Alaska Department of Fish and Game
Division of Wildlife Conservation

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Management Report of
Survey-Inventory Activities
1 July 1993- 30 June 1995

MOUNTAIN GOAT

Mary V Hicks, Editor

STELLO

Grants W-24-2, W-24-3
Study 12.0
December 1996

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
Frank Rue, Commissioner

DIVISION OF WILDLIFE CONSERVATION
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LOCATION

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

GEOGRAPHIC DESCRIPTION: That portion of Unit 1 lying south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound.

BACKGROUND

Severe winter weather conditions during 1968-1975 reduced mountain goat populations in Unit 1A (Smith 1984) 90%. Subsequent moderate weather enabled goat populations to recover, and we believe populations are stable at moderately high levels.

Unit 1A, with its glacially created steep valleys and peaks, provides important escape terrain for goats from wolves and bears. Alpine vegetation consists of heath fields and provides goats with nutritious forb-sedge meadows. At lower elevations, dense stands of old-growth trees provide necessary cover, and shrubs and evergreen forbs provide goats with important foods during critical winter months.

Although goats historically inhabited only the subunit's mainland, they now are on Revillagigedo Island as a result of introductions to Swan Lake (17) in 1983 (Smith and Nichols 1984) and Upper Mahoney Lake (15) in 1991 (ADF&G Unpubl. data, Ketchikan). These areas were selected as transplant sites because of suitable escape terrain and wintering habitat. The Swan Lake population has increased substantially since its introduction, and we believe it now includes 200-250 goats. This increase prompted us to initiate a hunting season in the vicinity of Swan Lake in 1993. We estimate the Upper Mahoney Lake population currently consists of 25-30 goats.

Hunter harvests from Unit 1A averaged roughly 45 goats each season during 1972-1988. However, the average annual harvest dropped to about 20 during the past 6 seasons as a result of 1989 legislation requiring nonresident goat hunters to hunt with registered guides. Cyclic and unpredictable weather severity, rather than hunter harvests, are believed most influential to goat populations.

To monitor population changes brought on by winter weather and predation, we attempt to complete aerial surveys of established trend count areas each fall. Although we believe survey results generally reflect population trends, we have found that weather conditions immediately before and during surveys can greatly influence our ability to observe goats.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1 Maintain goat population densities greater than 20 goats per hour of survey time during fall surveys and, when not achieved, determine probable causes.

2 Survey goats annually in established trend count areas throughout Unit 1A.

METHODS

We attempt to survey at least 6 of the subunit's 12 established trend count areas (TCAs) each fall as weather and schedules allow. TCAs vary in size from 23 mi^2 to 200 mi^2. We generally initiate surveys during September or early October between 1700-1900 hours. A PA-18 Supercub with a pilot and observer is flown at 200-300 ft. Both the pilot and observer search for goats, and the observer records observed goats on a 1:63,360 topographic map. We classify goats as either adults or kids and make no effort to ascertain sex or distinguish other age groups.

We gather harvest information through a mandatory hunt report which is part of a required registration permit. Information we collect includes hunt area and number of days hunted, hunter success, date of hunts and kills, transport methods and commercial services. Successful hunters who pursue a second goat are treated as separate hunters for the purposes of calculating and presenting hunt and harvest information.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

From 9 July 1993 to 24 February 1994, we obtained 18 relocations from 3 of the 7 goats originally radiocollared as part of the Upper Mahoney Lake introduction (Larsen 1992). On 6 April, 1994, we recovered the carcass of adult radiocollared male #003 who had died of malnutrition above Upper Ketchikan Lake. This was the second radiocollared goat found dead subsequent to the 1991 release; the first was a collared nanny that had died of malnutrition near Twin Peaks during December 1991 (Larsen, unpubl. rep., Ketchikan). Snowmachiners found the skull of an uncollared adult billy (dead of undetermined causes) on a ridge west of Harriet Hunt Lake in early spring 1993. Before the last of the radio collars went off the air in November 1993, we were aware that 3 of the 15 transplanted goats had died. Despite these losses, incidental observations of kids during both 1993 and 1994 indicate herd growth. Surveys and incidental observations of goats near Swan Lake similarly indicate herd growth in that area.

Aerial surveys were completed in TCAs K-4 (Wilson Arm/Boca-de-Quadra), K-7 (Yes Bay/Reflection Lake), K-9 (Chickamin River/Lake 2722), K-10 (Chickamin River/Walker Cove), and K-11 (Walker Cove/Rudyerd Bay) during fall 1993 (Table 1). Only 210 goats were observed in nearly 7 hours of flying. The observation rate of 31 goats/hr is the lowest on record (Table 1). Considerably fewer goats were observed in nearly all the surveyed TCAs than in the past (Table 2).

Reasons for the low counts are uncertain, but we suspect hot temperatures for 10 days preceding surveys caused goats to seek shade, making it impossible to observe them. In 1994, we observed higher numbers of goats in all the TCAs than were surveyed in 1993 (Table 2). Based on these results, we believe the goat population has remained relatively stable in most parts of the subunit during this report period. Only the status of the population around Yes Bay/Reflection Lake (TCA K-7) remains in question.

Population Size

We developed population estimates for goats inhabiting Unit 1A using survey data (ADF&G unpubl. rep., 1990, Ketchikan) and the sightability correction factor developed by Smith and

Bovee (1984). To derive our estimate, we first delineated the percentage of each Wildlife Analysis Area (WAA) that we believed contained suitable goat habitat. We then applied our survey-derived estimate of 1.27 goats/mi^2 to these percentages, which resulted in a mainland estimate of 7,300-10,200 goats (ADF&G unpubl. rep., 1990, Ketchikan).

Survey results from 1993 and 1994 indicate a possible decline in goat numbers around TCA K-7 (Yes Bay/Reflection Lake) (Table 2). Former Unit 1A goat research biologist, C. Smith, indicated he was aware of heavy wolf predation of goats on the northern Cleveland Peninsula during the early 1980s. He observed that as wolf numbers increased in the area, predation of radiocollared goats increased markedly (pers commun). In the absence of severe winters for the past 2 decades, and given the low hunter harvest from the area, we believe predation is affecting goat numbers on the northern Cleveland Peninsula.

The Swan Lake goat population has increased dramatically during this report period. Aerial surveys completed using a helicopter indicated a minimum of 84 goats in 1992 and 127 in 1993 (Table 2). Using Smith and Bovee's (1984) sightability correction factor of 33%-46% results in a 1993 estimate of 276-385 goats. The accuracy of this estimate cannot be determined since there is no way for us to determine actual sightability of goats surveyed. Our impression is that sightability during our survey was better than Smith and Bovee's. We believe a closer estimate for the Swan Lake population is 200-250 goats.

We observed 18 goats during a fall 1994 survey of the Upper Mahoney Lake and Deer Mountain area (Table 2). Using Smith and Bovee's correction factor results in a population estimate of 39-54. Our impression is this estimate is also high; a more reasonable estimate is 25-30 goats.

Population Composition

Our 1993 surveys resulted in an overall productivity estimate for the subunit of 29 kids to 100 adults (Table 1), although this varied from 0-42 among TCAs (Table 2). In 1994 our subunit productivity estimate decreased to a 6-year low of 19 kids to 100 adults (Table 1) and varied from 15-29 among TCAs (Table 2). Among the TCAs surveyed, K-7 showed a marked decline in productivity, falling from 37 kids to 100 adults in 1990 to 15 in 1994. This observation further heightens our suspicion that predation may be substantially affecting that population.

Distribution and Movement

Goats inhabit the mainland portion of the subunit from the southwesternmost tip of the Cleveland Peninsula to the subunit's eastern border along Portland Canal. Our surveys of the Swan Lake population indicate these goats have mostly remained within a 6-mile radius of the original release site. However, on 12 October 1992, we documented movements by 2 Swan Lake goats to a ridge near the west head of Carroll Inlet, a distance of approximately 12 miles from the site of the original transplant. Coincidentally, a nanny from the Upper Mahoney Lake population was observed within a few hundred yards of these goats. This nanny's movements were much more extensive than those of other goats transplanted with her. Smith and Nichols (1984) noted that subsequent to releases, lactating females appeared to search for their lost kids, often covering great distances in their efforts. This may account for this nanny's extensive movements, although no indications of lactation were noted at the time of her capture. Regardless, given the movements

shown by both this nanny and the Swan Lake goats, we consider it likely that intermingling of goats from the 2 releases will become increasingly common and eventually create one large island-wide population.

