permit hunt reports required from all hunters. Hunters not reporting were sent up to 2 reminder letter. In addition, successful hunters were required to have goat horns checked by department staff to correctly identify the goat's sex and age. To minimize kill of females, hunters were given an information leaflet that presented methods of differentiating sexes of goats at a distance and explained benefits of selectively harvesting males.

We cooperated with the U.S. Forest Service (USFS) to study habitat and population identity. The Forest Service collected and analyzed all data during this reporting period. Preliminary results of the ADF&G portion of the goat study was reported earlier. A final report will be completed during the next reporting period.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: We completed aerial surveys in 8 of 12 permit hunt areas between 6 August and 12 September 1992. The Goat Mountain Observation area that is closed to hunting was also surveyed. We counted 1071 goats. Flights were a joint effort with the USFS, Cordova and Glacier Ranger Districts, who helped fund aircraft charter and provided an observer. Surveys were not completed during 1991.

The goat population in Unit 6 declined during the past 5 years. We estimated 3100 to 3700 goats in 1988/89 (Griese 1990) and 2700 to 3300 in 1990/91 (Nowlin 1992). The population in 1992/93 was 2400 to 2800 goats.

Population size and trend varied among subunits. Unit 6D had the largest number (1520-1820) and was stable or slightly increasing (Table 1). Units 6A and 6B had smaller numbers and accounted for all of the decrease in the Unit 6 population. The number of goats has declined by 23 to 28% since 1988/89. Surveys were not completed in Unit 6C during this reporting period. However, incidental observations indicated a small number of goats that were stable or slightly increasing.

Results of aerial goat surveys can be extremely variable (Ballard 1975 and Fox 1977). We feel variability was reduced by standardizing methods and surveying during excellent or good

conditions. Of 20 sample units completed, 7 were rated as excellent, 13 were considered good, and none was poor.

Population Composition: The kid-to-older goat ratio and percent kids for all areas counted during 1992/93 was 25:100 and 20%, respectively (Table 1). This was similar to values from the previous 4 years.

The kid-to-older goat ratios during 1992/93 in Units 6A, 6B, and 6D were 28:100, 26:100, and 24:100, respectively. Percent kids in those units were 22%, 21% and 19%, respectively. Compared to the previous 4 years, these ratios and percentages were lower in Units 6A and 6D and higher in Unit 6B.

Composition, as an indicator of population trend in the subunits, was not comparable to other areas in southcentral Alaska. Over the past 5 years, numbers decreased in Units 6A and 6B; where percentages of kids were 22-24% and 17-21%, respectively. During the same period, numbers were stable or slightly increasing in Unit 6D, where percent kids was 19-21%. On the Kenai Peninsula, percent kids was 23-32% in increasing populations, 20-23% where goat numbers were stable, and <20% in decreasing populations (Del Frate 1992). On Kodiak Island, increasing goat populations were characterized by 28% kids and decreasing populations by 17% kids (Smith and VanDaele 1987).

Hunter harvest was conservative in all areas. However, there were differences in winter conditions and wolf predation that influenced mortality.

Mortality

Harvest:

Season and Bag Limit. The season in Unit 6 was 1 August to 31 December. The bag limit was 1 goat by registration permit only.

Board of Game Actions and Emergency Orders. The Board of Game did not take any actions in Unit 6 during this reporting period.

Fourteen emergency orders were issued, closing all or portions of registration permit hunts. During 1991/92, 7 emergency orders were issued. Hunts 823 and 824 were closed before any goats were taken because surveys indicated too few goats to support harvest. Additional closures made when MAH was reached or approached included the eastern portion of hunt 820 and all of hunts 828, 829, and 830. During 1992/93, 7 more emergency orders were issued. The Kitrov Hills and Brower Ridge portions of hunt 820 were closed before any goats were killed because of low numbers seen during surveys. Other closures made when MAH was reached or approached included the Berg Lakes and White River/Icy Bay sections of hunt 820 and all of hunts 825, 826, 828, 829, and 830.

Hunter Harvest. Goat harvest in Unit 6 was conservative. Hunters reported taking 50 goats during each year of this reporting period (Table 2). During 1991/92 and 1992/93, MAH was 73 and 69 goats, respectively. Among permit areas, MAH was reached in 5 of 18 hunts that were open during the 2 regulatory years.

The reported take included 43 (86%) males and 7 (14%) females during 1991/92. In 1992/93, the sex composition was 39 males (80%) and 10 (20%) females. One animal of undetermined sex was taken during the 2 years.

In the 1991/92 harvest, the average age of 42 male goats was 5-years (range=1-10), and the average of 7 females was 6-years (range=2-12). In 1992/93, the average age of 36 males was 5-years (range=2-11), and the average of 9 females was 6-years (range=2-12).

Harvest during this reporting period was the second lowest documented in Unit 6 since harvest monitoring began in 1972. The only lower take was 41 goats in 1989/90. The low kill during the current period was due primarily to a declining population that reduced MAH.

The Exxon Valdez oil spill was likely the most important factor depressing harvest in 1989/90. Oiled beaches and a massive cleanup effort probably deterred hunters from visiting Prince William Sound and possibly the remainder of Unit 6. The MAH was 110 goats, with only 41 goats taken, and there were not any individual hunt areas closed by emergency order because MAH was reached.

Permit Hunts. Number of permits issued this reporting period was near the historic low in 1989/90. Permits were first required in the entire unit in 1981/82. Number issued peaked at 796 in 1983/84, steadily declined to a low of 235 in 1989/90, and ranged from 247 to 267 since then. The downward trend reflects long-term reduction in hunting opportunity.

Hunter Residency and Success. During this reporting period, most goat hunters were residents of Alaska (Table 3). Among those residents, most did not live in Unit 6. This was also the case during 1990/91 and 1991/92. However, during 1988/89 nonresidents of Alaska outnumbered residents.

Hunter success during 1991/92 and 1992/93 was 46% and 42%, respectively. During the previous 3 years, it ranged from a low of 36% in 1988/89 to a high of 50% in 1990/91.

Harvest Chronology. September and October were consistently the most productive months for goat harvest (Table 4). Seventy-two percent and 88% of the harvest occurred in this period during 1991/92 and 1992/93, respectively. This was also the pattern during the previous 3 years.

Some variation occurred in August and November harvests during 1988/89 and 1989/90 because of regulatory actions. Harvest did not occur in August because the season did not

open for most hunters until 1 September. November harvest varied because of emergency closures and changes in hunter eligibility for permit hunts near major community centers.

Transport Methods. Airplanes were the most important means of hunter transport (Table 5). They provided transportation for 78% and 72% of hunters during 1991/92 and 1992/93, respectively. They were similarly important during previous years.

Other Mortality:

Predation by wolves was likely an important source of natural mortality, particularly in Units 6A, 6B, and 6C where wolf density was greatest. Goat numbers have declined sharply in these subunits over the past 5 years. Predation was a factor in the decline and may retard recovery (Fox and Streveler 1986). We are cooperating with a USFS study of wolf ecology which will improve our understanding of prey-predator relationships in these subunits.

Deep snow during winter (Smith 1984) and spring (Adams and Bailey 1982, Swenson 1985) may increase mortality and decrease reproductive success. It was probably a factor during 1989/90, 1991/92 and 1992/93. Depth at Worthington Glacier, (2100 ft elevation) east of Valdez, was well above average for March through May during all 3 years (Alaska Annual Data Summary, USDA, Soil Conservation Service).

Habitat

Old-growth forest provides important winter habitat for goats along the coast of Alaska (Schoen and Kirchhoff 1982, Fox 1979, Fox et al 1989). We recognize the potential for clearcut logging to negatively affect populations through removal of old-growth timber and improved human access. Logging roads can result in increased legal harvest, illegal harvest, and disturbance (Arnett and Irwin 1989, Fox et al 1989).

In Unit 6A near Icy Bay, clearcutting on state land from the late 1960s until the late 1980s removed timber from goat winter range. Goat numbers in that area declined drastically. The first systematic surveys in 1984/85 counted 204 animals. Subsequent surveys in 1989/90 and 1992/93 tallied 97 and 85 goats. Habitat loss and improved access associated with logging were major factors in the decline. Wolf predation and deep snow were also factors.

Logging is continuing in Unit 6A. However, goat winter range was identified and many of the forest practices recommended by Fox et al. (1989) were adopted by the state land management agency, Department of Natural Resources, to minimize affects on goat habitat.

Future habitat loss due to clearcut logging is expected in Unit 6D from Nelson Bay to Port Fidalgo. Much of the goat winter range is in private ownership, and extensive logging is planned or in progress. Private landowners are not required to consider goat habitat in their forest practices.

CONCLUSIONS AND RECOMMENDATIONS

We revised population objectives for this reporting period. Previous objectives were to increase the goat population to at least 4500 and sustain an annual harvest of 160 goats, including a maximum of 30% females and an average age of 6.0 years by the year 2000. These objectives were unrealistic given a declining population, wolf predation, and effects of logging. The revised objectives were achieved during this reporting period.

Harvest and number of permits issued continued at near record low levels. This was due primarily to a declining number of goats that reduced hunting opportunity.

Reversal of the downward population trend should be a top priority for goat management in Unit 6. I recommend the following 4 steps:

1. Continue the conservative harvest strategy to facilitate population recovery. MAH should not exceed 5% in permit hunt areas with declining numbers.

2. Evaluate the potential for goat introductions on Montague and Knight Islands to increase the population.

3. Continue cooperation with USFS wolf ecology research to improve understanding of the role of predation.

4. Complete studies of habitat and population identity and use results to develop habitat capability models, assess the affect of logging, and refine survey methods.

Changes to hunting season dates and bag limits are not warranted at this time. MAH for hunt areas should be adjusted annually within the recommended range, as dictated by the previous year's harvest composition, winter severity, level of predation, and population status and trend. Frequent surveys and diligent harvest monitoring are essential under this strategy.

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Table 1. Unit 6 summer/fall mountain goat composition counts and estimated population size, 1988-92.

Hunt No. Area	Regulatory year	Adults[a]	(%)	Kids (%)	Unk.	Kids:100 adults	Total goats observed	Estimated population size
RG820	1988/89	-		-	-	-	-	-
Subunit	1989/90	433	(76)	139 (24)	4	32	576[b]	800-900
6A	1990/91	-		-	-	-	-	-
	1991/92	-		-	-	-	-	-
	1992/93	160	(77)	47 (23)	0	29	207[c]	550-650
RG825	1988/89	-		-	-	-	-	-
	1989/90	-		-	-	-	-	-
	1990/91	34	(74)	12 (26)	2	35	48[b]	50-60
	1991/92	-		-	-	-	-	-
	1992/93	46	(82)	10 (18)	0	22	56[b]	60-70
Suckling	1988/89	-		-	-	-	-	-
Hills	1989/90	-		-	-	-	-	-
	1990/91	6	(86)	1 (14)	0	17	7[b]	8-10
	1991/92	-		-	-	-	-	-
	1992/93	-		-	-	-	-	-
Mt.	1988/89	-		-	-	-	-	-
Hamilton	1989/90	-		-	-	-	-	-
	1990/91	7	(70)	3 (30)	0	43	10[c]	11-14
	1991/92	-		-	-	-	-	-
	1992/93	-		-	-	-	-	-
TOTAL	1988/89	-		-	-	-	-	-
6A	1989/90	433	(76)	139 (24)	4	32	576	870-980
	1990/91	47	(75)	16 (25)	2	34	65	840-960
	1991/92	-		-	-	-	-	-
	1992/93	206	(78)	57 (22)	0	28	263	630-740

Table 1. Continued.

Hunt No. Area	Regulatory year	Adults[a]	(%)	Kids (%)	Unk.	Kids:100 adults	Total goats observed	Estimated population size
RG826	1988/89	-	-	-	-	-	-	-
Subunit	1989/90	-	-	-	-	-	-	-
6B	1990/91	114	(83)	24 (17)	0	21	138[b]	150-180
	1991/92	-		-	-	-	-	-
	1992/93	102	(76)	33 (24)	0	32	135[b]	150-180
RG878	1988/89	58	(83)	12 (17)	0	21	70[b]	80-90
	1989/90	-		-	-	-	-	-
	1990/91	-		-	-	-	-	-
	1991/92	-		-	-	-	-	-
	1992/93	-		-	-	-	-	-
Goat Mt.	1988/89	-		-	-	-	-	-
	1989/90	-		-	-	-	-	-
	1990/91	-		-	-			
	1991/92	-		-	-	-	-	-
	1992/93	61	(86)	10 (14)	0	16	71[c]	90-100
TOTAL	1988/89	58	(83)	12 (17)	0	21	70	370-430
6B	1989/90	-		-	-	-	-	-
	1990/91	114	(83)	24 (17)	0	21	138	330-390
	1991/92	-		-	-	-	-	-
	1992/93	163	(79)	43 (21)	0	26	206	280-330
RG821	1988/89	64	(85)	11 (15)	0	17	75[b]	120-140
Subunit	1989/90	-		-	-	-	-	-
6C	1990/91	-		-	-	-	-	-
	1991/92	-		-	-	-	-	-
	1992/93	-		-	-	-	-	-

Table 1. Continued.

Hunt No. Area	Regulatory year	Adults[a] (%)	Kids (%)	Unk.	Kids:100 adults	Total goats observed	Estimated population size
RG822	1988/89	-	-	-	-	-	-
Subunit	1989/90	221 (76)	68 (24	0	31	289[b]	320-380
6D	1990/91	166 (79)	43 (21)	0	26	209[c]	300-360
	1991/92	-	-	-	-	-	-
	1992/93	176 (81)	42 (19)	0	24	218[c]	280-330
RG823	1988/89	-	-	-	-	-	-
	1989/90	92 (88)	12 (12)	0	13	104[b]	110-140
	1990/91	76 (74)	27 (26)	0	36	103[b]	110-130
	1991/92	-	-	-	-	-	-
	1992/93	64 (74)	23 (26)	0	36	87[b]	100-110
RG824	1988/89	-	-	-	-	-	-
	1989/90	86 (76)	27 (24)	0	31	113[b]	120-150
	1990/91	81 (85)	14 (15)	0	17	95[b]	100-120
	1991/92	-	-	-	-	-	-
	1992/93	94 (76)	29 (24)	0	31	123[b]	130-160
RG828	1988/89	-	-	-	-	-	-
	1989/90	65 (81)	15 (19)	0	23	80[c]	90-100
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	22 (88)	3 (12)	0	14	25[c]	40-50
RG829	1988/89	-	-	-	-	-	-
	1989/90	-	-	-	-	-	-
	1990/91	215 (81)	49 (19)	0	23	264[b]	290-350
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-

Table 1. Continued.