MORTALITY

Harvest

Season and Bag Limit:

Unit 1A, Revillagigedo Island, except that portion west of Carroll Inlet and Creek, west of the divide between Carroll Creek and the south fork of Orchard Creek, Orchard Lake, Shrimp Bay and Gedney Pass.	Aug. 1-Dec. 31	One goat by registration permit.
Unit 1A, remainder of Revillagigedo Island		No open season.
Remainder of Unit 1A	Aug. 1-Dec. 31	Two goats by registration permit.

Hunter Harvest. The highest harvest among the past 6 seasons occurred in 1993 when 20 billies and 13 nannies were reported harvested by 85 participating hunters (Table 3). The 1994 harvest by 72 participating hunters took only 11 billies and 9 nannies. One billy harvested from the subunit during 1993 qualified for entry into the Boone and Crockett Club's awards book, scoring 47 2/8 points.

In 1993 we initiated a hunt in response to increased numbers of goats observed around Swan Lake. Two nannies and 1 billy were harvested from the area during the first year of the hunt, but no goats were harvested in 1994. Rugged terrain and poor access are probably responsible for the low harvest.

Permit Hunts. Goat hunting in Subunit 1A has been regulated through registration permits for the past 15 years. During 1982-1993 we issued second permits to hunters who killed goats and returned their first permit hunt reports. Before the 1994 season this practice changed so that hunters can now harvest 2 goats during a single hunt. In 1994, 3 of the 17 successful hunters bagged 2 goats (Table 3). We issued 299 and 215 permits from our Ketchikan office during 1993 and 1994, respectively.

Hunter Residency and Success. Nonresidents did not hunt goats in Unit 1A during 1993; however, 3 nonresidents hunted goats in Subunit 1A during 1994 and 2 were successful (Table 4). Hunters residing within the subunit composed 88% and 75% of the 1993 and 1994 harvests, respectively. Hunter success dropped from 39% in 1993 to 27% in 1994.

Harvest Chronology. Most of the 1993 and 1994 harvests occurred during September (Table 5). In the past 2 seasons only 4 goats were harvested from the subunit during November and December.

Transport Methods. Following 3 seasons of approximately equal use of boats and airplanes, for the past 3 years hunters have used airplanes for 70%-87% of their transportation to access goats; use of boats has sharply declined (Table 6).

CONCLUSIONS AND RECOMMENDATIONS

Mountain goat populations seem stable throughout most of Unit 1A. Our objective of maintaining goat densities greater than 20 goats per hour of survey time has consistently been met. However, around Yes Bay/Reflection Lake on the northern Cleveland Peninsula, goat numbers and productivity have declined. Given the low harvests that have occurred in the area and the succession of mild winters, we suspect predation may be having a substantial influence on goats in that area.

As a result of state legislation which took effect in 1989, all nonresident goat hunters are required to be accompanied by a registered guide or by an Alaska resident over 19 years of age who is within the second degree of kindred. This law has all but eliminated nonresident participation in the subunit's goat hunting.

The introduced goat population near Swan Lake on Revillagigedo Island continued to increase during this report period. In response to the increase, we initiated a hunt in the area beginning in 1993. Three goats were harvested during the first 2 seasons.

The success of the 1991 Upper Mahoney Lake introduction is still uncertain. Three of the originally transplanted goats have died, but during the past 2 years we have observed several kids near the release site. We have established a trend count area near Deer Mountain/Upper Mahoney Lake (K-13) which we intend to periodically survey along with the other TCAs established in the subunit.

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Prepared by:	Submitted by:
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Table 1. Unit 1A mountain goat survey data, 1968-1994

Survey dates[a]	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	4.9	146
Sept. 13 - Sept. 16, 1971	111	357	468	31	3.9	120
Aug. 16 - Sept. 16, 1973	35	149	184	23	2.5	74
Aug. 27 - Sept. 21, 1974	14	50	64	28	1.8	35
Aug. 12 - Sept. 11, 1975	84	270	354	31	7.6	46
Sept. 1 - Sept. 11, 1976	73	283	356	26	8.0	44
Aug. 31 - Sept. 6, 1977	165	354	519	47	6.3	82
Sept. 5 - Sept. 9, 1978	126	404	530	31	5.2	102
Sept. 18 - Sept. 21, 1979	62	238	300	26	3.8	79
Aug. 20 - Sept. 12, 1980	215	617	832	35	9.6	87
Aug. 26 - Sept. 21, 1981	153	461	614	33	6.0	102
Aug. 29 - Sept. 18, 1982	167	515	682	32	6.9	99
Aug. 30 - Sept. 23, 1983	177	658	835	27	7.5	111
Sept. 5 - Sept. 24, 1984	174	666	840	26	7.1	118
Sept. 9 - Sept. 26, 1985	75	311	386	24	3.3	117
Sept. 12 - Sept. 15, 1986	64	359	423	18	4.0	106
Sept. 23 - Oct. 8, 1987	39	182	221	21	2.0	110
Sept. 3 - Sept. 19, 1988	104	304	408	34	4.4	93
Sept. 10 - Sept. 13, 1989	124	415	539	30	5.5	98
Sept. 6 - Oct. 3, 1990	193	603	796	32	9.3	85
Aug. 30 - Sept. 5, 1993	47	163	210	29	6.8	31
Sept. 8 - Oct. 1, 1994[b]	81	414	495	19	8.8	56

[a]Most comparable data is from 1975-1994.

[b]Includes a 48 minute survey of the Deer Mountain/Upper Mahoney Lake transplanted population; 14 adults and 4 kids observed.

Table 2. Unit 1A trend count area surveys, 1980-1994.

Survey area	Year	Adults	Kids	Total Goats	Survey time (hrs.)	Goats per/hr	Kids: 100 Adults	Sets of Twins
K-3	1982	26	10	36	0.5	72	38	3
	1980	42	11	53	1.5	35	26	0
K-4	1994	49	10	59	1.1	54	20	0
	1993	21	6	27	0.6	45	28	0
	1990	71	26	97	0.9	108	37	3
	1989	59	19	78	0.9	87	32	1
	1988	17	4	21	0.7	30	24	0
	1987	69	17	86	0.8	107	25	0
	1985	24	3	27	0.9	30	13	0
	1984	76	22	98	0.9	109	29	2
	1983	88	26	114	1.1	104	30	5
	1982	64	23	87	1.0	87	36	0
	1981	68	27	95	0.8	119	40	4
	1980	35	18	53	0.7	76	51	1
K-5	1994	189	40	229	2.5	92	21	1
	1990	153	46	199	2.0	99	30	2
	1989	59	19	78	0.9	87	32	1
	1988	93	29	122	1.3	94	31	0
	1986	148	24	172	1.2	143	16	1
	1985	99	21	120	1.0	120	21	0
	1984	153	46	199	1.5	133	30	1
	1983	173	47	220	2.0	110	27	2
	1982	118	48	166	1.6	104	41	5
	1981	145	47	192	1.8	107	32	5
	1980	116	35	151	2.1	72	30	4
K-7	1994	82	12	94	2.6	36	15	0
	1993[a]	68	18	86	2.5	34	26	0
	1990	166	62	228	2.0	114	37	2
	1984	117	30	147	1.8	82	26	0
	1983	131	37	168	1.8	93	28	1
	1980	128	36	164	1.8	91	28	2
K-8	1982[b]	52	13	65	0.7	89	25	0

Table 2. Continued

Survey area	Year	Adults	Kids	Total Goats	Survey time (hrs.)	Goats per/hr.	Kids: 100 Adults	Sets of Twins
K-9	1993[a]	48	20	68	2.2	31	42	1
	1990	81	22	103	1.5	69	27	1
	1989	94	33	127	1.4	91	35	2
	1988	119	46	165	1.3	127	39	1
	1986	106	21	127	1.4	91	20	0
	1985	92	24	116	1.1	105	26	1
	1984	138	19	157	1.4	112	14	0
	1983	146	37	183	1.6	114	25	0
	1982	104	25	129	1.3	99	24	0
	1981	100	39	139	1.8	77	39	4
	1980	158	66	224	1.8	124	42	4
K-10	1994	63	10	73	1.4	52	16	0
	1993[a]	21	3	24	1.2	20	14	0
	1990	86	22	108	0.9	120	26	2
	1989	66	13	79	1.1	72	20	0
	1988	70	23	93	0.9	103	33	0
	1987	92	18	100	1.0	100	20	0
	1986	75	12	87	1.1	79	16	0
	1985	120	30	150	1.1	136	25	2
	1984	150	47	197	1.2	164	31	2
	1983	88	26	114	1.0	114	30	5
	1982	99	26	125	1.2	104	26	2
	1981	119	33	152	1.2	127	28	1
	1980	116	42	158	1.5	105	36	4
K-11	1994	17	5	22	0.4	55	29	1
	1993[a]	5	0	5	0.2	25	0	0
	1990	15	2	17	0.3	57	13	0
	1989	21	4	25	0.4	62	19	0
	1987	21	4	25	0.3	83	19	0
	1986	30	7	37	0.3	123	23	0
	1984	32	10	42	0.4	105	31	1
	1982	20	8	28	0.2	140	40	0
	1981	29	7	36	0.3	120	24	0
	1980	22	7	29	0.3	97	32	1

Table 2. Continued

Survey area	Year	Adults	Kids	Total Goats	Survey time (hrs.)	Goats per/hr.	Kids: 100 Adults	Sets of Twins
K-12[c]	1993[d]	95	32	127	1.3	98	34	3
	1992[d]	62	22	84	2.0	42	35	3
	1990	31	13	44	1.7	26	42	3
	1988	29	14	43	1.2	36	48	0
K-13[e]	1994	14	4	18	0.8	22	28	0

[a] Extended hot weather suspected of keeping goats in low-elevation shade.
[b] Incomplete survey.
[c] Swan Lake transplanted population.
[d] Surveys were done using a Bell 206 Jet Ranger helicopter.
[e] Upper Mahoney Lake transplanted population.

Table 3. Unit 1A mountain goat harvest data for permit hunt RG001/002, 1985-1994.

Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	Male	Female	Total
1985	261	122	88	51	29	22	51
1986	244	122	71	51	16	33	51
1987	195	107	61	27	14	3	27
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
1993	299	197	52	33	20	13	33
1994[d]	215	135	55	20[e]	11	9	20

[a] Number of permits issue 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.
[d] Regulation changed; hunters could take 2 goats during a single hunt.
[e] Three hunters killed 2 goats

Table 4. Unit 1A goat hunter residency and success, 1985-1994.

	Successful				Unsuccessful			
Year	Local res.[a]	Nonlocal res.	Nonres.	Total	Local res.[a]	Nonlocal res.	Nonres.	Total
1985		30	21	51		67	21	88
1986		39	12	51		48	23	71
1987	15	0	12	27	44	3	14	1
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
1993	29	4	0	33	50	2	0	52
1994	15	3	2	20	45	9	1	55

a Local and nonlocal residents combined during 1985 and 1986. Local residents reside in Subunit 1A.

Table 5. Unit 1A goat harvest chronology, 1985-1994.

Year	Aug.	Sept.	Oct.	Nov.	Dec.
1985	14	49	29	0	8
1986	16	59	8	2	16
1987	33	30	22	7	7
1988	24	58	15	3	0
1989	17	30	17	13	22
1990	9	8	2	1	0
1991	5	3	4	1	3
1992	7	6	6	4	0
1993	5	15	9	0	4
1994	1	13	6	0	0
Totals	131	271	118	31	60

Table 6. Unit 1A transportation methods used by successful goat hunters, 1985-1994.

Year	Airplanes (%)	Boats (%)
1985	90	10
1986	82	18
1987	64	36
1988	85	15
1989	48	52
1990	53	47
1991	49	51
1992	87	13
1993	70	30
1994	70	30

LOCATION

GAME MANAGEMENT UNIT: 1B (3,000 mi^2)

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point.

BACKGROUND

Mountain goats are indigenous to Subunit 1B, distributed throughout appropriate habitat. Goats reside in alpine and subalpine areas from spring until fall. During winter goats use windblown or steep slopes with little snow cover and retreat to timbered areas during severe weather, often descending to coastal shorelines. Although data is scarce, it indicates that goat populations have been 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 hunting pressure is focused near access points. Because of this, we must monitor harvest closely. The kill has ranged from 17 to 36 goats in the last 4 years.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES:

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

METHODS

Aerial surveys were flown within established trend count areas to obtain the number of goats and the proportion of kids in the population. We monitored hunter harvest through a registration permit system. All permit holders were required to report and those hunting report the location and duration of the hunt, transportation used, date 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 Subunit 1B. The population appears stable.

Population Composition

Table 1 shows the past 4 years of age composition data from aerial trend counts. Differences in sample size occur because of inclement weather which makes complete surveys difficult. In the June 1995 survey, kids composed 6% of the goats classified, a substantial decrease. The decrease may be from poor production or due to the early date the survey was flown (goat surveys are

usually flown in August). Annual differences in survey intensity (i.e., minutes/mile search time) and methods, as well as lack of information about seasonal goat movements, make it difficult to estimate goat abundance.

MORTALITY

Harvest:

Season and Bag Limit:

Subunit 1B, that portion north of the Bradfield Canal and the north fork of the Bradfield River	Aug. 1-Dec. 31	One goat by registration permit only. However the taking of kids or nannies with kids is prohibited.
Remainder of Subunit 1B	Aug. 1-Dec. 31	Two goats by registration permit only.

Board of Game Actions and Emergency Orders. An emergency order was issued on September 23, 1992 and expired June 30, 1993 closing the Frosty Bay area of Subunit 1B to goat hunting. The closure was issued to prevent excessive goat harvest during logging operations. A subsequent emergency order was issued July 30, 1993 and remained in effect until all logging activity in the Frosty Bay sale area ceased and roads were closed to motorized vehicles. The Board of Game eliminated the protection of kids and nannies with kids in harvest regulations effective July 1, 1995. The Federal Subsistence Board retained a 2 goat bag limit for a portion of permit area RG004 and required a Federal subsistence permit for the taking of the second goat.

Hunter Harvest. The 1993 and 1994 harvests of 36 and 34 goats, respectively, for Subunit 1B was in line with our management harvest goal of 35 goats (Table 2). Hunter success was 43% in 1993 and 40% in 1994, which did not meet the management goal of 35%. The male component of the harvest was greater than 50%, but this data from hunting reports has not been verified. We distributed literature designed to help hunters identify male goats, and we encouraged hunters to select males.

In 1994 one hunter harvested a second goat in the RG004 area under a Federal permit. Federal regulations require a state permit for a first goat and a federal permit to take a second goat.

Hunter Residency and Success. Petersburg and Wrangell residents, defined as local, continue to be the largest group of hunters (Table 3). Fewer nonresident hunters are participating than during years before the mandatory guide regulation.

Harvest Chronology: Harvest chronology changed slightly compared with previous years (Table 4). In 1993 more goats were taken in September. In 1994 hunters took a greater proportion of goats in August.

Transport Methods. In 1993 and 1994, 56 and 65%, respectively, of successful hunters accessed their hunting area by airplane; the remainder used boats (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

Goat populations seem stable in Subunit 1B, but with possible low production in 1994, the population should be monitored closely in the upcoming year. I recommend no change in state regulations.

Prepared by:	Submitted by:
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Wildlife Biologist II	Regional Management Coordinator

Table. 1. Unit 1B summer aerial mount goat composition counts, 1991-94.

Regulatory Year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 Adults	Total Goats Observed	Goats /Hour
1991/92	67	(83)	14	(17)	0	21	81	35
1992/93	117	(70)	50	(30)	0	43	167	72
1994/95 (Aug. 1994)	90	(74)	31	(26)	0	34	121	35
1994/95 (June 1995)	339	(94)	21	(6)	0	16	360	32

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

Table 2. Unit 1B mountain goat harvest data by permit hunt, 1991-94.