Hunt No. Area	Regulatory year	Adults[a] (%)	Kids (%)	Unk.	Kids:100 adults	Total goats observed	Estimated population size
RG830	1988/89`	230 (79)	61 (21)``	0	27	291[b]	320-380
	1989/90	-	-	-	-	-	-
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	291 (83)	58 (17)	0	20	349[b]	380-450
RG879	1988/89	-	-	-	-	-	-
	1989/90	-	-	-	-	-	-
	1990/91	78 (77)	23 (23)	0	29	101[b]	110-130
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-
Valdez	1988/89	-	-	-	-	-	-
	1989/90	43 (74)	15 (26)	0	35	58[b]	60-70
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-
Heiden Canyon	1988/89	-	-	-	-	-	-
	1989/90	16 (84)	3 (16)	0	19	19[b]	21-25
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-
Mt. Castner	1988/89	-	-	-	-	-	-
	1989/90	14 (70)	6 (30)	0	43[b]	20	22-26
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-

Table 1. Continued.

Hunt No. Area	Regulatory year	Adults[a] (%)	Kids (%)	Unk.	Kids:100 adults	Total goats observed	Estimated population size
Sargent	1988/89	8 (89)	1 (11)	0	13[b]	9	10-12
Icefield	1989/90	-	-	-	-	-	-
	1990/91	-	-	-	-	-	-
	1991/92	-	-	-	-	-	-
	1992/93	-	-	-	-	-	-
6D	1988/89	238 (79)	62 (21)	0	26	300	1410-1700
TOTAL	1989/90	537 (79)	146 (21)	0	27	683	1440-1750
	1990/91	616 (80)	156 (20)	0	25	772	1450-1720
	1991/92	-	-	-	-	-	-
	1992/93	647 (81)	155 (19)	0	24	802	1520-1800
TOTAL	1988/89	360 (81)	85 (19)	0	24	445	3100-3700
UNIT 6	1989/90	970 (77)	285 (23)	4	29	1259	-
	1990/91	777 (80)	196 (20)	2	25	975	2700-3300
	1991/92	-	-	-	-	-	-
	1992/93	1016 (80)	255 (20)	0	25	1271	2400-2800

[a] Adults means, older goats excluding kids.
b Complete survey of count area.
[c] Partial survey of count area.

Table 2. Unit 6 mountain goat harvest data by permit hunt, 1988-92.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unk.	Total harvest
RG820/6A	1988/89	56	29	55	45	8 (44)	10 (56)	0	18
	1989/90	23	35	0	100	14 (100)	0	1	15
	1990/91	42	36	30	70	12 (67)	6 (33)	1	19
	1991/92	26	35	29	71	10 (83)	2 (17)	0	12
	1992/93	45	56	60	40	8 (100)	0	0	8
RG825/6A	1988/89	4	50	0	100	0	2 (100)	0	2
	1989/90	3	33	50	50	1 (100)	0	0	1
	1990/91	3	67	0	100	1 (100)	0	0	1
	1991/92	2	50	0	100	1 (100)	0	0	1
	1992/93	14	57	50	50	3 (100)	0	0	3
TOTAL 6A	1988/89	60	30	52	48	8 (40)	12 (60)	0	20
	1989/90	26	35	6	94	15 (100)	0	1	16
	1990/91	45	38	29	71	13 (68)	6 (32)	1	20
	1991/92	28	36	28	72	11 (85)	2 (15)	0	13
	1992/93	59	56	58	42	11 (100)	0	0	11
RG826/6B	1988/89	10	40	67	33	2 (100)	0	0	2
	1989/90	14	71	50	50	2 (100)	0	0	2
	1990/91	14	50	43	57	3 (75)	1 (25)	0	4
	1991/92	22	68	43	57	3 (75)	1 (25)	0	4
	1992/93	20	60	25	75	4 (67)	2 (33)	0	6
RG878/6B	1988/89	0	0	0	0	0	0	0	0
	1989/90	6	67	0	100	2 (100)	0	0	2
	1990/91	5	40	67	33	1 (100)	0	0	1
	1991/92	12	75	33	33	1 (100)	0	0	1
	1992/93	9	67	67	33	1 (100)	0	0	1

Table 2. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males(%)	Females(%)	Unk.	Total harvest
TOTAL 6B	1988/89	10	40	67	33	2 (100)	0	0	2
	1989/90	20	70	33	67	4 (100)	0	0	4
	1990/91	19	47	50	50	4 (80)	1 (20)	0	5
	1991/92	34	71	40	50	4 (80)	1 (20)	0	5
	1992/93	29	62	36	64	5 (71)	2 (29)	0	7
RG821/6C	1988/89	22	82	50	50	1 (50)	1 (50)	0	2
RG822/6D	1988/89	89	49	84	16	4 (67)	2 (33)	1	7
	1989/90	32	81	83	17	1 (100)	0	1	18
	1990/91	39	72	55	45	4 (80)	1 (20)	0	5
	1991/92	47	53	59	41	8 (89)	1 (11)	0	9
	1992/93	39	51	74	26	4 (80)	1 (20)	0	5
RG823/6D	1989/90	20	75	100	0	0	0	0	0
RG824/6D	1989/90	30	77	86	14	0	1 (100)	0	1
RG828/6D	1988/89	20	50	50	50	4 (80)	1 (20)	0	5
	1989/90	24	63	56	44	1 (33)	2 (67)	1	4
	1990/91	32	66	82	18	2 (100)	0	0	2
	1991/92	33	70	80	20	2 (100)	0	0	2
	1992/93	7	71	100	0	0	0	0	0
RG829/6D	1988/89	112	52	65	35	12 (67)	6 (33)	1	19
	1989/90	22	68	43	57	2 (50)	2 (50)	0	4
	1990/91	54	33	50	50	13 (72)	5 (28)	0	18
	1991/92	40	48	38	62	10 (77)	3 (23)	0	13
	1992/93	37	54	35	65	8 (73)	3 (27)	0	11

Table 2. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males(%)	Females(%)	Unk.	Total harvest
RG830/6D	1988/89	84	45	61	39	10 (63)	6 (38)	2	18
	1989/90	51	53	67	33	6 (75)	2 (25)	0	8
	1990/91	39	54	39	61	7 (64)	4 (36)	0	11
	1991/92	36	56	63	38	6 (100)	0	0	6
	1992/93	68	47	61	39	9 (69)	4 (31)	1	14
RG879/6D	1988/89	38	29	56	44	9 (82)	2 (18)	1	12
	1989/90	10	60	25	75	3 (100)	0	0	3
	1990/91	34	56	80	20	2 (67)	1 (33)	0	3
	1991/92	29	55	85	15	2 (100)	0	0	2
	1992/93	28	68	78	22	2 (100)	0	0	2
TOTAL 6D	1988/89	343	47	66	34	39 (70)	17 (30)	5	61
	1989/90	189	67	66	34	13 (65)	7 (35)	1	21
	1990/91	198	54	57	43	28 (72)	11 (28)	0	39
	1991/92	185	56	61	39	28 (88)	4 (13)	0	32
	1992/93	179	54	61	39	23 (74)	8 (26)	1	32
TOTAL UNIT 6	1988/89	435	46	64	36	50 (63)	30 (38)	5	85
	1989/90	235	64	52	48	32 (82)	7 (18)	2	41
	1990/91	262	51	50	50	45 (71)	18 (29)	1	64
	1991/92	247	55	54	45	43 (86)	7 (14)	0	50
	1992/93	267	54	57	41	39 (80)	10 (20)	1	50

Table 3. Unit 6 mountain goat hunter residency and success, 1988-92.

Area	Regulatory year	Successful: Local[a] resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total(%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total(%)	Total hunters
6A	1988/89	0	7	13	20 (48)	2	13	7	22 (52)	42
	1989/90	0	3	13	16 (94)	0	0	1	1 (6)	17
	1990/91	1	8	11	20 (71)	0	4	4	8 (29)	28
	1991/92	0	1	12	13 (72)	0	3	2	5 (28)	18
	1992/93	0	1	10	11 (42)	1	10	4	15 (58)	26
6B	1988/89	0	0	2	2 (33)	2	1	1	4 (67)	6
	1989/90	2	0	2	4 (67)	0	1	1	2 (33)	6
	1990/91	2	0	3	5 (50)	2	2	1	5 (50)	10
	1991/92	0	1	4	5 (56)	0	4	0	4 (44)	9
	1992/93	0	2	5	7 (64)	0	3	1	4 (36)	11
6C	1988/89	1	1	0	2 (50)	1	1	0	2 (50)	4
6D	1988/89	6	22	33	61 (34)	8	34	79	121 (66)	182
	1989/90	5	12	4	21 (34)	10	22	9	41 (66)	62
	1990/91	5	30	4	39 (43)	17	34	1	52 (57)	91
	1991/92	7	21	4	32 (39)	10	37	3	50 (61)	82
	1992/93	5	19	8	32 (39)	9	36	6	51 (61)	83
UNIT 6 TOTAL	1988/89	7	30	48	85 (36)	13	49	87	149 (64)	234
	1989/90	7	15	19	41 (48)	10	23	11	44 (52)	85
	1990/91	8	38	18	64 (50)	19	40	6	65 (50)	129
	1991/92	7	23	20	50 (46)	10	44	5	59 (54)	109
	1992/93	5	22	23	50 (42)	10	49	11	70 (58)	120

[a] Resident of Unit 6.

Table 4. Unit 6 mountain goat harvest chronology percent by time period, 1988-92.

Area	Regulatory Year	Harvest Periods August	September	October	November	December	January	*n*
	1988/89	0	70	25	5	0	0	20
	1989/90	0	50	50	0	0	0	16
	1990/91	20	50	30	0	0	0	20
	1991/92	15	69	15	0	0	0	13
	1992/93	27	64	9	0	0	0	11
6B	1988/89	0	0	100	0	0	0	2
	1989/90	0	100	0	0	0	0	4
	1990/91	20	40	40	0	0	0	5
	1991/92	40	40	20	0	0	0	5
	1992/93	29	57	14	0	0	0	7
6C	1988/89	0	0	0	100	0	0	2
6D	1988/89	0	79	11	10	0	0	61
	1989/90	0	14	43	43	0	0	21
	1990/91	10	36	49	3	3	0	39
	1991/92	28	38	31	3	0	0	32
	1992/93	0	63	34	3	0	0	32
UNIT 6 TOTAL	1988/89	0	73	16	11	0	0	85
	1989/90	0	37	41	22	0	0	41
	1990/91	14	41	42	2	2	0	64
	1991/92	26	46	26	2	0	0	50
	1992/93	10	62	26	2	0	0	50

Table 5. Unit 6 mountain goat harvest percent by transport method, 1988-92.

Area	Regulatory year	Percent of harvest: Airplane	Boat	3-or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
6A	1988/89	100	0	0	0	0	0	0	20
	1989/90	100	0	0	0	0	0	0	16
	1990/91	100	0	0	0	0	0	0	20
	1991/92	100	0	0	0	0	0	0	13
	1992/93	100	0	0	0	0	0	0	11
6B	1988/89	100	0	0	0	0	0	0	2
	1989/90	100	0	0	0	0	0	0	4
	1990/91	80	20	0	0	0	0	0	5
	1991/92	100	0	0	0	0	0	0	5
	1992/93	100	0	0	0	0	0	0	7
6C	1988/89	50	0	0	0	0	50	0	2
6D	1988/89	75	24	0	0	0	0	2	59
	1989/90	43	38	5	10	0	5	0	21
	1990/91	33	62	3	0	0	3	0	39
	1991/92	66	28	3	0	0	3	0	32
	1992/93	56	44	0	0	0	0	0	32
UNIT 6 TOTAL	1988/89	81	17	0	0	0	1	1	83
	1989/90	71	20	2	5	0	2	0	41
	1990/91	58	39	2	0	0	2	0	64
	1991/92	78	18	2	0	0	2	0	50
	1992/93	72	28	0	0	0	0	0	50

LOCATION

Game Management Units: 7 and 15 (8,397 mi^2)

Geographical Description: Kenai Peninsula

BACKGROUND

Mountain goats inhabit the entire length of the Kenai Mountains, the westernmost extension of the species' continental range. Goat populations are most abundant in the coastal mountains and least abundant along the relatively dry western slopes and interior portions of the Kenai Mountains where they coexist with Dall sheep.

The Kenai Peninsula has been a popular mountain goat hunting area since statehood because of its proximity to Anchorage and relatively good accessibility of goat populations. By the late 1970s, wildlife managers recognized that long general seasons with bag limits of 2 goats, combined with moderate to severe winters had led to local population declines. Consequently, permit hunts were implemented in 1978 to reduce harvest rates and to distribute hunters. Since 1982, goat harvest on the Kenai Peninsula has been managed by a combination of drawing and registration permit hunts. Holdermann (1989) provided a summary of the Kenai Peninsula mountain goat management system.

Goats within the Kenai Fjords National Park (KFNP) were protected from hunting when the park was established in 1980. In addition to KFNP, most goat habitat on the Kenai Peninsula was within the Kenai National Wildlife Refuge, Chugach National Forest, or Kachemak Bay State Park and remains virtually unaffected by development.

Since 1980 bark beetles have infested and killed many older stands of spruce trees on the Kenai peninsula. Markets for Alaska wood products may facilitate extensive logging on federal, state, and private lands and could adversely affect goat populations through loss of winter habitat.

MANAGEMENT DIRECTION

Management Objectives

To maintain a population of 4000 to 4500 mountain goats with a harvest of predominantly (66% minimum) males.

METHODS

The Kenai Peninsula goat range, excluding KFNP, is divided into 31 count areas which correspond to hunt areas. Since the early 1970s, ADF&G has routinely monitored goat populations in these areas by midsummer aerial surveys according to the techniques of Lentfer (1955). We fly surveys in a Piper PA-18 Super Cub with an observer during early morning and evening hours in July and August before hunting season. Flights follow drainage contours beginning at the subalpine zone and progressing upward into the alpine zone by 150-200 m increments. We count and classify goats as kids (< 4 months) or older goats and record data on standardized forms. Harvest quotas are adjusted based on the number of goats we observe in each hunt area.

Three goat population trend areas, each consisting of 2 or 3 contiguous count areas, were established in 3 separate geographic regions of the Kenai. The 3 areas became the primary sampling units for monitoring trends in goat production and abundance for the regions they represent. A description of these trend areas was reported in Del Frate (1992).

The size of the peninsula mountain goat population is estimated by combining the most recent aerial count of each survey area. We express the composite estimate as a range by assuming 70% to 90% of the goats present during aerial surveys are observed.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: We observed 3291 goats during surveys of count areas on the Kenai Peninsula. This excluded the KFNP that contained an estimated 800-1000 goats. We estimated there were 4500 (90% observability) to 5800 goats (70% observability) on the Kenai Peninsula.

Blying Sound. Aerial surveys of the Blying Sound trend area indicated a stable population of approximately 300 goats between 1968-71. Goat numbers declined during the mid 1970s and steadily increased to at least 458 goats by 1983 (Table 1). The 1987 survey indicated the population had stabilized at approximately 461 goats. In 1991 the number of goats observed declined; howeve, survey conditions were poor.

West Slope. The formations along the west slope of the Kenai Mountains from Chickaloon Bay to Tustemena Glacier support the lowest mountain goat density on the Kenai Peninsula because of habitat and climatic limitations. Nevertheless, the goat population in this area has extended their range and undergone rapid growth during the last 2 decades. The goat population in this area declined in the mid 1970s but increased in the 1980s and early 1990s (Table 1).