Hunt No.	Regulatory Year	Permits Issued	Number Did Not Hunt	(%) Did Not Hunt	Number of Successful Hunters	(%) Successful Hunters	Males	(%)	Females	Total Harvest
RG001	1991/92	19	0	(0)	6	(32)	3	(50)	3	6
	1992/93	37	14	(38)	10	(43)	3	(30)	7	10
	1993/94	18	0	(0)	11	(61)	5	(45)	6	11
	1994/95	6	0	(0)	6	(100)	1	(17)	5	6
RG004	1991/92	140	77	(55)	11	(20)	7	(64)	4	11
	1992/93	178	116	(65)	18	(30)	14	(78)	4	18
	1993/94	147	81	(55)	25	(38)	19	(76)	6	25
	1994/95	144	64	(44)	28	(35)	19	(68)	9	28
Combined	1991/92	159	77	(48)	17	(29)	10	(59)	7	17
	1992/93	215	130	(60)	28	(35)	17	(61)	11	28
	1993/94	165	81	(49)	36	(43)	24	(67)	12	36
	1994/95	150	64	(43)	34	(40)	20	(59)	14	34

Table 3. Unit 1B mountain goat hunter residency and success, 1991-94.

	Successful					Unsuccessful					
Regulatory Year	Local[a] Resident	Non-Local Resident	Non-Resident	Total	(%)	Local[a] Resident	NonLocal Resident	Non-Resident	Total	(%)	Total Hunters
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
1993/94	18	16	2	36	(44)	32	13	1	46	(56)	82
1994/95	21	7	6	34	(40)	35	5	10	50	(60)	84

[a] Residents of Petersburg, Wrangell, and Kake.

Table 4. Unit 1B mountain goat harvest chronology, percent by time period, 1991-94.

	Harvest Periods										
Regulatory	August		September		October		November		December		Total
Year	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	Harvest
1991/92	3	(18)	8	(470	5	(29)	1	(6)	0	(0)	17
1992/93	11	(39)	10	(36)	4	(14)	0	(0)	3	(17)	28
1993/94	9	(25)	15	(41)	9	(25)	1	(3)	2	(6)	36
1994/95	11	(32)	8	(24)	8	(24)	2	(6)	5	(15)	34

Table 5. Unit 1B mountain goat harvest, percent by transport methods, 1991-94.

	Percent of Harvest						
Regulatory	Airplane		Boat		Other		Total Harvest
Year	*n*	(%)	*n*	(%)	*n*	(%)	
1991/92	7	(41)	8	(47)	2	(12)	17
1992/93	14	(50)	14	(50)	0	(0)	28
1993/94	20	(56)	16	(44)	0	(0)	36
1994/95	22	(65)	12	(35)	0	(0)	34

LOCATION

GAME MANAGEMENT UNIT: 1C (7,600 mi^2)

GEOGRAPHIC DESCRIPTION: That portion of the Southeast Alaska mainland from Cape Fanshaw to the latitude of Eldred Rock.

BACKGROUND

Mountain goats inhabited Southeast Alaska from southern refugia 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 inhabit most of the coastal range of Southeast Alaska where steep forested slopes broken by rock outcrops are common.

A popular species for both local hunters and international trophy hunters, mountain goat populations in areas easily accessible near Juneau have been significantly reduced from historical high numbers. Near Juneau, goat populations may have been reduced to low numbers early this century as mining activity increased. Sport hunting of the dwindling populations probably contributed to further declines. Low goat numbers prompted the Board of Game's decision to close the area between the Taku Glacier and Eagle Glacier/River to hunting in 1985. In an effort to boost local goat numbers, in the summer of 1989 we introduced mountain goats from the Whiting River to Mount Juneau, an area which formally supported goats. All of these goats, individually marked during the introduction, had apparently left the area by 1992. However, small numbers of mountain goats have been sighted both on Mt. Juneau and on Heintzelman Ridge above urban Juneau since the transplant. Goat sightings have also been reported from habitats near Juneau such as Sheep Mountain, Mt. Bullard, and Mt. McGinniss.

Guided hunts in Tracy and Endicott Arms at the southern end of the subunit have become a major factor in the Unit 1C goat harvest. This is one of few areas in the world where hunters may stay in comfort aboard large boats and make day hunts for goats along the steep cliffs lining these fiords. This use predominates late in the season, when snows force goats to lower elevations.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

1 Maintain goat densities so at least 30 goats per hour are seen during fall surveys from Eagle River/Glacier to the Antler River and in the Chilkat Range north of the Endicott River;

2 Maintain goat densities so at least 50 goats per hour are seen during fall surveys south of Taku Inlet; and

3 Retain the closure of the Chilkat Range south of the Endicott River until surveys reveal at least 80 goats in the area from William Henry Mountain to Tear Drop Lake.

METHODS

We gathered harvest data from registration permit returns for the 1993 and 1994 fall hunts. Population surveys were conducted during the reporting period from boats and aircraft.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Most information on mountain goat populations within Unit 1C came from comments gathered from hunters. Goat capture and telemetry flights made at 2 Juneau area mine sites gave some indication about populations near Juneau. Mountain goats probably are at medium densities over most of the range that is hunted, although some people have reported finding few goats in areas traditionally productive for hunters. These reports often mention abundant wolf sign, although mild weather could be contributing to low goat numbers at lower elevations during hunting seasons. Little sign of contagious ecthyma has been seen during the reporting period, although any facial lesion tends to be attributed to the disease by hunters. The "orf" outbreak that occurred in this subunit in the early 1990s has 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.

Limited inventories were conducted during the reporting period, including both aerial counts and a survey conducted from boats in Tracy and Endicott Arms (Table 1). No surveys were conducted in the Chilkat Range. Tracy and Endicott Arms were covered well in 1994, but no other areas were surveyed that year. Surveys of Tracy and Endicott Arms indicate the populations there are healthy.

MORTALITY

Harvest

Season and Bag Limit:

Subunit 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.
Subunit 1C, that portion draining into Stephens Passage and Taku Inlet between Eagle Glacier and River and Taku Glacier, and all drainages of the Chilkat Range	No open season	

south of the Endicott River

Remainder of Subunit 1C	Aug. 1-Nov. 30	One goat by registration permit only.

Hunter Harvest. Hunters took 89 goats during the reporting period, 47 in 1993 and 42 in 1994 (Table 2). Average harvest during the reporting period was higher than any year from 1988 to 1992. Males composed 80% of the harvest this period. This probably stems from the increase in guided hunts within the area. Registered guides are aware that females are counted more heavily against harvest guidelines and that it is in their interest to specialize in taking billies. The reported sex ratio of the harvest is unreliable because hunters are sometimes reluctant to admit to killing a nanny.

Permit Hunts. Registration Permit Hunts RG012 and RG013 have been covered under a single permit since the 1988 season. The number of permits issued continued to increase during the reporting period, with 157 and 168 being issued in 1993 and 1994, respectively (Table 3). Compliance with reporting requirements has been good.

Hunter Residency and Success. Although local residents accounted for the majority of hunters, nonresidents accounted for most of the harvest during the reporting period (Table 4). The success rate averaged 49% during the reporting period compared with 48% for the years 1988 through 1992. The number of successful nonresidents was greater during this reporting period than in previous years. In 1994 successful nonresidents outnumbered successful residents for the first time. This reflects the growing importance of guided hunts within the subunit.

Successful hunters averaged 2.8 days afield during the reporting period, an effort identical to the mean effort of successful hunters from 1990 to 1992 (Table 3). Unsuccessful hunters averaged 2.9 days 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 reflects the availability of goats at lower altitudes and hunter desire to take an animal in winter pelage.

Transport Methods. Boats have been the primary means of transportation for successful hunters. This trend continued during the reporting period, with 74% of successful hunters using them (Table 6). Other means included airplanes, highway vehicles, and foot. The latter 2 means were used near Juneau.

The use of commercial services increased during this reporting period compared with use in 1991 and 1992 (Table 6). Forty-five percent of hunters used a commercial service during the reporting period compared with only 28% during 1991 and 1992. This reflects the requirement for all nonresident hunters to use a guide. Commercial transportation to the field was used by 30% of the hunters using commercial services; this percentage is not surprising since most huntable areas are removed from human settlements.

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 the deaths of radiocollared goats in a study conducted near Haines, Alaska could be attributed to falls (Dinneford pers commun). Several radiocollared study goats near Juneau died in circumstances that may have involved accidents, although abundant wolf sign at carcass locations added to our uncertainty of the cause of those deaths. We received reports of wolf packs in alpine areas close to goat herds near Juneau during summer 1992. During winters of 1993 and 1994, we sighted wolves near goat herds.