Kachemak Bay. The quality of habitat and goat abundance in the upper Kachemak Bay trend area were similar to Blying Sound. The distribution of goats and Dall sheep overlap in the northern one-third of this trend area. We have minimal survey data for this area before 1980; however, the population grew substantially throughout the 1980s and early 1990s (Table 1).

Population Composition: In 1991 we surveyed 16 count areas and tallied 1711 goats with 18.5% kids (Table 2). In 1992 we counted 1888 goats in 18 count areas. There were 23.8% kids in the population in 1992.

Mortality

Harvest:

Season and Bag Limit. The sport season has remained 10 August to 30 September, by drawing permit since 1987 (Table 3). This was followed by a 15 October to 30 November registration permit hunt (Table 4). The Tier II subsistence hunt for hunt areas 852T, 863T, 864T, and 865T was from 1 August to 30 September. The bag limit was 1 goat.

Board of Game Actions and Emergency Orders. During their spring 1989 meeting, the Board of Game advanced the opening date from 10 August to 1 August for Tier II hunts. This was at the request of residents of Nanwalek (formerly English Bay). Also beginning in 1989, nonresidents were required to be accompanied by a guide.

In the spring of 1992, the Board of Game designated most of the Kenai Peninsula a nonsubsistence area. This designation eliminated 2 of the Tier II hunt areas. These areas were reclassified as drawing hunts. The Board also increased the maximum number of permits the department could issue to 500.

Hunter Harvest. Hunters harvested 134 goats on the Kenai Peninsula in 1991. Drawing permittees killed 62 goats (44 males, 17 females, and 1 unspecified sex) throughout 23 hunt areas (Table 5). Permittees harvested 59 goats (42 males and 17 females) from 13 hunt areas during the registration permit hunt (Table 6). Subsistence hunters harvested 13 billy goats in the lower Kenai Peninsula Tier II hunts (Table 7).

Hunters harvested 182 goats on the Kenai Peninsula in 1992. Drawing permittees killed 78 goats (54 males, 23 females, and 1 unspecified sex) throughout 24 hunt areas (Table 8). Permittees harvested 75 goats (52 males, 22 females and 1 unspecified sex) from 14 hunt areas during the registration permit hunt (Table 9). Subsistence hunters harvested 24 goats (19 males and 5 females) in the lower Kenai peninsula Tier II hunts (Table 7).

Harvest of mountain goats in hunt areas for drawing, registration, and Tier II hunts were within allowable harvest guidelines of less than 7% of goats counted.

Hunter Residency and Success. Success rates varied widely between hunt areas and hunt types as well as between years (Tables 10, 11, & 12). Goat distribution, weather, and hunter

demographics contributed to these variations. Nonresident hunters composed less than 10% of total hunters in 1991 and 1992, respectively (Tables 13 & 14). However, nonresidents usually had high success rates (> 75%) because of guiding requirements. The overall success rate of nonresidents was 78% and 85% for 1991 and 1992, respectively.

Harvest Chronology. Drawing permittees harvested a higher proportion of goats during the last part of September (Table 15). Registration permittees followed a significantly different pattern. The registration season was quota-based and hunt areas were closed as quotas were achieved. Consequently, harvest occurred shortly after registration hunting began. Many areas with easy access had high demand and closed within 5 days.

Transport Methods. Transportation methods varied between units because of accessibility. In 1991, successful hunters in Unit 7 used highway vehicles (34.2%), boats (32.9%), and aircraft (21.9%) (Table 16). In Unit 15, successful hunters used aircraft (47.5%), boats (31.1%), and horses (6.6%) (Table 17). All other transportation methods were less than 5%.

In 1992, the transportation types used were similar to the previous year. Successful hunters in Unit 7 used highway vehicles (43.8%), boats (26.7%), and aircraft (19.0%) (Table 16). In Unit 15 successful hunters used aircraft (45.8%) and boats (41.7%) (Table 17).

CONCLUSIONS AND RECOMMENDATIONS

Population size was estimated from the most recent surveys of count areas. We observed 3291 goats on the Kenai Peninsula excluding KFNP. An estimated 800 to 1000 goats inhabited the KFNP. Including KFNP, we estimated between 4500 (assuming 90% observability) and 5800 goats (assuming 70% observability) on the Kenai Peninsula. The goat population was stable and the management objective of maintaining 4000 to 4500 mountain goats on the Kenai Peninsula was met.

Within trend areas during the period 1968-1987, kids:100 older goats and the percentage of kids in the population ranged from 20:100 to 44:100 and 17-31%, respectively (Table 1). With favorable weather and limited harvest, increasing populations were characterized by 30-48 kids:100 older goats and 23-32% kids. Stable populations had 25-30 kids:100 older goats and 20-23% kids. Declining populations held kid percentages below 20%.

The system of mountain goat harvest management developed on the Kenai Peninsula may have application in other areas of the state. Advantages are: (1) Allocation of permits by hunt areas effectively disperses hunting effort, alleviating the problem of localized overharvest in areas with easy access; (2) count areas that correspond with hunt areas allow for specific hunt area objectives; and (3) long-term use of trend areas will greatly facilitate the assessment of hunting and environmental effects on mountain goats.

Harvest rates for individual count areas were increased to 7% of countable goats to stabilize goat numbers within management objectives. The department will produce a Kenai Peninsula mountain goat management plan for presentation at the Northern Wild Sheep and Goat Symposium in 1994. We do not recommend any changes in goat harvest management on the Kenai Peninsula at this time.

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Table 1. Kenai Peninsula mountain goat trends 1968-93.

Trend Area	Year	Kids: 100 older Goats	% Kids	Total Count	Population Trend[a]
Blying Sound	1968	34.1	25.4	299	
(Count areas	1971	23.6	19.1	308	+3
845,846)	1974	38.0	27.5	258	-16
	1977	21.1	17.4	333	+29
	1978	39.2	28.1	366	+10
	1983	33.9	25.3	458	+25
	1985	20.3	16.9	397	-13
	1987	25.6	20.4	461	+16
	1991	24.2	19.5	385	-16
West Slope	1968	44.0	30.6	36	
(Count areas	1977	25.0	20.0	25	-31
855,856,857)	1978	31.6	24.0	25	+0
	1979	40.6	28.9	45	+80
	1980	27.1	21.3	61	+36
	1981	34.6	25.7	70	+15
	1983	43.2	30.2	106	+51
	1987	44.1	30.6	160	+51
	1990	37.5	27.3	110	-31
	1991	33.3	25.0	128	+16
	1992	32.2	24.4	156	+22
	1993	32.0	24.2	128	-18
Kachemak Bay	1968	42.4	29.8	289	
(Count areas	1978	32.9	24.8	105	-64
858,859,860)	1980	29.3	22.7	172	+64
	1987	27.5	21.6	301	+75
	1990	32.7	24.6	463	+54
	1992	31.4	23.9	544	+17

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

Table 2. Units 7 & 15 aerial mountain goat composition counts and estimated population size, 1988-92.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
831	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	29	7	--	24	36	--	36
	1992/93	34	12	--	35	46	--	46
832	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	2	0	--	0	2	--	2
833	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	131	23	--	18	154	--	154
	1992/93[a]	--	--	--	--	--	--	--
834	1988/89	14	3	0	21	17	--	17
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	66	16	--	24	82	--	82
	1992/93[a]	--	--	--	--	--	--	--

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
835	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	72	13	--	18	85	--	85
	1992/93[a]	--	--	--	--	--	--	--
836	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	154	30	--	19	184	--	184
	1992/93[a]	--	--	--	--	--	--	--
837	1988/89	27	8	0	30	35	--	--
	1989/90	16	3	0	19	19	--	--
	1990/91	16	3	0	19	19	--	19
	1991/92	20	5	0	25	25	--	25
	1992/93	20	6	0	30	26	--	26
838	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	12	3	0	25	15	--	15
	1991/92	16	7	0	44	23	--	23
	1992/93[a]	--	--	--	--	--	--	--

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
839	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	118	33	0	28	151	--	151
	1992/93[a]	--	--	--	--	--	--	--
840	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	43
841	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[ac]	--	--	--	--	--	--	--
	1992/93	41	12	0	29	53	--	53
842	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	71	25	0	35	96	--	96

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
843	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	34	8	0	23	42	--	42
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	80	29	0	36	109	--	109
844	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	67	17	0	25	84	--	84
	1992/93[a]	--	--	--	--	--	--	--
845	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	216	49	0	23	265	--	265
	1992/93[a]	--	--	--	--	--	--	--
846	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	94	26	0	28	120[d]	--	173
	1992/93[a]	--	--	--	--	--	--	--

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
847	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	52
848	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	142	32	0	23	174	--	174
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
849	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
850	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
851	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
852	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	110	44	0	40	154	--	154
853	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	0	0	0	N/A	0	--	0
	1992/93[a]	--	--	--	--	--	--	--
854	1988/89	60	14	0	23	74	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	59	12	0	20	71	--	71
	1991/92	78	23	0	29	101	--	101
	1992/93	70	28	0	40	98	--	98

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
855	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	11	3	0	27	14	--	14
	1991/92	26	6	0	23	32	--	32
	1992/93	16	4	0	25	20	--	20
856	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	25	14	0	56	39	--	39
	1991/92	46	19	0	41	65	--	65
	1992/93	50	15	0	30	65	--	65
857	1988/89	35	8	0	23	43	--	--
	1989/90	52	17	0	33	69	--	--
	1990/91	44	13	0	29	57	--	57
	1991/92	24	7	0	29	31[e]	--	57
	1992/93	52	19	0	36	71	--	71
858	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	72	23	0	32	95	--	95
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	87	28	0	32	115	--	115

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
859	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	128	14	0	34	172	--	172
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	147	54	0	37	201	--	201
860	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91	149	47	0	32	196	--	196
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	180	48	0	27	228	--	228
861	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	107	33	0	31	140	--	140
862	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	67	21	--	31	88	--	88

Table 2. Continued.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
863	1988/89[a]	--	--	--	--	--	--	--
	1989/90[a]	--	--	--	--	--	--	--
	1990/91[a]	--	--	--	--	--	--	--
	1991/92	235	41	0	17	276[e]	--	276
	1987/88[a]	--	--	--	--	--	--	--
864	1988/89[a]	--	--	--	--	--	--	--
	1989/90	104	26	0	25	130	--	130
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	98	21	0	21	119	--	119
865	1988/89[a]	--	--	--	--	--	--	--
	1989/90	141	29	0	21	170	--	170
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	120	28	0	23	148	--	148
	1992/93[a]	129	30	0	23	159	--	159

[a]No survey.
[b]Population for purpose of permit allocation.
[c]New hunt area 841- Cecil Rhodes Mountain 1991.
[d]Poor count.
[e]Partial count.

Table 3. Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1984-92.

Year	Season Dates	No. Permits Issued	No. Hunters	Percent Success	Harvest			
					M	F	U	Total
1984	10 Aug. - 30 Sept.	355	169	38	50	14	1	65
1985	10 Aug. - 30 Sept.	16	11	45	2	3		5
1986	6 Sept. - 31 Oct.	130	60	58	21	14		35
1987	10 Aug. - 30 Sept.	340	160	42	49	17	1	67
1988	10 Aug. - 30 Sept.	329	156	38	43	17		60
1989	10 Aug. - 30 Sept.	324	146	47	46	22		68
1990	10 Aug. - 30 Sept.	280	151	36	36	18	1	55
1991	10 Aug. - 30 Sept.	320	172	36	44	17	1	62
1992	10 Aug. - 30 Sept.	347	180	43	54	23	1	78
Total					345	145	5	495

Table 4. Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984-92.

Year	Season Dates	No. Permits Issued	No. Hunters	Percent Success	Harvest			
					M	F	U	Total
1984	15 Oct. - 30 Nov.	289	189	37	43	26	1	70
1985	1 Oct.- 31 Oct.	578	326	38	64	57	3	124
1986	6 Sept. - 31 Oct.	349	180	44	52	27	1	80
1987	15 Oct. - 30 Nov.	327	155	25	26	13		39
1988	15 Oct. - 30 Nov.	301	180	39	46	24	1	71
1989	15 Oct. - 30 Nov.	Unk.	127	25	18	13	1	32
1990	15 Oct. - 30 Nov.	255	125	29	23	12	3	38[a]
1991	15 Oct. - 30 Nov.	416	212	28	42	17		59
1992	15 Oct. - 30 Nov.	433	263	29	52	22	1	75
Total					366	211	11	588

[a]Includes 2 goats illegally taken during the registration hunt.

Table 5. Kenai Peninsula mountain goat drawing permit hunt summary, 1991[a].

Hunt Area	Permits issued	Number of Hunters	Percent Success	Harvest			Total
				Male	Female	Unknown	
831	2	2	0				0
833	6	5	67	1	3		4
834	2	2	100	2			2
835	4	2	0				0
836	20	16	13	1	1		2
837	2	2	50	1			1
839	10	7	14		1		1
840	25	10	10	1			1
842	10	6	17	1			1
843	6	6	50	2	1		3
844	15	8	38	3			3
845	40	14	21	2		1	3
846	40	19	37	5	2		7
847	12	8	25	3			3
854	12	8	50	2	2		4
855	4	3	0				0
856	4	2	100	2			2
857	10	9	55	3	2		5
858	12	6	67	4			4
859	28	8	50	2	2		4
860	24	15	47	6	1		7
861	18	4	25	1			1
862	14	10	40	2	2		4
Totals	320	172	36	44	17	1	62

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

Table 6. Kenai Peninsula mountain goat registration permit hunt summary, 1991[a].

Hunt Area	Permits issued	Number of Hunters	Percent Success	Harvest			Total
				Male	Female	Unknown	
833/848	58	31	32	7	3		10
835/812	74	33	9	2	1		3
836/849	107	52	10	4	1		5
840/851	7	2	0				0
844/885	12	6	17		1		1
845/886	56	27	59	11	5		16
852/883	7	6	83	3	2		5
858/892	4	2	50	1			1
859/893	6	3	66	2			2
860/894	37	18	17	3			3
863/897	15	12	58	4	3		7
864/898	26	17	18	3			3
865/899	7	3	100	2	1		3
Totals	416	212	28	42	17		59

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

Table 7. Kenai Peninsula subsistence harvest, 1986-92.

Year	Season Dates	No. Permits Issued	No. Hunters	Percent Success	Harvest			Total
					M	F	U	
1986	6 Sept. - 31 Oct.	15	6	50	1	2	0	3
1987	10 Aug. - 31 Oct.	7	5	40	1	1	0	2
1988	10 Aug. - 31 Oct.	7	3	0	0	0	0	0
1989[a]	1 Aug. - 31 Oct.				0	0	3	3
1990[b]	28 Sept.-. 18 Dec.				1	4	0	5
1991[c]	1 Aug.-. 30 Sept.	94	42	31	13	0	0	13
1992[c]	1 Aug.-. 30 Sept.	94	53	45	19	5	0	24

[a] Subsistence hunts 852W, 863W, 864W, and 865W. Effort was unavailable.
[b] Tier II Subsistence hunts 865T and 875T. Effort was unavailable.
[c] Tier II Subsistence hunts 852T and 863T-865T.