HABITAT

Assessment

Winter and summer goat range within Unit 1C is extensive and goat numbers are probably well below carrying capacity in most areas of the subunit.

Some loss of critical winter range could be expected if proposed mining projects in Unit 1C are developed. Whereas the A-J Mine project may have adverse effects on goats residing in the area, the decision to eliminate Sheep Creek valley as a tailings disposal site has lessened the potential impact of this project. Although we have been following radiocollared goats in the A-J Mine area for 5 years, we have been unable to document goat use of habitat adjacent to the mine portal.

Development of the Kensington Mine north of Berners Bay would remove some of the old-growth timber which serves as winter goat habitat. Activities at the mine may displace goats' using the Lion's Head Mountain area. Monitoring of radiocollared goats in the Kensington Mine area has shown that goats use the areas directly adjacent to the mine.

CONCLUSIONS AND RECOMMENDATIONS

Since aerial surveys were not completed in the northern part of the subunit during the reporting period, it is unknown if management objectives regarding goat densities were met. In Tracy/Endicott arms management objectives were met. Hunter effort and success was greater than preceding seasons. In both years hunters killed primarily males.

Continued efforts to do aerial surveys within the subunit should be made, since survey information is sparse. As weather and funding permit, surveys should be done to determine population composition and status. Predation by wolves and habitat quality should be considered possible limiting factors in both closed areas. Goats added to the Juneau area population by the Mt. Juneau reintroduction have not been obvious contributors to population expansion, although goat numbers near Juneau have increased.

Easily accessed areas such as Tracy and Endicott Arms may be receiving heavy hunting pressure compared with the rest of the subunit. For this reason, we use fine scale management of goat populations through harvest guidelines for hunt subareas for northern Southeast Alaska. This allows us to monitor harvest pressure in discrete areas within permit hunt boundaries. To minimize the amount of paper carried by the hunter, we will continue to administer hunts in Unit 1C under one permit.

Although the percentage of nannies in the kill was low during the reporting period, continued emphasis should be placed on directing hunting pressure away from females. Harvest guidelines established for each permit hunt area will continue to be used and should further encourage hunters to select for males.

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Table 1. Unit 1C mountain goat composition counts, 1986-94.

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	Percent Kids	Goats per hour
1986	192	55	247	29	22	42
1987			No Survey			
1988	81	26	107	32	24	26
1989	514	169	683	33	25	51
1990-92			No Survey			
1993[1]	171	4	175	2	2	17
	62	15	77	25	19	77
1994	370	79	370	21	18	82

[1] The first survey was conducted from a boat in early May at Tracy and Endicott Arm. The second survey, conducted from a PA-18 aircraft in October, was done in the Kensington Mine area.

Table 2. Unit 1C annual goat harvest, 1988-94.

Year	Males	Females	Unknown	Total
1988	14	19	3	36
1989	28	11	3	42
1990	19	10	1	30
1991	14	8	0	22
1992	27	12	0	39
1988-92 Mean				34
(%)	(60)	(36)	(4)	
1993	35	12	0	47
1994	36	6	0	42
1993-94 Mean			---	45
(%)	(80)	(20)		

Table 3. Unit 1C hunter effort and success, 1990-94.

		Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	Permits Issued	No. Hunters	Total Days	Avg. Days	No. Hunters	Total Days	Avg. Days	No. Hunters	Total Days	Avg. Days
1990	140	30	82	2.7	25	57	2.5	55	139	2.7
1991	145	22	48	2.2	41	114	2.8	63	162	2.6
1992	151	39	124	3.2	35	74	2.1	74	198	2.7
1990-92 Mean	145	30	85	2.8	34	82	2.4	64	166	2.6
1993	157	47	135	2.9	50	136	2.7	97	271	2.8
1994	168	42	114	2.7	41	132	3.2	83	246	3.0
1993-94 Mean	163	45	125	2.8	46	134	2.9	90	259	2.9

Table 4. Unit 1C hunter success by community of residence, 1988-94.

		Successful Hunters			Unsuccessful Hunters		
Year	Percent Success	Unit Resident	Other AK	Non-Resident	Unit Resident	Other AK	Non-Resident
1988	45	30	3	3	39	2	3
1989	53	25	9	8	32	2	3
1990	55	16	4	10	20	4	1
1991	35	14	3	5	34	4	3
1992	53	22	5	12	27	8	0
1988-92 (%)	(48)	(64)	(14)	(22)	(84)	(11)	(5)
1993	48	22	4	21	40	7	3
1994	51	16	3	23	29	7	5
1993-94 (%)	(49)	(43)	(8)	(49)	(76)	(15)	(9)

Table 5. Unit 1C transport methods used by successful hunters, 1988-94.

Year	Airplane		Boat		Foot		Hwy. Veh.		Other	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
1988	5	(15)	26	(79)	0	(0)	2	(6)	0	(0)
1989	10	(24)	25	(59)	0	(0)	2	(3)	5	(12)
1990	2	(7)	26	(87)	2	(7)	0	(0)	0	(0)
1991	3	(14)	19	(86)	0	(0)	0	(0)	0	(0)
1992	7	(18)	32	(82)	0	(0)	0	(0)	0	(0)
1988-92 (%)		(16)		(78)		(1)		(2)		(3)
1993	7	17	35	85	1	2	4	10	0	0
1994	9	21	31	74	0	0	2	5	0	0
1993-94 (%)		(18(		(74)		(1)		(7)		(0)

Table 6. Unit 1C commercial services used by hunters, 1991-94.

Year	Unit Residents		Other AK Residents		Nonresidents		Total Use		Registered Guide	Transport	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1991	21	3	1	1	0	7	22	11	5	6	0
1992	38	4	6	2	2	10	46	16	7	9	0
1991-92 (%)	(90)	(10)	(70)	(30)	(11)	(89)	(72)	(28)	(44)	(66)	---
1993	36	14	4	4	2	21	42	39	21	17	1
1994	38	4	7	1	1	27	46	33	28	4	0
1993-94 (%)	(80)	(20)	(69)	(31)	(5)	(95)	(55)	(45)	(69)	(30)	(1)

LOCATION

GAME MANAGEMENT UNIT: 1D (2,700 mi^2)

GEOGRAPHIC 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 hunts (RG025, RG026, and the "Skagway pie" area formerly designated as Hunt 804) in Unit 1D. The former hunt area 804 is the smallest of the three areas, bounded by the Taiya River, the Yukon and White Pass Railroad, and the Canadian border. This area was closed by Board of Game action in 1984 because of an apparent sharp decline in goat numbers as evidenced by fewer sightings, reduced hunter success, and a greater proportion of females in the harvest. Aerial composition counts conducted between 1983 and 1992 indicated this population had not recovered despite the closure. In the rest of the subunit, 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 increase hunting pressure and illegal harvest. Additional hunting pressure and ability to access previously unhunted areas were considered as detrimental to goat populations as the habitat loss resulting from logging and mining.

MANAGEMENT OBJECTIVES

MANAGEMENT OBJECTIVES

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

- Hunt RG804 (Skagway) - Increase population to 100 animals.
- Hunt RG025 (Haines North) - Increase estimated population from 600 to 1000 goats. Maintain hunter success of 25%.
- Hunt RG026 (Haines South) - Increase estimated population from 300 to 500 goats. Maintain hunter success of 25%.

METHODS

In 1993 ADF&G personnel conducted aerial surveys within the subunit. During 1994 extensive surveys of the unit were conducted by Bureau of Land Management and ADF&G personnel. Harvest parameters, including hunting pressure and hunter success rates, were determined for areas RG025 and RG026 jointly, as a single registration permit was used for both hunts.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population status is difficult to estimate with occasional surveys which were not necessarily in identical areas. Survey results vary extensively year to year for most areas (Tables 1a, 1b, and 1c). Some of these variations are due in part to the intensity and scope of the surveys in an area. For example, surveys of the Tsirku River and Takhin Ridge area may consist of flights only on the Tsirku Ridge, South Takhin Ridge only, both the North and South Takhin Ridges, or the area in its entirety (Table 1c). Although some differences in the survey results for identical areas are most certainly related to survey conditions, the degree to which a survey is influenced is unknown.