Table 8. Kenai Peninsula mountain goat drawing permit hunt summary, 1992[a].

Hunt Area	Permits issued	Number of Hunters	Percent Success	Harvest			
				Male	Female	Unknown	Total
831	2	1	100	1			1
833	6	2	0				0
834	6	6	50	2	1		3
835	8	7	43	1	2		3
836	25	18	28	3	2		5
837	2	1	0				0
839	10	7	57	4			4
840	25	6	0				0
841	2	2	100	1	1		2
842	15	10	60	4	2		6
843	6	5	60	1	2		3
844	20	9	22	2			2
845[b]	40	19	32	4	2		6
846[c]	40	22	59	11	2	13	
847	12	8	50	3	1		4
854	16	3	0				0
855	4	2	0				0
856	6	5	60	0	3		3
857	6	4	25	0	1		1
858	12	6	17	1			1
859	28	13	69	9			9
860	24	14	50	3	4		7
861	18	8	50	3		1	4
862	14	5	20	1			1
Totals	347	180	43	54	23	1 78	

[a] Season Dates: 10 August - 30 September.
[b] Two permit reports were not returned.
[c] One permit report was not returned.

Table 9. Kenai Peninsula mountain goat registration permit hunt summary, 1992[a].

Hunt Area	Permits issued	Number of Hunters	Percent Success	Harvest			Total
				Male	Female	Unknown	
833	130	78	6	5			5
836	44	31	29	9			9
839[b]	99	66	33	12	10		22
840	6	3	0				0
844[b]	9	3	0				0
845	40	15	60	4	4	1	9
852	8	5	80	3	1		4
854	27	11	9	1			1
858	7	5	60	2	1		3
859	10	5	100	3	2		5
860	25	20	50	7	3		10
861	7	4	0				0
863	11	9	56	5			5
864	10	8	25	1	1		2
Totals	433	263	29	52	22	1	75

[a]Season dates: 15 October - 30 November.
[b] One permit report was not returned for each hunt area.

Table 10. Units 7 & 15 mountain goat harvest data by drawing permit hunt, 1988-92.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
831	1988/89	2	0	50	50	0	1	--	--	1
	1989/90	2	0	0	100	0	2	--	--	2
	1990/91	2	50	100	0	0	0	--	--	0
	1991/92	2	0	100	0	0	0	--	--	0
	1992/93	2	50	0	50	1	0	--	--	1
832	1988/89	0	--	--	--	--	--	--	--	--
	1989/90	0	--	--	--	--	--	--	--	--
	1990/91	0	--	--	--	--	--	--	--	--
	1991/92	0	--	--	--	--	--	--	--	--
	1992/93	0	--	--	--	--	--	--	--	--
833	1988/89	8	63	66	33	1	0	--	--	1
	1989/90	6	0	33	66	2	2	--	--	4
	1990/91	6	33	100	0	0	0	--	--	0
	1991/92	6	17	20	80	1	3	--	--	4
	1992/93	6	67	100	0	0	0	--	--	0
834	1988/89	4	50	100	0	0	0	--	--	0
	1989/90	4	0	75	25	1	0	--	--	1
	1990/91	4	0	25	75	1	2	--	--	3
	1991/92	2	0	0	100	2	0	--	--	2
	1992/93	6	0	50	50	2	1	--	--	3

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
835	1988/89	4	50	100	0	0	0	--	--	0
	1989/90	4	25	33	66	1	1	--	--	2
	1990/91	4	25	66	33	1	0	--	--	1
	1991/92	4	50	100	0	0	0	--	--	0
	1992/93	8	13	57	43	1	2	--	--	3
836	1988/89	20	55	66	33	1	2	--	--	3
	1989/90	20	50	50	50	4	1	--	--	5
	1990/91	20	20	69	31	2	2	1	--	5
	1991/92	20	20	87	13	1	1	--	--	2
	1992/93	25	28	72	28	3	2	--	--	5
837	1988/89	3	33	33	33	0	1	--	--	1
	1989/90	5	0	60	40	2	0	--	--	2
	1990/91	3	33	33	33	1	0	--	--	1
	1991/92	2	0	50	50	1	0	--	--	1
	1992/93	2	50	100	0	0	0	--	--	0
839	1988/89	16	6	47	53	4	4	--	--	8
	1989/90	13	15	73	27	2	1	--	--	3
	1990/91	13	23	90	10	1	0	--	--	1
	1991/92	10	30	86	14	0	1	--	--	1
	1992/93	10	30	43	57	4	0	--	--	4

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
840	1988/89	15	73	100	0	0	0	--	--	0
	1989/90	15	87	100	0	0	0	--	--	0
	1990/91	15	60	83	17	1	0	--	--	1
	1991/92	25	60	90	10	1	0	--	--	1
	1992/93	25	76	100	0	0	0	--	--	0
842	1988/89	8	25	66	33	2	0	--	--	2
	1989/90	6	66	100	0	0	0	--	--	0
	1990/91	6	33	50	50	2	0	--	--	2
	1991/92	10	40	83	17	1	0	--	--	1
	1992/93	15	33	40	60	4	2	--	--	6
843	1988/89	2	50	0	100	1	0	--	--	1
	1989/90	2	100	0	0	0	0	--	--	0
	1990/91	2	50	0	100	1	0	--	--	1
	1991/92	6	0	50	50	2	1	--	--	3
	1992/93	6	17	40	60	1	2	--	--	3
844	1988/89	15	87	50	50	1	0	--	--	1
	1989/90	15	60	83	17	1	0	--	--	1
	1990/91	15	40	100	0	0	0	--	--	0
	1991/92	15	47	62	38	3	0	--	--	3
	1992/93	20	55	78	22	2	0	--	--	2

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
845	1988/89	38	74	60	40	4	0	--	--	4
	1989/90	38	63	71	29	3	1	--	--	4
	1990/91	38	63	93	7	0	1	--	--	1
	1991/92	40	65	79	21	2	0	1	--	3
	1992/93	40	53	68	32	4	2	--	--	6
846	1988/89	40	50	90	10	2	0	--	--	2
	1989/90	40	58	71	29	4	1	--	--	5
	1990/91	40	55	34	66	5	5	--	--	10
	1991/92	40	53	63	37	5	2	--	--	7
	1992/93	40	45	41	59	11	2	--	--	13
847	1988/89	12	58	60	40	1	1	--	--	2
	1989/90	12	66	100	0	0	0	--	--	0
	1990/91	12	50	100	0	0	0	--	--	0
	1991/92	12	33	75	25	3	0	--	--	3
	1992/93	12	33	50	50	3	1	--	--	4
852	1988/89	20	50	90	10	1	0	--	--	1
	1989/90	20	90	0	100	1	1	--	--	2
	1990/91[a]	--	--	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--	--	--

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
854	1988/89	8	50	0	100	3	1	--	--	4
	1989/90	10	60	75	25	1	0	--	--	1
	1990/91	10	60	100	0	0	0	--	--	0
	1991/92	12	33	50	50	2	2	--	--	4
	1992/93	12	81	100	0	0	0	--	--	0
855	1988/89	4	25	66	33	1	0	--	--	1
	1989/90	10	60	75	25	1	0	--	--	1
	1990/91	5	20	75	25	1	0	--	--	1
	1991/92	4	25	100	0	0	0	--	--	0
	1992/93	4	50	100	0	0	0	--	--	0
856	1988/89	2	50	0	100	0	1	--	--	1
	1989/90	3	66	100	0	0	0	--	--	0
	1990/91	3	33	50	50	1	0	--	--	1
	1991/92	4	50	0	100	2	0	--	--	2
	1992/93	6	17	40	60	0	3	--	--	3
857	1988/89	10	50	20	80	4	0	--	--	4
	1989/90	10	50	40	60	3	0	--	--	3
	1990/91	10	40	17	83	1	4	--	--	5
	1991/92	10	10	45	55	3	2	--	--	5
	1992/93	6	33	75	25	0	1	--	--	1

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
858	1988/89	8	75	50	50	1	0	--	--	1
	1989/90	8	75	0	100	2	0	--	--	2
	1990/91	8	63	33	66	2	0	--	--	2
	1991/92	12	50	33	67	4	0	--	--	4
	1992/93	12	50	83	17	1	0	--	--	1
859	1988/89	16	63	17	83	2	3	--	--	5
	1989/90	16	25	8	92	8	3	--	--	11
	1990/91	16	38	50	50	3	2	--	--	5
	1991/92	28	71	50	50	2	2	--	--	4
	1992/93	28	54	31	69	9	0	--	--	9
860	1988/89	20	40	58	42	3	2	--	--	5
	1989/90	20	60	63	37	1	2	--	--	3
	1990/91	20	65	57	43	3	0	--	--	3
	1991/92	24	38	53	47	6	1	--	--	7
	1992/93	24	42	50	50	3	4	--	--	7
861	1988/89	18	50	89	11	0	1	--	--	1
	1989/90	18	50	11	89	5	3	--	--	8
	1990/91	18	39	18	82	8	1	--	--	9
	1991/92	18	78	75	25	1	0	--	--	1
	1992/93	18	56	50	50	3	0	1	--	4

Table 10. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
862	1988/89	10	40	50	50	3	0	--	--	3
	1989/90	10	30	43	57	2	2	--	--	4
	1990/91	10	40	50	50	2	1	--	--	3
	1991/92	14	29	60	40	2	2	--	--	4
	1992/93	14	64	80	20	1	0	--	--	1
863	1988/89	16	50	50	50	4	0	--	--	4
	1989/90	16	81	0	100	3	0	--	--	3
	1990/91[a]	0	--	--	--	--	--	--	--	--
	1991/92[a]	0	--	--	--	--	--	--	--	--
	1992/93[a]	0	--	--	--	--	--	--	--	--
864	1988/89	10	30	43	57	4	0	--	--	4
	1989/90	6	50	66	33	0	1	--	--	1
	1990/91[a]	0	--	--	--	--	--	--	--	--
	1991/92[a]	0	--	--	--	--	--	--	--	--
	1992/93[a]	0	--	--	--	--	--	--	--	--
865	1988/89[a]	0	--	--	--	--	--	--	--	--
	1989/90[a]	0	--	--	--	--	--	--	--	--
	1990/91[a]	0	--	--	--	--	--	--	--	--
	1991/92[a]	0	--	--	--	--	--	--	--	--
	1992/93[a]	0	--	--	--	--	--	--	--	--

[a]Subsistence season.

Table 11. Units 7 & 15 mountain goat harvest data by registration permit hunt, 1988-92.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
831	1988/89	2	0	50	50	0	1	--	--	1
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0
833	1988/89	29	34	68	32	4	2	--	--	6
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	58	47	68	32	7	3	--	--	10
	1992/93	130	40	94	6	5	0	--	--	5
835	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	74	55	91	9	2	1	--	--	3
	1992/93	0	--	--	--	--	--	--	--	0
836	1988/89	10	70	66	33	1	0	--	--	1
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	107	51	90	10	4	1	--	--	5
	1992/93	44	30	71	29	9	0	--	--	9

Table 11. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
839	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	91	47	79	21	9	4	--	--	13
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	99	33	67	33	12	10	--	--	22
840	1988/89	9	78	100	0	0	0	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	18	61	100	0	0	0	--	--	0
	1991/92	7	71	100	0	0	0	--	--	0
	1992/93	6	50	100	0	0	0	--	--	0
842	1988/89	60	33	78	22	7	2	--	--	9
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0
843	1988/89	1	100	0	0	0	0	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0

Table 11. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
844	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	?[a]	--	89	11	3	1	--	--	4
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	12	50	83	17	0	1	--	--	1
	1992/93	9	67	100	0	0	0	--	--	0
845	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	?[a]	--	75	25	2	1	--	--	3
	1990/91	34	41	65	35	6	1	--	--	7
	1991/92	56	52	41	59	11	5	--	--	16
	1992/93	40	63	40	60	4	4	1	--	9
846	1988/89	47	51	61	39	7	2	--	--	9
	1989/90	?[a]	--	69	31	9	3	1	--	13
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0
847	1988/89	8	38	40	60	2	1	--	--	3
	1989/90	?[a]	--	78	22	0	2	--	--	2
	1990/91	55	55	76	24	2	3	1	2	8
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0

Table 11. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
852	1988/89	8	38	20	80	2	1	1	--	4
	1989/90	?[a]	--	100	0	0	0	--	--	0
	1990/91	0	0	0	0	0	0	--	--	0
	1991/92	7	14	17	83	3	2	--	--	5
	1992/93	8	38	20	80	3	1	--	--	4
854	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	14	50	57	43	2	1	--	--	3
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	27	59	91	9	1	0	--	--	1
855	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	26	54	75	25	1	2	--	--	3
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0
858	1988/89	14	50	29	71	2	3	--	--	5
	1989/90	?[a]	--	71	29	0	2	--	--	2
	1990/91	8	63	66	33	0	1	--	--	1
	1991/92	4	50	50	50	1	0	--	--	1
	1992/93	7	29	40	60	2	1	--	--	3

Table 11. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
859	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	9	66	0	100	3	0	--	--	3
	1991/92	6	50	33	67	2	0	--	--	2
	1987/88	10	50	0	100	3	2	--	--	5
860	1988/89	19	58	25	75	4	2	--	--	6
	1989/90	?[a]	--	60	33	0	1	--	--	1
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	37	51	83	17	3	0	--	--	3
	1992/93	25	20	50	50	7	3	--	--	10
861	1988/89	16	38	70	30	2	1	--	--	3
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	7	43	100	0	0	0	--	--	0
862	1988/89	0	--	--	--	--	--	--	--	0
	1989/90[a]	--	--	78	22	2	0	--	--	2
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	0	--	--	--	--	--	--	--	0

Table 11. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
863	1988/89	30	30	71	29	1	5	--	--	6
	1989/90	?[a]	--	17	83	2	3	--	--	5
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	15	20	42	58	4	3	--	--	7
	1992/93	11	18	44	56	5	0	--	--	5
865	1988/89	0	--	--	--	--	--	--	--	0
	1989/90	0	--	--	--	--	--	--	--	0
	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	7	57	0	100	2	1	--	--	3
	1992/93	0	--	--	--	--	--	--	--	0

[a]Original permits lost.

Table 12. Units 7 & 15 mountain goat harvest data by Tier II subsistence permit hunt, 1988-92.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
852	1988/89[a]	0	--	--	--	--	--	--	--	0
	1989/90[c]									
	1990/91[d]									
	1991/92	20	70	67	33	2	0	--	--	2
	1992/93[a]	20	60	50	50	3	1	--	--	4
863	1988/89[a]	0	--	--	--	--	--	--	--	0
	1989/90[c]									
	1990/91[d]									
	1991/92	12	33	37	63	5	0	--	--	5
	1992/93	24	42	43	57	6	2	--	--	8
864	1988/89[a]	0	--	--	--	--	--	--	--	0
	1989/90[c]	--	--	--	--	--	--	--	--	--
	1990/91[d]	--	--	--	--	--	--	--	--	--
	1991/92	20	50	80	20	2	0	--	--	2
	1992/93	20	25	80	20	3	0	--	--	3
865	1988/89[b]	7	57	100	0	0	0	--	--	0
	1989/90[c]	--	--	--	--	--	--	--	--	5
	1990/91[d]	--	--	--	--	--	--	--	--	--
	1991/92	42	57	78	22	4	0	--	--	4
	1992/93[b]	30	47	44	56	7	2	--	--	9

Table 12. Continued.