Historical data indicates that in easily accessible areas, such as Hunt 804, hunting pressure has the potential to reduce goat numbers rapidly (Table 1a). Despite being closed to hunting since 1987, this area has shown no significant population increase. A portion of the Takshanuk Mountains in Hunt area 025 is bordered by highways and is readily accessible. Although the number of goats observed in the Takshanuk Mountains (Table 1b) is consistent with previous surveys, fewer goats were observed per hour than in any previous year. Since other areas in northern Southeast Alaska have exhibited low growth rates similar to that of Hunt 804 even after several years of protection, this area merits yearly monitoring.

Population Size

A total of 976 goats were counted in Unit 1D in 1994. Of the total, 16, 549, and 411 goats were enumerated in hunt areas 804, 025, and 026, respectively (Tables 1a, 1b, and 1c). Although only about one-half of Hunt 804 was surveyed, the low number of goats seen indicates the population remains low.

MORTALITY

Harvest

Season and Bag Limit:

Hunt 804	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	
Hunt 025	Unit 1D, that portion lying north of the Katzehin River and east of the Haines Highway.	Sept. 15-Nov. 30	One goat by registration permit only.

Hunt 026	Remainder of Unit 1D.	Aug. 1 - Dec 31	One goat by registration permit only.

Board of Game Actions and Emergency Orders. We used harvest guidelines to establish safe harvest levels during the reporting period. In both 1993 and 1994, the goat kill in areas accessed from the Haines Highway and roads around Chilkoot Lake approached guideline levels. Emergency orders were used to close the season for that portion of Unit 1D between the Haines Highway and the Ferebee River/Glacier during both years of the reporting period. In 1993 the season was closed on November 3; in 1994 the season closed November 23.

Hunter Harvest. Hunters harvested 50 goats during the reporting period, 25 in each year (Table 2). In 1993, 15 were male, 8 were female, and 2 animals were reported as unknown sex. In 1994 12 males, 12 females, and 1 goat of unknown sex were taken. Harvest during the reporting period was similar to the 1988-1992 mean (Table 2).

Permit Hunts. Mountain goat hunting within the subunit occurred under 2 registration permit hunts during the period. Hunts RG025 and RG026 were combined on a single permit (a practice that began before 1991) to reduce hunter confusion. Hunt reports were integrated for the 2 hunts. At this time the main reason for maintaining 2 hunts in the subunit is to allow different opening and closing dates to be used, in an attempt to adjust for relative differences in ease of access. Hunt 804, covering the area between the Taiya River and the White Pass & Yukon Railroad, remained closed.

Hunter Residency and Success. The number of permittees for Unit 1D increased during this reporting period, with 182 and 171 permits being issued in 1993 and 1994, respectively (Table 3). A mean of 26% of the hunters were successful during the reporting period (Table 4). This is somewhat lower than the 1988-1992 mean of 30%.

The majority of goat hunters in Unit 1D are local residents. In 1993, 64% and 72% of harvested goats were taken by residents of the subunit. Very few hunters are nonresidents.

Harvest Chronology. Goats can be hunted in Unit 1D from the first of August until the end of December. Most goats have been taken from September into November. Emergency orders were issued in 1991 and 1992, closing an easily accessible portion of Hunt RG025 for the later part of the season.

Transport Methods. Boats and highway vehicles are the transportation means used most often (Table 5). Of successful hunters, 54% and 30% reported using boats or highway vehicles, respectively, during the reporting period. This compares with the 1990-1992 mean of 51% and 28% for boats and highway vehicles, respectively.

Most goat hunters do not use commercial services in Unit 1D (Table 6). During the reporting period, 4 of the 50 successful hunters reported using a commercial service. One hunter used a guide, 2 sought commercial transport to the field, and 1 reported using some other commercial service.

CONCLUSIONS AND RECOMMENDATIONS

Finer scale management of mountain goats is becoming necessary as hunting pressure increases. The 2 open permit hunt areas (025 and 026) 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. Careful population and harvest monitoring is necessary; closures may be required to avoid excessive harvest in areas with concentrated hunting pressure. Finally, consistent surveys are needed to improve population estimates and/or monitor population trends within the subunit. The importance of surveys will continue to increase as management becomes more area-specific and pressure from activities other than hunting increases.

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Table 1a. Unit 1D mountain goat composition counts, Hunt Area 804.

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	(%) Kids	Goats/hour
1981	73	22	95	30	(23)	60
1983	26	5	31	19	(16)	56
1984	27	13	40	48	(33)	36
1985	29	3	32	10	(9)	25
1986	13	5	18	38	(28)	28
1987	7	0	7	0	(0)	55
1988			No Survey			
1989	17	6	23	35	26	35
1990-91			No Surveys			
1992	1	0	1	0	0	3
1993			No Survey			
1994[1]	11	5	16	45	31	20

[1] Skagway Pass side only, goats/hour is for the entire survey which included a portion of Hunt Area 025.

Table 1b. Unit 1D mountain goat composition counts, Hunt Area 025.

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	(%) Kids	Goats/hr
1990-91			No Surveys			
	Klukwah Mt. (K) and Ferebee Gl./River (F) to Chilkoot Inlet					
1982 (K,F)	33	14	47	42	(30)	10
1983 (K)	64	12	76	19	(16)	118
1989 (K)	26	9	35	35	(26)	60
1993			No Survey			
1994 (K,F)[1]	111	21	131	19	(16)	45
			Takshanuk Mtns. (E, W)			
1982 (E)	10	1	11	10	(9)	19
1983 (E,W)	48	9	57	19	(16)	29
1985 (W)	30	2	32	7	(6)	30
1989 (E,W)	40	16	56	40	(29)	34
1993 (W)	27	7	35	26	(20)	59
1994 (E,W)[1]	48	5	53	10	(9)	17
	North of the Klehini River and West of the Chilkat River					
1974	9	1	10	11	(10)	16
1975	33	5	38	15	(13)	30
1989	23	6	29	26	(21)	70
1993			No Survey			
1994[1]	58	4	62	7	(6)	69
	East of Ferebee Gl./River (F), Chilkoot/Taiya (C) Inlet					
1982 (F)	13	9	22	69	(41)	23
1983 (F,C)[2]	86	19	105	22	(18)	61
1986 (F,C)	35	6	41	17	(15)	21
1987 (C)	16	1	17	6	(6)	19
1989 (F,C)	39	17	56	44	(30)	40
1992 (F,C)	30	10	40	33	(33)	19
1993			No Survey			
1994 (F,C)[1,2]	119/130	21/33	140/163	18/25	(15/20)	46/59

[1] First survey listed conducted by the Bureau of Land Management in a PA-18 aircraft; this survey does not overlap with the ADF&G survey.

[2] Included the Nourse River area.

[3] Goats/hour includes two surveys, one at 98 goats/hour (survey included a portion of Hunt Area 026) and one at 20 goats/hour (survey included a portion of Hunt Area 804).

Table 1c. Unit 1D mountain goat composition counts, Hunt Area 026.

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	(%) Kids	Goats/hour
1988			No Survey			
1990-92			No Surveys			
			Tsirku River (T) and Takhin Ridge (N,S)			
1983 (T)	67	23	90	34	(26)	29
1985 (S)	41	13	54	32	(24)	69
1987 (N,S)	14	4	18	29	(22)	11
1989 (N,S)	111	33	144	30	(23)	126
1993 (N,S)	100	21	121	21	(17)	112
1994 (T,N,S)[2,3]	129	29	156	22	(19)	48
			Remainder of Area West of Chilkoot Inlet			
1974	39	3	42	8	7	72
1975	20	9	29	45	31	---
1993			No Survey			
1994[1]	184	32	213	17	15	49
			East of Chilkoot Inlet			
1993			No Survey			
1994[4]	32	10	42	31	24	98

1 First survey listed conducted by the Bureau of Land Management in a PA-18 aircraft.
2 Survey consisted of a significantly larger area than previous surveys represented.
3 The amount of time spent counting goats is not available.
4 Goats/hour is for entire survey which included a portion of Hunt Area 025.

Table 2. Unit 1D annual goat harvest, 1988-94.