Hunt No. /Area	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Unk.	Illegal	Total harvest
875	1988/89	n/a	--	--	--	--	--	--	--	--
	1989/90[c]	--	--	--	--	--	--	--	--	3
	1990/91[d]	--	--	--	--	1	4	--	--	5
	1991/92	n/a	--	--	--	--	--	--	--	--
	1992/93	n/a	--	--	--	--	--	--	--	--

[a]Non exclusinve subsistence registration hunt by residents of Port Graham/English Bay.
[b]Exclusive subsistence hunt by residents of Port Graham/English Bay.
[c]Data not available - all areas combined totaled 3 goats harvested.
[d]Tier II subsistence 865T, 875T. Data not available. Total harvest of 5 goats.

Table 13. Units 7 & 15 mountain goat hunter drawing permit hunt residency and success, 1988-92.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	
1988/89	15	33	8	56(37)	19	71	4	94(63)	150
1989/90	17	46	5	68(47)	12	65	0	77(53)	145
1990/91	19	33	3	55(37)	17	78	0	95(63)	150
1991/92	18	41	3	62(36)	22	87	1	110(64)	172
1992/93	20	55	1	76(42)[b]	20	82	1	103(58)[b]	179

[a]Local means resident of GMU that hunted in their respective unit.
[b]Two unspecified successful and 2 unspecified unsuccessful hunters.

Table 14. Units 7 & 15 mountain goat hunter registration permit hunt residency and success, 1988-92.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	
1988/89	19	41	9	69(38)	33	77	1	111(62)	180
1989/90	10	21	0	31(27)	30	54	2	86(74)	117
1990/91	7	25	4	36(31)	7	73	1	81(69)	117
1991/92	12	39	4	59(28)[b]	35	118	1	154(72)[b]	213
1992/93	16	48	10	75(29)[c]	39	144	1	184(71)	258

[a]Local means resident of GMU 7 or 15
[b]One unspecified successful and 4 unspecified unsuccessful hunters.
[c]Four unspecified successful hunters.

Table 15. Units 7 & 15 mountain goat harvest chronology for 1988-1992.

Regulatory year	Harvest periods								Total[a] Harvest
	10-19 August	20-31 August	1-15 September	16-30 September	15-31 October	1-15 November	16-31 November	Unknown	
1988/89	Not Available								
1989/90	Not Available								
1990/91	--	--	--	--	34	1	0	55	90
1991/92	9	12	16	25	45	10	1	0	118
1992/93	13	14	16	34	71	0	3	0	151

[a]Does not include Tier II subsistence and unreported harvest.

Table 16. Unit 7 mountain goat harvest percent by transport method, 1988-92.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	n
1988/89	39	3	13	6	0	0	35	5	78
1989/90	17	0	19	4	0	4	55	2	53
1990/91	21	0	28	2	0	4	40	6	53
1991/92	22	0	33	1	0	4	34	6	73
1992/93	19	2	27	2	0	2	44	5	105

Table 17. Unit 15 mountain goat harvest percent by transport method, 1988-92.

Regulatory year	Percent of harvest								n
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1988/89	51	9	32	0	0	2	4	2	53
1989/90	64	11	23	0	0	0	0	2	47
1990/91	46	11	36	5	0	0	2	0	44
1991/92	48	7	31	3	0	2	3	7	61
1992/93	46	4	42	1	0	0	3	4	72

LOCATION

Game Management Unit: 8 (5,097 mi^2)

Geographical Description: Kodiak and Adjacent Islands

BACKGROUND

Mountain goats have moved into most of the suitable habitat since their introduction to Kodiak Island in 1952 and 1953. Annual aerial composition counts indicated the population was growing in the most recently occupied habitat. Highest densities were in the northcentral Kodiak Island drainages of Ugak, Terror, Uganik and Kiliuda Bays. A 1990 aerial survey indicated goat numbers were increasing steadily in the Uyak and Zachar Bay drainages of southcentral Kodiak Island. Hunting has been allowed by permit since 1968. Annual harvest ranged from 25 to 39 goats from 1988 to 1992. Hunting has been regulated by drawing permits since 1986. The road-accessible drainages near Kodiak city, where goats were at low density, were closed to hunting to provide viewing opportunity. Much of the southern Kodiak Island goat range which had been closed to facilitate colonization into suitable habitat was opened to hunting in 1991.

MANAGEMENT DIRECTION

Management Objectives

Maintain a prehunting population of at least 400-500 goats.

METHODS

We complete composition counts annually with fixed-wing aircraft in August and early September. Count areas approximately correspond to the 7 permit hunt areas. We collect data on harvest and hunting effort from mandatory hunter reports and by examining horns of harvested goats.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: The mountain goat population was estimated at a minimum of 675 animals in 1992 (Table 1). An aerial survey of approximately 40% of the goat range in 1992 resulted

in a count of 419 goats. There may have been some duplication because part of the eastern Terror Lake count area was surveyed twice.

The 1992 composition count of 419 goats in 40% of the goat habitat indicated an increasing population. Smith (1993) reported a total count of 449 goats in 70% of the habitat in 1990, noting herds increasing in size were located in the Zachar Bay and Uyak Bay drainages of southern Kodiak Island.

Population Composition: The kid:adult ratio ranged from 11-32 kids:100 adults with a mean of 24 (Table 1). Unusually low productivity in 1989, with only 11 kids:100 adults, was probably related to the extremely severe 1988-89 winter with record low temperatures and deep snow accumulation. Except in 1989, a minimum of 21 kids:100 adults were recorded.

Distribution and Movement: Occasional sightings of goats near known goat habitat were made by the public and personnel in other agencies. Goats were commonly observed on mountain peaks adjacent to the Kodiak Island road system. Goats inhabit, in at least small numbers, most suitable habitat on Kodiak Island.

Mortality

Harvest:

Season and Bag Limits. The open season for resident and nonresident hunters was 1 September to 31 October. The bag limit was 1 goat by drawing permit.

Board of Game Actions and Emergency Orders. In 1991 the Board adopted a department recommendation to open hunting by drawing permit in part of southern Kodiak Island where the goat population was increasing. Two new permit hunts were created and drawing permits increased to 125.

In 1986 the Board opted to allow hunting only by drawing permit. This came as the result of excessive harvests in 1984 and 1985 with registration permit hunts. A drawing permit hunt with 100 permits was in effect during the 3 regulatory years from 1988-89 through 1990-91.

Hunter Harvest. Annual harvest ranged from 25-39 goats (average = 30.4) during the 5-year period from 1988-1992 (Table 2). Annual harvests were stable to slightly increasing (Table 2). Annual harvest ranged from 2-9 goats for each of the 7 permit hunts. Hunters harvested 10 goats each year in the 2 newly opened permit hunts; 45% of the goats were males.

The mean age of goats harvested (annually) ranged from 3.3-4.1 years for males and from 3.8-5.4 years for females (Table 3). The harvest of males exceeded females in 4 of 7 permit hunts, with an overall mean of 57% males.

Permit Hunts. The number of permits issued by lottery ranged from 100-125, and 56% of the permittees reported hunting. Hunters' compliance with permit hunt conditions was good. However, permittees who did not hunt frequently failed to return permit reports until receiving reminder letters.

Hunter Residency and Success. Successful hunters were often residents of Unit 8 (59%), followed by nonlocal Alaska residents (36%), and nonresidents (5%) (Table 4). Annual hunter success ranged between 46-56% with a 5-year mean of 51%.

Harvest Chronology. October harvest exceeded those in September every year except 1990 (Table 5). Weather patterns, which affect hunter success and influence when hunters go into the field, largely determined the chronology of harvest.

Transport Methods. Aircraft were the predominant transportation method used by hunters (Table 6).

Other Mortality: Documenting mortality from sources other than hunting is seldom possible because of the remote, rugged nature of goat habitat. Predation by brown bears undoubtedly occurs but is probably rare. The low production of kids in 1989 is probably from the unusually severe preceding winter, but it is unknown whether early postnatal mortality of kids or low initial productivity occurred. Wounding loss and illegal harvest contribute additional mortality equivalent to 10% of the reported harvest.

Habitat

Assessment: Goat habitat on Kodiak Island is relatively secure because it is remote and has little immediate commercial value. Construction and operation of the Terror Lake hydroelectric project in goat habitat in northern Kodiak Island has not been detrimental (Smith, 1988).

The population is probably near carrying capacity of the habitat in northcentral Kodiak Island where goats first became established. In recently colonized areas of southern Kodiak Island, the population is below carrying capacity.

Winter severity is quite variable in the maritime environment where precipitation at lower elevations may occur as either rain or snow. In studying goats on northern Kodiak Island, Hjeljord (1973) observed goats were found at higher elevations in March during a winter with snow cover at sea level, but goats were found at lower elevations during winters when lower slopes were partly snow-free. Smith and Van Daele (1987) determined that winter distribution was strongly influenced by snow cover, with goats favoring southerly exposed slopes and cliff faces.

Nonregulatory Management Problems/Needs

Although it is suspected that present goat density is near carrying capacity in some areas, a conservative harvest regime continues to be employed. Research into the relationships between winter severity and carrying capacity could provide managers with more precise estimates of allowable harvests.

CONCLUSIONS AND RECOMMENDATIONS

The goat population was stable to increasing in northcentral Kodiak Island, and it continued to increase in recently colonized drainages of southern Kodiak. The policy of allowing goats to populate vacant habitat by keeping areas with low populations closed to hunting has been effective. The Board of Game opened much of the previously closed area of southern Kodiak Island to a limited permit hunt beginning in 1991, after aerial surveys indicated goats were sufficiently abundant to sustain a harvest. Much of the area recently opened to hunting is extremely difficult to access, and further liberalization of hunting regulations may be justified if the goat population continues to increase.

Limiting permits is effective in maintaining stable annual harvests, which appear conservative. No changes in seasons or bag limits are recommended.

Management objectives for goats in Unit 8 have been modified to reflect increases in goat numbers and distribution. The recommended objective is to maintain a prehunting population of 400-500 goats that will sustain an annual harvest of greater than 50% males.

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Table 1. Unit 8 Aerial summer mountain goat composition counts and estimated population size, 1988-92.

Area	Regulatory year	Adults	(%)	Kids	(%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
	1988/89	176	(10)	20	(10)	11	196	61.3	435
All	1989/90	221	(76)	71	(24)	32	292	88.3	450
permit	1990/91[a]	388	(79)	106	(21)	27	494	43.7	550 [B]
hunts	1991/92	211	(78)	58	(22)	27	269	59.8	--
	1992/93	346	(83)	73	(17)	21	419	144.5	--
871	1988/89	65	(87)	10	(13)	15	75	--	--
	1989/90	68	(81)	16	(19)	24	84	--	--
	1990/91	59	(77)	18	(23)	31	77	--	80-90
	1991/92	54	(73)	20	(27)	27	74	--	--
	1992/93	110	(81)	25	(19)	23	135	--	--
872	1988/89	26	(96)	1	(4)	4	27	--	--
	1989/90	29	(69)	13	(31)	45	42	--	--
	1990/91	36	(78)	10	(22)	28	46	--	50-60
	1991/92	34	(81)	8	(19)	24	42	--	--
	1992/93	47	(82)	10	(18)	21	57	--	--
873	1988/89	50	(94)	3	(6)	6	53	--	--
	1989/90	72	(71)	30	(29)	42	102	--	--
	1990/91	93	(78)	26	(22)	28	119	--	120-130
	1991/92	47	(78)	13	(22)	22	60	--	--
	1992/93	133	(84)	25	(16)	19	158	--	--
874	1988/89	32	(86)	5	(14)	16	37	--	--
	1989/90	27	(82)	6	(18)	22	33	--	--
	1990/91	28	(80)	7	(20)	25	35	--	40-60
	1991/92	55	(77)	16	(23)	29	71	--	--
	1992/93	56	(81)	13	(19)	23	69	--	--
875	1991/92	11	(100)	0	(0)	--	11	--	--
	1992/93	--	--	--	--	--	--	--	--
876	1988/89	--	--	--	--	--	--	--	--
	1989/90	7	(78)	2	(22)	29	9	--	--
	1990/91	18	(69)	8	(31)	44	26	--	50-60
	1991/92	10	(91)	1	(9)	10	11	--	--
	1992/93	--	--	--	--	--	--	--	--
877	1991/92	--	--	--	--	--	--	--	--
	1992/93	--	--	--	--	--	--	--	--

[a] Extensive survey covering most of known goat range.

[b] Population estimates extrapolated from annual composition counts and personal knowledge of area management biologist; considered a minimum estimate.

Table 2. Unit 8 mountain goat harvest data by permit hunt, 1988-92

HuntNo/ Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
	1988/89	100	47	52	48	15 (60)	10 (40)	0	0	25
All	1989/90	100	48	46	54	14 (52)	13 (48)	0	0	27
permit	1990/91	100	35	51	49	18 (62)	10 (33)	1	0	29
hunts	1991/92	125	53	52	48	17 (53)	15 (47)	0	0	32
	1992/93	111	58	38	62	22 (58)	16 (42)	1	0	39
871	1988/89	20	50	80	20	2 (100)	0 (0)	--	--	2
	1989/90	20	35	62	38	3 (60)	2 (40)	--	--	5
	1990/91	20	35	69	31	1 (25)	3 (75)	--	--	4
	1991/92	20	65	57	43	1 (33)	2 (67)	0	0	3
	1992/93	15	60	50	50	1 (33)	2 (67)	0	0	3
872	1988/89	15	20	42	58	4 (57)	3 (43)	--	--	7
	1989/90	15	60	17	83	4 (80)	1 (20)	--	--	5
	1990/91	15	40	11	89	5 (63)	3 (37)	--	--	8
	1991/92	10	70	43	57	4 (100)	0 (0))	0	0	4
	1992/93	8	0	12	88	4 (57)	3 (43)	0	0	7
873	1988/89	20	45	64	36	1 (25)	3 (75)	--	--	4
	1989/90	20	40	25	75	4 (44)	5 (56)	--	--	9
	1990/91	20	30	79	21	2 (100)	0 (0)	1	--	3
	1991/92	25	44	89	18	1 (50)	1 (50)	0	0	2
	1992/93	20	45	27	73	4 (57)	3 (43)	1	0	7
874	1988/89	20	75	40	60	1 (33)	2 (66)	--	--	3
	1989/90	20	55	67	33	1 (33)	2 (66)	--	--	3
	1990/91	20	50	30	70	5 (71)	2 (29)	--	--	7
	1991/92	20	70	43	57	5 (63)	3 (37)	0	0	8
	1992/93	15	53	14	86	4 (67)	2 (33)	0	0	6
875	1991/92	15	47	57	43	0 (0)	3 (100)	0	0	3
	1992/93	20	50	40	60	6 (100)	0 (0)	0	0	6
876	1988/89	25	44	22	78	7 (78)	2 (22)	--	--	9
	1989/90	25	60	50	50	2 (40)	3 (60)	--	--	5
	1990/91	25	48	46	54	5 (71)	2 (29)	--	--	7
	1991/92	25	48	58	42	4 (80)	1 (20)	0	0	5
	1992/93	25	52	62	38	2 (40)	3 (60)	0	0	5
877	1991/92	10	20	13	75	2 (29)	5 (71)	0	0	7
	1992/93	8	0	50	50	1 (25)	3 (75)	--	--	4

Table 3. Unit 8 mountain goat harvest mean age data from horn rings, 1988-92.