Year	Males	Females	Unknown	Total
1988	9	10	0	19
1989	14	8	0	22
1990	18	12	1	31
1991	18	5	2	25
1992	9	11	3	23
1988-92 Mean				24
(%)	(56)	(39)	(5)	
1993	15	8	2	25
1994	12	12	1	25
1993-94 Mean				25
(%)	(54)	(0)	(6)	

Table 3. Unit 1D hunter effort and success, 1990-94.

		Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	Permits Issued	No. Hunters	Total # Days	Avg. # Days	No. Hunters	Total # Days	Avg. # Days	No. Hunters	Total # Days	Avg. # Days
1990	193	31	56	1.8	71	116	1.6	102	172	1.7
1991	154	25	36	1.5	48	115	2.5	73	151	2.2
1992	130	23	35	1.5	47	115	2.4	70	150	2.1
1990-92 Mean	159	26	49	1.6	55	115	2.1	82	158	2.0
1993	182	25	54	2.2	67	158	2.5	92	212	2.4
1994	171	25	64	2.6	79	168	2.3	104	232	2.4
1993-94 Mean	177	25	59	2.4	73	163	2.4	98	222	2.4

Table 4. Unit 1D hunter success by community of residence, 1988-94.

		Successful Hunters			Unsuccessful Hunters		
Year	Percent Success	Unit Resident	Other AK	Non-Resident	Unit Resident	Other AK	Non-Resident
1988	25	12	1	6	43	13	1
1989	29	20	2	0	41	13	0
1990	30	20	9	2	60	11	0
1991	34	21	4	0	32	16	0
1992	33	21	2	0	38	8	1
1988-92 (%)	(30)	(78)	(15)	(7)	(77)	(22)	(1)
1993	27	17	6	2	51	16	0
1994	24	15	9	1	54	25	0
1993-94 (%)	(26)	(64)	(30)	(6)	(72)	(28)	(0)

Table 5. Unit 1D transport methods used by successful hunters, 1990-94.

Year	Airplane Total	(%)	Boat Total	(%)	Foot Total	(%)	Hwy Vehicle Total	(%)	Other Total	(%)
1990	0	(0)	17	(55)	5	(16)	7	(23)	2	(6)
1991	0	(0)	13	(57)	1	(4)	9	(39)	0	(0)
1992	0	(0)	9	(41)	7	(32)	5	(23)	1	(5)
1990-92 (%)		(0)		(51)		(17)		(28)		(4)
1993	3	(12)	12	(48)	0	(0)	8	(32)	2	(8)
1994	0	(0)	15	(60)	3	(12)	7	(28)	0	(0)
1993-94 (%)		(6)		(54)		(6)		(30)		(4)

Table 6. Unit 1D commercial services used by hunters, 1991-94.

Year	Unit Residents		Other AK Residents		Non-Residents		Total Use		Registered Guide	Transport	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1991[1]	18	2	7	0	0	0	25	2	0	0	2
1992	48	0	9	0	0	0	57	0	0	0	0
1991-92 (%)	(97)	(3)	(100)	(0)	---	---	(98)	(2)	---	---	(100)
1993	57	2	14	0	2	0	73	2	0	1	1
1994	64	0	28	1	0	1	92	2	1	1	0
1993-94 (%)	(98)	(2)	(98)	(2)	(67)	(33)	(98)	(2)	(25)	(50)	(25)

[1] Only 37% of hunters reported whether they used, or did not use, commercial services in 1991; data prior to 1991 is even more sparse.

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5,800 mi^2)

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

BACKGROUND

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

In the mid-1950s, goats were transplanted to Chichagof Island (Burris and McKnight 1973), but there is no huntable population. 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. Goats are increasing their numbers and extending their distribution on Baranof Island.

Severe winters, that reduced goat numbers in the past, have not occurred in recent years. Throughout most goat habitat, hunter access is difficult and weather plays an important role in regulating harvest.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1. Maintain a population sufficient to provide an annual harvest of at least 35 goats.
2. 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 obtain 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 from the reports includes area and days hunted, kill date, transportation used, and use of commercial services. Successful hunters are also encouraged to bring in the horns from their goat for age determination.

A single aerial population survey was accomplished during this report period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During a fall 1994 aerial survey of goat habitat on northern Baranof Island, we observed 717 goats. In 1989, 523 goats were observed in essentially the same area. The ratio of kids to adults(24.3:100) was high, indicating reproductive success has resulted in population growth. It is

probable the total population exceeds Young's (pers commun) 1991 estimate of 1000 goats on Baranof Island.

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 goat hunting were the same as State regulations.

Hunter Harvest. In 1993 we issued 313 permits, and hunters harvested 57 goats. In 1994, we issued 331 permits and hunters took 52 goats. The percent of permittees who actually hunted each year was 52% and 51%, respectively. For those who hunted, 35% were successful in 1993 and 31% successful in 1994. Five-year averages for 1990-94 are: permits issued, 308; hunters afield, 141; and reported harvest, 46 goats. Hunters reported sex of goats as 77% males in 1993 and 62% males in 1994. Given the population growth, 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). Now that all non-Alaskans 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 taken between August and October. In 1994 December snow falls enhanced goat availability and led to significant harvest.

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 occurs in high harvest years.

CONCLUSIONS AND RECOMMENDATIONS

The interest since 1984 in hunting mountain goats on Baranof Island has been fairly stable. Harvest levels relate closely to actual hunting effort which, in itself, is most affected by weather. Although survey data are limited, 1994 survey data and public comments indicate the population is still growing and extending its range. I recommend no change in state regulations.

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Table 1. Unit 4 mountain goat harvest data for Registration Permit Hunt RG150, 1990/91-1994/95.

Reg. Year	Permits issued	Did not report	Did not hunt	Unsuccessful hunters	Successsful hunters	Male	Female	Unknown	Illegal	Total harvest
1990/91	306	3	175	86	42	24	17	1	0	42
1991/92	300	5	181	85	29	18	11	0	0	29
1992/93	290	2	144	94	50	30	19	1	0	50
1993/94	313	3	148	105	57	42	15	1	0	57
1994/95	331	2	170	107	52	32	20	0	0	52

Table 2. Unit 4 goat hunter residency and success for Registration Permit RG150, 1990/91-1994/95.

	Successful				Unsuccessful				
Reg. year	Local[a] resident	Nonlocal resident	Nonresident	Total	Local[a] resident	Nonlocal resident	Nonresident	Total	Total hunter
1990/91	37	2	3	42	75	6	5	86	128
1991/92	26	2	1	29	74	9	2	85	114
1992/93	45	2	3	50	81	12	1	94	144
1993/94	47	8	2	57	91	9	5	105	162
1994/95	45	3	4	52	88	17	2	107	159

[a]Resident

Table 3. Unit 4 goat harvest chronology for Registration Permit RG150, 1990/91-1994/95.

	Harvest Period					
year	August	September	October	November	December	Total
1990/91	7	11	15	3	6	42
1991/92	6	5	10	3	5	29
1992/93	17	11	8	9	5	50
1993/94	16	16	16	1	8	57
1994/95	13	8	12	3	16	52

Table 4. Unit 4 goat harvest by transport method for Registration Permit Hunt RG150, 1990/91-1994/95.

year	Airplane	Boat	Walked	Other	Total
1990/91	10	29	3	0	42
1991/92	5	20	3	1	29
1992/93	13	33	4	0	50
1993/94	14	38	5	0	57
1994/95	12	34	0	6	52

LOCATION

GAME MANAGEMENT UNIT: 5 (5,800 mi^2)

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf of Alaska 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 the present northern and western limits of distribution may be the result of a relatively recent arrival in the area. Thus, unlike other large mammals in the Yakutat Forelands area (i.e., moose and bear), mountain goats may have come up the coast rather than down the Tatshenshini/Alsek River corridor.