	Males	(%)	Females	(%)
1988/89	4.1	(13)	5.0	(9)
1989/90	3.3	(14)	3.8	(11)
1990/91	4.0	(17)	5.4	(9)
1991/92	3.8	(17)	4.0	(15)
1992/93	3.8	(21)	4.7	(14)

Table 4. Unit 8 mountain goat hunter residence and success, 1988-92.

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
1988/89	17	3	5	25	(48)	16	11	0	27	(52)	52
1989/90	16	9	2	27	(54)	13	7	3	23	(46)	50
1990/91	12	17	0	29	(49)	15	15	0	30	(51)	59
1991/92	20	10	1	31	(46)	20	17	0	37	(54)	68
1992/93	24	15	0	39	(56)	14	16	1	31	(44)	70

[a] Includes all Alaska residents in 1986/87 and 1987/88; GMU 8 residents only in 3 remaining years.

Table 5. Unit 8 mountain goat harvest chronology percent by time period, 1988-92.

		Harvest periods		
Area	Regulatory year	September	October	n
All permit hunts	1988/89	48	52	25
	1989/90	37	63	27
	1990/91	63	41	29
	1991/92	41	59	32
	1992/93	46	54	39

Table 6. Unit 8 mountain goat harvest by transport method and hunter success, 1988-92.

Regulatory Year	Successful hunters									Unsuccessful hunters								
	Airplane		Boat		ORV		Other		Total	Airplane		Boat		ORV		Other		Total
	No.	(%)	No	(%)	No.	(%)	No.	(%)	Reporting	No.	(%)	No.	(%)	No.	(%)	No.	(%)	Reporting
1988/89	--	--	--	--	--	--	--	--	---	--	--	--	--	--	--	--	--	--
1989/90	--	--	--	--	--	--	--	--	---	--	--	--	--	--	--	--	--	--
1990/91	28	(100)	0	(0)	.	(0)	0	(0)	28	18	(62)	7	(24)	3	(10)	1	(4)	29
1991/92	29	(65)	10	(32)	0	(0)	1	(3)	31	25	(76)	4	(12)	3	(9)	1	(3)	33
1992/93	32	(82)	0	(15)	0	(0)	1	(3)	39	20	(87)	1	(4)	0	(0)	2	(9)	23

Table 6. Continued

Regulatory Year	All hunters								
	Airplane		Boat		ORV		Other		Total Reporting
	No.	(%)	No	(%)	No.	(%)	No.	(%)	
1988/89	35	(73)	12	(25)	1	(2)	0	(0)	48
1989/90	31	(64)	10	(20)	7	(14)	1	(2)	49
1990/91	46	(81)	7	(12)	3	(5)	1	(2)	57
1991/92	45	(70)	14	(22)	3	(5)	2	(3)	64
1992/93	52	(84)	7	(11)	0	(0)	3	(5)	62

LOCATION

Game Management Unit: 11 (13,300 mi^2)

Geographical Description: Wrangell Mountains

BACKGROUND

Hunters have harvested mountain goats in Unit 11 for at least 30 years. Harvest data for goats was not collected before 1972. Although seasons and bag limits were liberal, harvest before 1972 was minimal. The season length and bag limit were reduced in the mid 1970s because of an increase in hunting pressure and harvest.

We established the MacColl Ridge trend count area in 1970 to monitor population trends and gather sex and age composition data. Additional aerial survey data on mountain goats in other portions of Unit 11 have been collected in conjunction with sheep counts.

MANAGEMENT DIRECTION

Management Objectives

Maintain harvest of mountain goats to under 10% of the estimated mountain goat population within the hunt area.

METHODS

Department personnel conduct aerial surveys to determine sex and age composition and population trends on MacColl Ridge. MacColl Ridge is located north of the Chitina River in the southeastern portion of Unit 11. Additional mountain goat data are collected during aerial surveys of sheep trend count areas. Harvest and hunting pressure are controlled by registration permit. We monitor harvests by requiring registration at the Glennallen office and check-out of all successful permittees.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: The 1993 survey of MacColl Ridge resulted in a count of 48 goats, only 8% below the 1992 count of 52 (Table 1). The highest count on MacColl Ridge was 65 goats in 1981 during a helicopter survey. Aerial counts over the past 10 years have averaged 48

(range=34-63) goats a year. It was difficult to detect a trend because of yearly fluctuations in survey results; however, the mountain goat population on MacColl Ridge seems stable.

Biologists estimated 700 mountain goats inhabit the southern Wrangell and Chugach mountains in Unit 11. We derived this population estimate by combining survey results from different count areas in Unit 11 between 1973 and 1984. If a count area was surveyed more than once, the highest count was used in the population estimate.

Population Composition: The ratio of kids:adults observed on MacColl Ridge during 1993 was 20:100; kids composed 17% of the goats observed (Table 1). Kid production has been lower the last 3 years, averaging 8 kids per year, compared to an average of 12 kids per year between 1988 and 1990. The number of adults observed in 1993 declined from the previous 2 years.

Distribution and Movements: In the past, surveyors have tallied approximately 400 mountain goats during aerial surveys in the Wrangell Mountains, north of the Chitina River between the Chesnina River and the Canadian Border. The Kennicott, Hawkins, and Barnard glaciers, MacColl Ridge, and McCarthy Creek supported the largest number of animals. Nearly 300 goats have been counted south of the Chitina River, in that portion of the Chugach Mountains from the Copper River east to the Canadian Border.

Information on movements is limited and major rutting and kidding areas are unknown. Field observations indicate seasonal altitudinal movements occur; goats often use lower elevations during the winter. East-west movements also occur, because animals have been observed traveling between the Kotsina and Kuskalana rivers and between Kennicott Glacier and McCarthy Creek.

Mortality

Harvest:

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

Board of Game Actions and Emergency Orders. In 1980, goat hunting was by registration permit only. This action was necessary because much of Unit 11 was included in Wrangell-Saint Elias National Park/Preserve, concentrating sport hunting on goats on preserve lands. Only subsistence hunting by local rural residents was allowed on park lands. In 1986, the goat season was reduced by 31 days, and this also aligned the closing date with adjacent Unit 6. Guides were required for all nonresident mountain goat hunters starting in 1989.

In 1990, the federal government assumed management of subsistence hunting on federal lands. The Federal Subsistence Board determined there was not subsistence hunting of

mountain goats in Unit 11 and subsequently closed the "hard park" to subsistence mountain goat hunting by local rural residents.

Hunter Harvest. Hunters killed 25 mountain goats during the 1991 season and 17 in 1992. The average yearly take since 1980 was 16 goats. The 1992 harvest was 8 (47%) males and 9 (53%) females, compared to the 1991 take of 13 (52%) males and 12 (48%) females (Table 2).

Before the last 2 years, males composed 74% of the harvest. The reason for the increased female harvest the last 2 years was unknown. High male harvest was attributable to the selection of larger trophy animals by nonresidents on guided hunts.

Hunter Residency and Success. We issued 53 registration permits in 1992; this was a decline from 69 permits issued the previous year. The highest number of permits issued was 97 in 1986 (Table 2). The hunter success rate was 60% in 1991and increased to 65% in 1992. Although it has fluctuated among years, the hunter success rate was high for Unit 11. Successful hunters reported spending 3.0 days afield, compared with 3.8 days for unsuccessful hunters in 1992. Hunting effort reported by Unit 11 goat hunters fluctuates little. Since 1986 nonresidents have taken 61% of the goats harvested, and they have experienced a higher success rate (75%) than residents (42%) (Table 3).

Permit Hunts. An unlimited number of registration permits were issued for mountain goat hunting on a first-come, first-served basis. Permits were available in person or by mail only at the ADF&G office in Glennallen. Hunters could report hunting results at ADF&G offices in Palmer, Anchorage, or Glennallen.

Harvest Chronology. In 1991 76% of the harvest occurred the initial 3 weeks of the season; the following year 94% of the harvest occurred during this same period (Table 4). A similar pattern has been observed since 1986, when more goats were taken later in the season, especially in October. The change in harvest chronology resulted from an increase in nonresident hunters' combining sheep and goat hunts during the first 20 days of September. Goats killed later in the season are usually taken by residents hunting only mountain goats.

Transport Methods. Most successful goat hunters used aircraft. Highway vehicles were also a popular method of transportation. Transportation by goat hunters in Unit 11 has changed little over the years (Table 5).

Other Mortality: Wolf predation of goats has been observed in portions of the unit. Reports by trappers and local residents indicated wolf predation may be common; however, predation rates have not been determined.

Habitat

Assessment: The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. However, goat habitat in these areas is limited. Substantial numbers of goats are north of the Chitina River, east of the Lakina River to the Canadian border. The remainder of the Wrangell Mountains west of the Lakina River is marginal goat habitat. Chugach Range habitat south of the Chitina River may be more suitable.

CONCLUSIONS AND RECOMMENDATIONS

The count of mountain goats in the MacColl Ridge trend area was slightly higher over the 1990-92 period. Although the 1990 count declined from the previous 3 years, it was similar to the 10-year average observed on MacColl Ridge during fixed-wing aircraft surveys. Kid production has been lower the past 3 years but was adequate to support a harvest. A decline in adults in 1993 possibly resulted from poor recruitment in previous years.

Interpretation of annual survey data is difficult because we do not know if yearly changes in the number of mountain goats observed on MacColl Ridge reflect actual population fluctuations or survey variables. Mountain goats are among the most difficult big game species to count because of rugged terrain and vegetation in the trend count areas. Counts are conducted at approximately the same time each year in an attempt to minimize the effect of movements on survey results.

The mountain goat population north of the Chitina River is stable; trends south of the Chitina River are unknown because of poor survey coverage. Mountain goats are only numerous in limited areas where habitat conditions are favorable. Overall, goat densities in Unit 11 are much lower than in areas with more favorable habitat (e.g., the Kenai Peninsula).

Goats were hunted throughout their range during the 1970s and hunting pressure was greater than in recent times. National Park Service and Federal Subsistence Board hunting regulations now restrict goat hunting on Preserve lands around McCarthy, MacColl Ridge, Hawkins and Barnard glaciers. MacColl Ridge receives some of the heaviest hunting pressure in the unit, especially for guided hunts. During the past 5 years, hunters have taken 26% (23 goats) of the total unit harvest from MacColl Ridge. The average annual harvest has been 5 goats, or 10% of the current observed population.

Barnard and Hawkins glaciers are popular sheep hunting areas for trophy rams, and because combination hunts are popular, goats also receive heavy pressure. Guides are active in these areas and harvest records over the past 5 years indicate 13 (14%) goats have been taken from Barnard Glacier and 15 (17%) from Hawkins Glacier. The average annual harvest rate over the past 5 years on these glaciers has exceeded 10% of the observed population.

Mountain goats in Unit 11 have sustained annual harvest rates of 10% of the observed population. This rate of harvest is probably sustainable because observed counts represent a

minimum population estimate. However, continuing heavy harvests from MacColl Ridge, Bernard and Hawkins glaciers could result in a decline in the goat population in those areas if productivity declines or predation increases. In addition to the yearly trend count on MacColl Ridge, goats should be surveyed annually in heavily hunted areas such as Hawkins and Barnard glaciers. Harvest rates are not a concern in other areas in the unit.

I recommend closing the hunting season by emergency order as soon as the harvest from MacColl Ridge, Hawkins and Barnard glaciers exceeds 12 goats or 10% of the observed goat population. Timely emergency order closures will be difficult because most of the harvest occurs in only a few days, early in the season. The annual harvest from Unit 11 should not exceed 35 goats for more than 1 year; if it does, we should reduce the length of season.

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Table 1. Unit 11 MacColl Ridge trend count area goat composition counts and estimated population size, 1988-93.

Area	Regulatory year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
MacColl Ridge	1988/89	29 (69)	13 (31)	0	44.8	42	42
	1989/90	31 (76)	10 (24)	0	32.2	41	41
	1990/91	43 (78)	12 (22)	0	27.9	55	55
	1991/92	45 (83)	9 (17)	0	20.0	54	54
	1992/93	45 (87)	7 (13)	0	15.6	52	52
	1993/94	40 (83)	8 (17)	0	20.0	48	48

[a] Estimate considered to be total count.

Table 2. Unit 11 mountain goat harvest data by permit hunt, 1988-92.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
880	1988/89	69	51	28	21	9 (60)	6 (40)	0	0	15
880	1989/90	66	39	35	26	12 (71)	5 (29)	0	0	17
880	1990/91	50	46	22	32	12 (75)	4 (25)	0	0	16
880	1991/92	69	39	25	36	13 (52)	12 (48)	0	0	25
880	1992/93	53	51	17	32	8 (47)	9 (53)	0	0	17

Table 3. Unit 11 mountain goat hunter residency and success, 1988-92.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Nonresident	Total(%)	
1988/89	4	3	8	15 (44)	--	11	8	19 (56)	34
1989/90	1	6	10	17 (43)	--	18	5	23 (57)	40
1990/91	0	5	11	16 (59)	--	9	2	11 (41)	27
1991/92	2	7	16	25 (60)	--	15	2	17 (40)	42
1992/93	2	3	12	17 (65)	--	6	3	9 (35)	26

[a] resident of Unit 11, 13, or that portion of Unit 12 along the Nabesna Road.

Table 4. Unit 11 mountain goat harvest chronology percent by time period, 1988-92.

Regulatory Year	September				October					*n*
	1-7	8-15	16-23	24-30	1-7	8-15	16-23	24-31	1-30	
1988/89	40	20	--	13	20	7	--	--	--	15
1989/90	18	18	18	18	5	5	18	--	--	17
1990/91	13	38	19	6	6	6	6	--	6	16
1991/92	24	36	16	4	20	--	--	--	--	25
1992/93	35	35	24	--	--	--	--	6	--	17

Table 5. Unit 11 mountain goat harvest percent by transport method, 1988-92.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk	*n*
1988/89	80	--	--	7	--	--	13	--	15
1989/90	82	--	--	--	--	--	18	--	17
1990/91	88	--	--	--	--	--	12	--	16
1991/92	80	8	4	4	--	--	4	--	24
1992/93	65	6	6	--	--	--	23	--	17

LOCATION

Game Management Units: Unit 13D and Unit 14 (12,370 mi^2)

Geographical Description: Talkeetna Mountains and northwestern Chugach Mountains

BACKGROUND

The first survey in Unit 13D was conducted in 1959. The first comprehensive goat survey in Unit 14 was in 1972. Periodic surveys have been conducted since then in both areas.

During the last decade, the goat population in the northwestern Chugach mountains (Units 13D and 14C) have increased slightly. The number of goats observed during aerial surveys in 14C ranged from 326 to 515 between 1982 and 1988. Between 1989 and 1992, counts ranged from 524 to 593. During the last decade, the goat population in the Talkeetna Mountains (Unit 14B) has fluctuated with no discernible trend.

Seasons and bag limits for goats in this area have varied since statehood. During the mid 1960s, regulations for Units 13 and 14 were at their most liberal, with a 144-day goat hunting season (10 August through 31 December) and 2-goat bag limit. Unit 14 went to a 1-goat bag limit in 1967, but 2 goats could be harvested by hunters in Unit 13D until 1975. In the 1970s the hunting season in Unit 14 began in early August or September and ran until 15 November. Unit 14A north of the Matanuska River was closed in 1976 (and has remained closed), and Unit 13D was closed to goat hunting 2 years later. In the early 1980s goat hunting in the northwestern Chugach Mountains was at its most restricted stage, with only 50 or 100 drawing permits issued for Units 14B and 14C and portions of 14A. Since 1984, mountain goat hunting in Unit 14 has been under a registration permit season; northern Units 14A and 14B have been closed since 1986 and 1987, respectively. Unit 13D was opened in 1987 under a drawing permit hunt after a 10-year closure. The harvest was limited to billies only during 1987 and 1988 but was extended to either sex in 1989.

A large portion of Unit 14C has been closed to goat hunting most of the time since the early 1960s. First, the drainages from Potter to Girdwood (Rainbow Closed Area) were closed. From 1969 to 1972 there were no areas in Unit 14C closed to goat hunting. In 1973 the recently created Chugach State Park, which encompassed most of the mountains west of the Lake George and Twentymile River drainages, was closed to goat hunting. However, in recent years these closed areas have never included a substantial segment of the goat population in Unit 14C.

Most registration permits are issued for the Lake George drainage in Unit 14C. Over half of the goats harvested in Unit 14 are taken in the Lake George drainage. During the last decade, the number of registered goat hunters has increased in Unit 14C. Annual goat harvests in this Unit have ranged from 20 to 45, with no discernible trend. Few goats are harvested in Units 13D and 14A.

MANAGEMENT DIRECTION

Management Objectives

The goat management objective for Unit 13 is to maintain a prehunting season population of at least 100 goats.

The goat management objective for Units 14A and 14B is to maintain a prehunting season population of at least 60 goats.

The goat management objective for Unit 14C is to maintain a population of at least 500 goats that will sustain an annual harvest of 25 goats composed of at least 60% males.

METHODS

We monitor sex and age composition and trend of goat populations through periodic aerial surveys. We monitor harvests by requiring successful hunters to bring in horns for sexing and aging. All hunters are required to return hunt reports which results in nearly 100% compliance.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: We conducted aerial surveys throughout most goat range in the Talkeetna Mountains in 1988 and 1991 and in the northwestern Chugach Mountains during 1989 and 1992 (Tables 1-4). Goat populations in Unit 13D and Unit 14 are increasing slowly.

Variations in count conditions and movement cause some of the annual fluctuations in numbers. Late evening surveys were best for observing goats. We counted the largest number of goats when we flew the survey in the evening instead of early morning to midday (e.g., 1988).

Aerial survey data collected over the past several years indicate at least 1000 goats inhabited the Talkeetna and northwestern Chugach mountains in August 1992 (Tables 1-4).

Population Composition: Annual composition data were only available for Unit 14C. Because of limited funding, a number of goat surveys in Units 14A, 14B, and 13D were either not conducted or were incidental to aerial sheep surveys. Goat surveys in Units 14A and 14B were conducted to optimize good goat counting conditions during 1991 and 1992. Goat surveys in Units 14A South and 14B are conducted on a 3-year and 3- to 5-year cycle. Kid recruitment has declined in all Units in recent years.

Distribution and Movements: Goats were seldom far from escape cover that includes broken, rocky, steep terrain. Goat distribution during summer has been documented from aerial surveys. During summer, goats fed in early morning and late evening on open grassy slopes, often adjacent to glaciers or snowfields. During midday, they sought relief from the heat in dense shrub cover, on ice fields or glaciers, and under rocky outcrops.

Winter range often contains steep, timbered hillsides or windblown slopes; however, little is known about precise winter distribution or kidding or rutting areas.

In Unit 13 mountain goats are chiefly in Unit 13D in the Chugach Mountains. Occasionally an animal is observed in the Talkeetna Mountains portion of Unit 13, and a small population inhabits the Chulitna Mountains near Cantwell. These goat populations are on the northernmost edge of mountain goat range and occupy poor habitat. Only Unit 13D animals are hunted. The future of mountain goats in Unit 13 depends largely on winter weather

conditions and secondarily on predation. During the early 1970s deep snowfall greatly reduced goat numbers.

Most mountain goats in Unit 14 live in the Chugach Mountains; however, small numbers are found in the Talkeetna mountains. Given favorable winter conditions, low predator populations, and low harvest rates, goats may increase in the Chugach Mountains portion of the unit. The Talkeetna Mountains are the northern limit of mountain goat range and are marginal habitat, unable to support a large goat population.

Mortality

Harvest:

Seasons and Bag Limits. In Unit 13D, the goat hunting season for residents and nonresidents was 10 August-20 September. The bag limit was 1 billy by drawing permit in 1988 and 1 goat by drawing permit from 1989 to 1992.

In Units 14A (south of the Matanuska River) and 14C, the hunting season for residents and nonresidents was 1 September-31 October; however, from 16-31 October goats could only be taken by bow and arrow. The bag limit was 1 goat by registration permit.

In Unit 14A north of the Matanuska River, goat hunting has been closed since 1986. The goat hunting season in Unit 14B has been closed since 1990.

Board of Game Action and Emergency Orders. In 1988, hunts 868 and 881 were closed by emergency order effective 8 October in the Twentymile River drainage of Unit 14C. In 1989 the Board of Game changed the bag limit in Unit 13D from males (billies) only to either sex. During 1990, the Unit 14B goat season was closed by emergency order and permits have not been issued since. The Board of Game closed the goat hunting season in this unit in 1992. However, the goat season in Unit 14A south of the Matanuska River was extended 2 weeks (16-31 October) by the Board in 1993.

Hunter Harvest. A hunting season was initiated in Unit 13D in 1987 after having been closed since 1978. Harvests have been low (Table 5). Those portions of Unit 14 open to goat hunting were changed from a drawing permit hunt to a registration permit hunt in 1984. This action substantially increased harvest in Unit 14C. Most of this increase was in the Lake George drainage because it supports a high density of goats and is easily accessible by aircraft. The last 2 weeks of October (16-31 October) were restricted to archery hunting; however, archers have not reported taking any goats during the archery-only season (Table 6).

Permit Hunts. Goat registration permits for Unit 14 increased slightly during the past 5 years (Table 6). Drawing permits issued for the eastern portion of Unit 13D increased from 16 to 25 in 1991 (Table 7).

Hunter Residency and Success. Most goat hunters in Units 13 and 14 are local residents (e.g., local residents composed 87% of all goat hunters in Unit 14 in 1992). Nonresidents composed only 8% of goat hunters in Unit 14 in 1992. Legislation passed in 1989 that required all nonresident goat hunters to be accompanied by a guide-outfitter or an Alaska resident within the second degree of kindred has reduced the number of nonresident hunters (Tables 8 and 9). Most nonresidents hunt in the Lake George drainage in Unit 14C.

Success rates from 1988 to 1992 in Unit 14 ranged from 29% to 39% (Table 9). Guided, nonresident hunters in the Lake George area were more successful than unguided, resident hunters (Table 8).

Harvest Chronology. In 1988 more goats were harvested in September than October in Unit 14C; since then, most goats have been harvested in October (Table 10). Goats were not harvested during the archery season the last 2 weeks of October. Harvests in Units 13D, 14A, and 14B were too small to evaluate chronologically.

Weather plays an important role in the timing of hunts; conditions often deteriorate rapidly during the last weeks of October. Season dates and suitable conditions for hunting other big game species also affect timing of goat hunts.

Transport Methods. Nearly all successful hunters used aircraft as the primary means of transport in Unit 14 (except in the Twentymile River drainage) and Unit 13D (Tables 11 and 12). In the Twentymile River drainage, most successful hunters used boats or highway vehicles.

CONCLUSIONS AND RECOMMENDATIONS

All management objectives were met. Aerial surveys completed after 1988 were conducted primarily during evening hours when goats were feeding and more easily observed. Because of this, our estimates of the mountain goat population have improved since 1988. This may account, in part, for the substantial increase in the number of goats observed in Unit 14C since 1989. Harvests in Unit 14C exceeded 25 goats in all 5 years. Goat harvests from 1988 to 1992 averaged 61% males.

Mountain goat populations should continue to be monitored; however, because of the low harvest in Unit 13D, goats need to be surveyed only every 2-3 years. In Unit 14C, because of budget limitations and the stability of the goat population, surveys can be conducted biennially unless the unit receives severe winter weather.

Management objectives need to reflect management philosophy. Units 14A and 14B are marginal habitat, and there should be a minimum observable population of 50 goats before hunting is allowed in these areas. I also recommend the harvest quota should not exceed 7% of the number of goats observed during surveys.

The number of goats are increasing in Unit 14C west of the Lake George drainage. The population in this area may be sufficient to support a new registration hunt in the near future. This area is within Chugach State Park, so we will need Division of Parks concurrence before a proposal is submitted to the Board of Game.

Management objectives should be changed to reflect the increasing number of goats and new management strategies, as follows:

- In Unit 14A (Chugach Mountains), to maintain a minimum observable population of 60 goats that will sustain an annual harvest of 4 goats composed of at least 70% males (averaged over a 3-year period).

- In Units 14A and 14B (Talkeetna Mountains), to allow the number of goats to reach a minimum observable population of 50 goats before allowing harvest, at which time annual harvest should not exceed 1 female.

Goat hunters have increased in number in recent years. However, many goat hunters in Unit 14 were local residents employed by the army or air force. With continuing military cutbacks, a portion of the local hunting population may leave the state.

Current season and bag limits are appropriate; however, goat populations in Unit 14 need to be monitored closely to prevent overharvesting.

Prepared by:	Submitted by:
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Table 1. Subunit 13D aerial mountain goat composition counts and estimated population size, 1988-92.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1988/89	--	--	--	--	--	--
1989/90	85 (77)	26 (23)	31	111	17.3	150
1990/91	--	--	--	--	--	--
1991/92	--	--	--	--	--	--
1992/93[b]	66 (79)	18 (21)	27	84	--	175

[a]Based upon 80-85% sightability (snow conditions).
[b]Partial survey; reliable information indicated at least 60 goats in unsurveyed count areas.

Table 2. Subunit 14A aerial mountain goat composition counts and estimated population size, 1988-92.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1988/89	--	--	--	--	--	--
1989/90	58 (68)	27 (32)	47	85	--	105
1990/91[b]	37 (88)	5 (12)	14	42	5.9	--
1991/92	--	--	--	--	--	--
1992/93	75 (76)	24 (24)	32	99	8.2	120

[a]Based upon 80-85% sightability (snow conditions).
[b]Partial survey.

Table 3. Subunit 14B aerial mountain goat composition counts and estimated population size, 1988-92.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1988/89	15 (79)	4 (21)	27	19	--	23
1989/90	--	--	--	--	--	--
1990/91	--	--	--	--	--	--
1991/92	28 (93)	2 (7)	7	30	2.1	35
1992/93	--	--	--	--	--	--

[a]Based upon 80-85% sightability (snow conditions).

Table 4. Subunit 14C aerial mountain goat composition counts and estimated population size, 1988-92.[a]

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
1988/89	296 (80)	74 (20)	25	370	73	460
1989/90	391 (74)	137 (26)	35	530	82	630
1990/91	411 (78)	113 (22)	28	524	81	650
1991/92[c]	414 (79)	110 (21)	27	524	131	730
1992/93	498 (84)	95 (16)	19	593	119	700

[a]Data include all goats observed in Subunit 14C; S&I reports prior to 1984 included only goats in registration hunt areas.
[b]Based upon 80-85% sightability (snow conditions).
[c]Partial survey (excludes Twentymile River drainage).

Table 5. Annual mountain goat harvest by subunit, 1988-92.

Regulatory year	Subunit 13D	14A[a]	14B[a]	14C[a]	Total
1988/89	2[b]	0	1	30	33
1989/90	4[c]	0	3	23	30
1990/91	5[c]	4	0[d]	28	37
1991/92	8[c]	4	0[d]	36	48
1992/93	5[c]	1	0[d]	38	44

[a]Registration permit only.
[b]Drawing permit only (billies only).
[c]Drawing permit only (either sex).
[d]Closed to mountain goat hunting.

Table 6. Unit 14 mountain goat harvest data by permit hunt, 1988-92.

Area	Regulatory year	Permits issued[a]	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unk.	Total harvest
866	1988/89	20	45	100	0	0 (0)	0 (0)	--	0
Subunit	1989/90	26	50	100	0	0 (0)	0 (0)	--	0
14A	1990/91	39	28	79	21	3 (75)	1 (25)	--	4
	1991/92	23	48	67	33	3 (75)	1 (25)	--	4
	1992/93	22	55	90	10	0 (0)	1 (100)	--	1
867	1988/89	6	50	67	33	1 (100)	0 (0)	--	1
Subunit	1989/90	10	50	75	25	3 (100)	0 (0)	--	3
14B	1990/91[b]	--	--	--	--	--	--	--	--
	1991/92[b]	--	--	--	--	--	--	--	--
	1992/93[b]	--	--	--	--	--	--	--	--
868	1988/89	47	49	63	37	5 (56)	4 (44)	--	9
Subunit	1989/90	64	48	75	25	5 (83)	1 (17)	--	6
14C	1990/91	69	36	97	3	1 (100)	0 (0)	--	1
Twentymile	1991/92	82	56	81	19	5 (71)	2 (29)	--	7
River	1992/93	95	45	77	23	5 (42)	7 (58)	--	12

[a]Includes permittees who did not report.
[b]Closed to mountain goat hunting.

Table 6. Continued.

Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)		Females (%)		Unk.	Total harvest
869	1988/89	126	52	66	34	11	(52)	10	(48)	--	21
Subunit	1989/90	109	38	69	31	12	(71)	5	(29)	--	17
14C	1990/91	107	30	58	42	15	(56)	12	(44)	--	27
Lake	1991/92	103	49	45	55	19	(70)	8	(30)	2	29
George	1992/93	120	41	63	37	14	(56)	11	(44)	1	26
881	1988/89	0	--	--	--	0	(0)	0	(0)	--	0
Subunit	1989/90	9	56	100	0	0	(0)	0	(0)	--	0
14C	1990/91	1	0	100	0	0	(0)	0	(0)	--	0
	1991/92	4	100	--	--	0	(0)	0	(0)	--	0
	1992/93	5	100	--	--	0	(0)	0	(0)	--	0
882	1988/89	4	25	100	0	0	(0)	0	(0)	--	0
Subunit	1989/90	2	100	--	--	0	(0)	0	(0)	--	0
14C	1990/91	3	0	100	0	0	(0)	0	(0)	--	0
	1991/92	4	75	100	0	0	(0)	0	(0)	--	0
	1992/93	5	100	--	--	0	(0)	0	(0)	--	0
Totals	1988/89	194	55	68	32	16	(53)	14	(47)	--	30
for all	1989/90	184	55	72	28	17	(74)	6	(26)	--	23
Subunit	1990/91	180	48	70	30	16	(57)	12	(43)	--	28
14C	1991/92	193	53	60	40	24	(71)	10	(29)	2	36
	1992/93	225	45	69	31	19	(51)	18	(49)	1	38
Totals for	1988/89	220	56	68	32	17	(55)	14	(45)	--	31
all Unit	1989/90	220	56	73	27	20	(77)	6	(23)	--	26
14 permit	1990/91	219	48	72	28	19	(59)	13	(41)	--	32
hunts	1991/92	216	53	61	39	27	(71)	11	(29)	2	40
	1992/93	247	46	71	29	19	(50)	19	(50)	1	39

Table 7. Subunit 13D mountain goat harvest data by permit hunt, 1988-92.

Area	Regulatory year	Permits issued[a]	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
827	1988/89	10	60	75	25	1 (100)	0 (0)	1
Subunit	1989/90	10	40	50	50	1 (33)	2 (67)	3
13D West	1990/91	10	50	40	60	3 (100)	0 (0)	3
818[b]	1991/92	10	60	25	75	2 (67)	1 (33)	3
	1992/93	10	70	33	67	1 (50)	1 (50)	2
828	1988/89	15	53	86	14	1 (100)	0 (0)	1
Subunit	1989/90	15	73	75	25	1 (100)	0 (0)	1
13D East	1990/91	16	69	60	40	1 (50)	1 (50)	2
819[c]	1991/92	25	48	61	39	4 (80)	1 (20)	5
	1992/93	25	56	73	27	1 (33)	2 (67)	3
Totals	1988/89	25	56	82	18	2 (100)	0 (0)	2
for all	1989/90	25	60	60	40	2 (50)	2 (50)	4
Subunit	1990/91	26	62	50	50	4 (80)	1 (20)	5
13D	1991/92	35	51	53	47	6 (75)	2 (25)	8
	1992/93	35	60	64	36	2 (40)	3 (60)	5

[a]Includes permittees who did not report.
[b]Hunt number 827 changed to hunt 818.
[c]Hunt number 828 changed to hunt 819.

Table 8. Subunit 13D mountain goat hunter residency and success, 1988-92.

Area	Regulatory year	Successful				Unsuccessful				Total hunters
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
827	1988/89	0	1	0	1 (25)	0	1	2	3 (75)	4
Subunit	1989/90	0	2	1	3 (50)	0	0	3	3 (50)	6
13D West	1990/91	0	3	0	3 (60)	0	2	0	2 (40)	5
818[a]	1991/92	0	3	0	3 (75)	0	1	0	1 (25)	4
	1992/93	0	2	0	2 (67)	0	1	0	1 (33)	3
828	1988/90	0	1	0	1 (14)	0	5	1	6 (86)	7
Subunit	1989/90	0	0	1	1 (25)	0	0	3	3 (75)	4
13D East	1990/91	0	2	0	2 (40)	0	3	0	3 (60)	5
819[b]	1991/92	0	5	0	5 (39)	0	7	1	8 (61)	13
	1992/93	1	2	0	3 (27)	0	8	0	8 (73)	11
Totals	1988/90	0	2	0	2 (18)	0	6	3	9 (82)	11
for all	1989/90	0	2	2	4 (40)	0	0	6	6 (60)	10
Subunit	1990/91	0	5	0	5 (50)	0	5	0	5 (50)	10
13D	1991/92	0	8	0	8 (47)	0	8	1	9 (53)	17
	1992/93	1	4	0	5 (36)	0	9	0	9 (64)	14

[a]Hunt number changed from 827 to 818.
[b]Hunt number changed from 828 to 819.

Table 9. Unit 14 mountain goat hunter residency and success, 1988-92.

Area	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)	Total hunters
866	1988/89	0	0	0	0 (0)	7	0	0	7 (100)	7
Subunit	1989/90	0	0	0	0 (0)	9	0	0	9 (100)	9
14A	1990/91	3	0	1	4 (21)	14	0	0	15 (79)[a]	19
	1991/92	4	0	0	4 (33)	6	1	1	8 (67)	12
	1992/93	0	0	1	1 (10)	8	0	0	9 (90)[a]	10
867	1988/89	0	0	1	1 (33)	2	0	0	2 (67)	3
Subunit	1989/90	1	0	2	3 (75)	1	0	0	1 (25)	4
14B	1990/91[b]	--	--	--	--	--	--	--	--	--
	1991/92[b]	--	--	--	--	--	--	--	--	--
	1992/93[b]	--	--	--	--	--	--	--	--	--
868	1988/89	5	2	2	9 (38)[a]	13	0	2	15 (62)	24
Subunit	1989/90	6	0	0	6 (25)	16	0	1	18 (75)[a]	24
14C	1990/91	1	0	0	1 (3)	30	0	0	31 (97)[a]	32
Twentymile	1991/92	6	1	0	7 (19)	26	2	0	29 (81)[a]	36
River	1992/93	12	0	0	12 (23)	39	1	0	40 (77)	52
869	1988/89	2	6	13	21 (53)	26	0	14	40 (47)	61
Subunit	1989/90	13	2	2	17 (31)	35	0	3	38 (69)	55
14C	1990/91	25	0	2	27 (47)	27	3	1	31 (53)	58
Lake	1991/92	24	1	4	29 (55)	23	1	0	24 (45)	53
George	1992/93	17	1	8	26 (37)	40	3	2	45 (63)	71
881	1988/89	0	0	0	0 (0)	0	0	0	0 (0)	0
Subunit	1989/90	0	0	0	0 (0)	4	0	0	4 (100)	4
14C	1990/91	0	0	0	0 (0)	1	0	0	1 (100)	1
Twentymile	1991/92	0	0	0	0 (0)	0	0	0	0 (0)	0
River (archery)	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0

Table 9. Continued.

Area	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)	Total hunters
882	1988/89	0	0	0	0 (0)	3	0	0	3 (100)	3
Subunit	1989/90	0	0	0	0 (0)	0	0	0	0 (0)	0
14C	1990/91	0	0	0	0 (0)	3	0	0	3 (100)	3
Lake	1991/92	0	0	0	0 (0)	1	0	0	1 (100)	1
George (archery)	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0
Totals	1988/89	7	8	15	30 (34)[a]	42	0	16	58 (66)	88
for all	1989/90	19	2	2	23 (28)	55	0	4	60 (72)[a]	83
Subunit	1990/91	26	0	2	28 (30)	61	3	1	66 (70)[a]	94
14C	1991/92	30	2	4	36 (40)	50	3	0	54 (60)[a]	90
	1992/93	29	1	8	38 (31)	79	4	2	85 (69)	123
Totals	1988/89	7	8	16	31 (32)[a]	51	0	16	67 (68)	98
for all	1989/90	20	2	4	26 (27)	65	0	4	70 (73)[a]	96
Unit 14	1990/91	29	0	3	32 (28)	75	3	1	81 (72)[a]	113
	1991/92	34	2	4	40 (39)	56	4	1	62 (61)[a]	102
	1992/93	29	1	9	39 (29)	87	4	2	94 (71)[a]	133

[a]Includes hunters with unspecified residency.
[b]No open season.

Table 10. Unit 14 mountain goat harvest chronology percent by time period, 1988-92.

Area	Regulatory year	Harvest period					Unknown	n
		August	September	October	November	December		
Subunit 14A	1988/89	0	0	0	0	0	0	0
	1989/90	0	0	0	0	0	0	0
	1990/91	0	50	50	0	0	0	4
	1991/92	0	25	75	0	0	0	4
	1992/93	0	100	0	0	0	0	1
Subunit 14B	1988/89	0	100	0	0	0	0	1
	1989/90	0	33	67	0	0	0	3
	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
Subunit 14C	1988/89	0	83	17	0	0	1	30
	1989/90	0	41	59	0	0	1	23
	1990/91	0	39	61	0	0	0	28
	1991/92	0	49	51	0	0	1	36
	1992/93	0	45	55	0	0	0	38
Totals for all Unit 14	1988/89	0	83	17	0	0	1	31
	1989/90	0	40	60	0	0	1	26
	1990/91	0	41	59	0	0	0	32
	1991/92	0	46	54	0	0	1	40
	1992/93	0	46	54	0	0	0	39

[a] No open season.

Table 11. Subunit 13D successful mountain goat hunter transport methods, 1988-92.

Regulatory year	Percent of harvest							n
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	
1988/89	100	0	0	0	0	0	0	2
1989/90	100	0	0	0	0	0	0	4
1990/91	60	0	40	0	0	0	0	5
1991/92	100	0	0	0	0	0	0	3
1992/93	60	0	0	0	0	0	40	5

Table 12. Unit 14 successful mountain goat hunter transport methods, 1988-92.

Area	Regulatory year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
866	1988/89	0	0	0	0	0	0	0	0	0
Subunit	1989/90	0	0	0	0	0	0	0	0	0
14A	1990/91	100	0	0	0	0	0	0	0	4
	1991/92	100	0	0	0	0	0	0	0	4
	1992/93	100	0	0	0	0	0	0	0	1
867	1988/89	100	0	0	0	0	0	0	0	1
Subunit	1989/90	100	0	0	0	0	0	0	0	3
14B	1990/91[a]	--	--	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--	--	--
868	1988/89	22	0	44	0	0	0	33	0	9
Subunit	1989/90	0	0	33	0	0	17	50	0	6
14C	1990/91	0	0	100	0	0	0	0	0	1
Twentymile	1991/92	29	0	29	0	0	0	29	14	7
River	1992/93	17	0	42	0	0	0	33	8	12
869	1988/89	100	0	0	0	0	0	0	0	21
Subunit	1989/90	88	0	6	0	0	0	0	6	17
14C	1990/91	93	0	4	0	0	0	0	4	27
Lake	1991/92	97	3	0	0	0	0	0	0	29
George	1992/93	93	0	0	0	0	0	4	4	27
Totals	1988/89	77	0	13	0	0	0	10	0	30
for all	1989/90	65	0	13	0	0	4	13	4	23
subunit	1990/91	89	0	7	0	0	0	0	4	28
14C[b]	1991/92	83	3	6	0	0	0	6	3	36
	1992/93	69	0	13	0	0	0	13	5	39

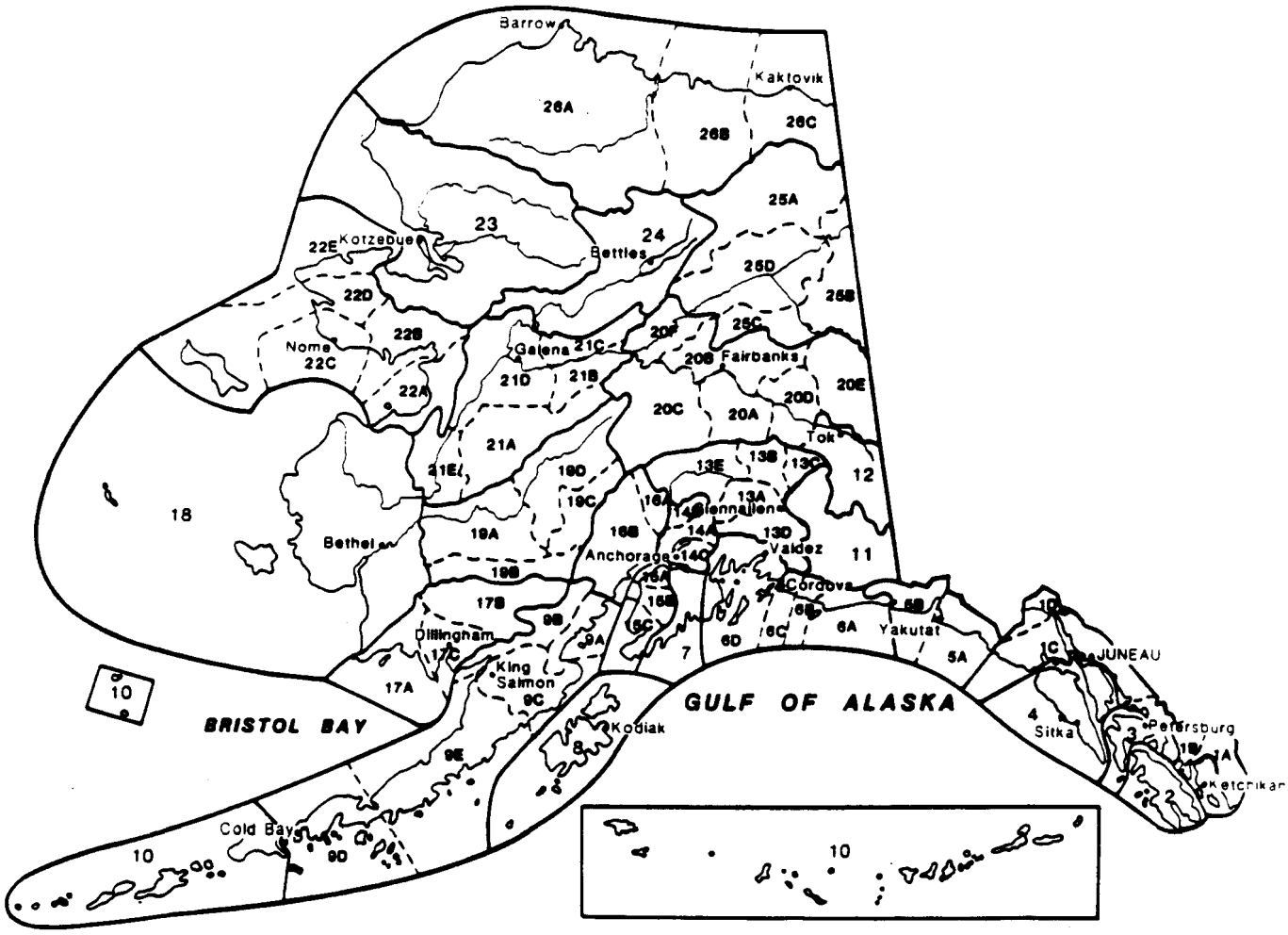
Table 12. Continued.

Area	Regulatory year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
Totals for all Unit 14	1988/89	77	0	13	0	0	0	10	0	31
	1989/90	69	0	12	0	0	4	12	4	26
	1990/91	91	0	6	0	0	0	0	4	32
	1991/92	85	3	5	0	0	0	5	3	40
	1992/93	70	0	13	0	0	0	13	5	40

[a]No open season.
[b]Hunts 881 and 882 had no successful hunters.

NOTES

Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitude for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.

PAT COSTELLO