Alaska natives used mountain goat hides for clothing and other domestic purposes. Recreational hunting occurred 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 counted 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 Unit 5A during the 1980s and anecdotal accounts from guides, pilots, and hunters indicate goat numbers are higher than recorded in the early 1970s.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Increase the estimated population from 850 to 1250 goats
- Maintain a hunter success rate of 25%

METHODS

No aerial surveys were conducted within the unit 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. Hunters were required to obtain registration permits from ADF&G offices to allow for inseason monitoring of harvest effort and intensity. Information collected from registration reports included date of hunt and number of days afield, method of transportation and commercial services used (for all hunters), and sex and date of kill (for successful hunters). Anecdotal information was gathered from hunters, ADF&G field personnel, and other agencies.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Surveys conducted in 1989 indicated the population was increasing, as the number of goats seen per hour during surveys increased (Table 1). The Unit 5 population is near 1000 animals. No information has been received that would indicate population declines, although if wolf numbers are increasing as believed, predation pressure on goats may be increasing.

MORTALITY

Harvest:

Season and Bag Limit.

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

Hunter Harvest. Hunters took 18 goats during the reporting period, 6 in 1993 and 12 in 1994. The proportion of males harvested was 50% in 1994 and 56% over the reporting period, substantially less than the previous 5 years (Table 2). Goat harvest has declined since 1983, when the third highest annual harvest of 23 was recorded. The reduction in kill seems related more to decreased effort rather than reduced success rate or a decline in goat numbers.

Illegal harvest is unknown.

Hunter Residency and Success. The hunter success rate averaged 62% during the reporting period, substantially higher than the 1988-1992 mean success rate (Table 3). All successful hunters were nonresidents in 1993; however, of 12 successful hunters in 1994 8 were local residents and only 1 was a nonresident. The number of Alaskan residents hunting increased during this period, outnumbering the nonresidents. Moreover, local residents replaced nonresidents as the largest user group, approaching a mean of 50% during the reporting period. Nonresidents still account for a significant portion of the effort and harvest, with nonlocal Alaskan effort and harvest being the smallest. The relatively low harvest by nonlocal Alaskans is partly due to the presence of other huntable goat populations in other parts of the state. The requirement that nonresidents be accompanied by an guide/outfitter is not believed to have had an effect on goat hunting in the Yakutat area.

Permit Hunts. We issued 39 and 41 registration permits during 1993 and 1994, respectively (Table 4). This is comparable to the 1988-1992 mean of 41. A mean of 14 hunters hunted each year of the reporting period, less than during 1988-1992. 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. Harvest over the entire reporting period followed this pattern. However, harvest in 1993 was completed by mid-October, whereas harvest in 1994 did not begin until October.

Transport Methods. The trend away from aircraft and toward boats began in 1991 and continues this reporting period (Table 5). Boats and aircraft were used by 55% and 22% of the successful hunters in the 2 report period seasons. Snowmachines were used by 17% of the successful hunters in 1994, local residents hunting during December. Use of snowmachines will probably continue to increase with increasing local effort late in the season.

CONCLUSIONS AND RECOMMENDATIONS

We should continue efforts to obtain population information through aerial composition counts. Although recent population information is not available, hunting effort is quite low and goat populations are moderately high, able to support additional harvest. However, areas easily accessible to snowmachine within Unit 5A late in the season warrant increased attention to prevent localized population depressions.

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Table 1. Unit 5 mountain goat composition counts, 1986-94.

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	Percent Kids	Goat/hour
1986	36[1]	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
1990-94	No Surveys					

[1] Incomplete survey

Table 2. Unit 5 annual goat harvest, 1988-94.

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
1988-92 Mean			---	8
(%)	(68)	(32)		
1993	4	2	0	6
1994	6	6	0	12
1993-94 Mean			---	9
(%)	(56)	(44)		

Table 3. Unit 5 hunter success by community of residence, 1988-94.

Year	Percent Success	Successful Hunters: Unit Resident	Successful Hunters: Nonlocal	Successful Hunters: Non-resident	Unsuccessful Hunters: Unit Resident	Unsuccessful Hunters: Nonlocal res	Unsuccessful Hunters: Non-resident
1988	26	0	2	3	5	1	8
1989	42	2	0	6	4	3	4
1990	43	3	4	6	3	11	3
1991	47	2	5	1	1	2	6
1992	31	2	2	0	1	2	6
1988-92 (%)	39	26	33	41	23	32	45
1993	50	0	0	6	3	0	3
1994	71	8	3	1	2	1	2
1993-94 (%)	62	44	17	39	45	10	45

Table 4. Unit 5 hunter effort and success, 1988-94.

Year	Permits Issued	Successful Hunters: No. Hunters	Successful Hunters: Total no. Days	Successful Hunters: Avg. no. Days	Unsuccessful Hunters: No. Hunters	Unsuccessful Hunters: Total no. Days	Unsuccessful Hunters: Avg. no. Days	Total Hunters: No. Hunters	Total Hunters: Total no. Days	Total Hunters: Avg. no. Days
1988	44	5	16	3.2	14	40	3.1	19	56	3.1
1989	40	8	12	1.5	11	38	3.8	19	50	2.8
1990	46	13	42	3.2	17	80	4.7	30	122	4.1
1991	42	8	22	2.8	9	16	2.7	17	38	2.7
1992	35	4	8	2.0	9	29	3.2	13	37	2.8
1988-92 Mean	41	8	20	2.5	10	41	4.1	20	61	3.1
1993	39	6	12	2.0	6	25	4.2	12	37	3.1
1994	41	12	28	2.3	5	12	2.4	17	40	2.4
1993-94 Mean	40	9	20	2.2	6	19	3.4	14	39	2.7

Table 5. Unit 5 transport methods by successful hunters, 1993-94.

	Airplane		Boat		Snowmachine		Highway Vehicle		Foot	
Year	Total	%	Total	%	Total	%	Total	%	Total	%
1988	4	80	0	0	0	0	1	20	0	0
1989	5	62	3	38	0	0	0	0	0	0
1990	11	85	0	0	2	15	0	0	0	0
1991	4	50	4	50	0	0	0	0	0	0
1992	2	50	2	50	0	0	0	0	0	0
1988-92 (%)	(68)		(24)		(5)		(3)		(0)	
1993	4	66	1	17	0	0	0	0	1	17
1994	0	0	9	75	3	25	0	0	0	0
1993-94 (%)	(22)		(55)		(17)		(0)		(6)	

Table 6. Unit 5 commercial services used by hunters, 1993-94.

	Unit Residents		Other AK Residents		Non-Residents		Total Use		Registered
Year	No	Yes	No	Yes	No	Yes	No	Yes	Guide
1989[1]	5	0	0	3	1	9	6	12	12
1990[1]	0	0	0	0	0	6	0	6	6
1991	2	1	2	4	0	6	4	11	6
1992	3	0	1	1	1	7	5	8	6
1989-92 (%)	92	8	28	72	7	93	29	71	100
1993	0	0	0	0	0	6	0	6	6
1994	8	0	0	1	0	3	8	4	4
1993-94 (%)	100	0	0	100	0	100	44	66	100

[1] Only use of guided services was collected

LOCATION

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

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Mountain goats are endemic to 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 in 1938 (ADF&G files), 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. Estimated current population is 2790.

Several significant events 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 small 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
- To achieve a minimum of 70% males in the harvest

METHODS

We did aerial surveys to estimate population size, trend, and composition in permit hunt areas (Figs. 1 and 2). Individual hunt areas were usually surveyed every 2 to 3 years during August and September. 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 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 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. Flights were made in the morning within 3 hours after sunrise or in the evening within 3 hours of sunset. Flight lines 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. Observations were generally made on the side of the aircraft toward steep topography. Searches were completed drainage by drainage to avoid duplicate counts and to 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 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 most survey results by hunt area, subunit and unit. We also summarized data from Unit 6D into western and eastern portions. The line dividing Unit 6D into western and eastern portions was drawn from Hinchinbrook Entrance through Valdez Arm, Port Valdez, and Lowe River. Summaries included goats observed, number of goats older than kids, percent older goats, number of kids, percent kids, and kids:100 older goats. Goat population was estimated by assuming 70%, 80% and 90% of goats were observed during surveys that were poor, good or excellent quality, respectively. The population was estimated during years when surveys were not completed by considering most recent surveys, harvest, and probable productivity and survival.

Harvest was monitored through permit hunt reports that we required from all hunters. Hunters not reporting were sent up to 2 reminder letters. 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 summarized most harvest results by hunt area, subunit, and unit. We also summarized data from Unit 6D into western and eastern portions. In addition to standard ADF&G harvest parameters, a weighted total harvest was calculated by multiplying number of males taken by 1 and number of females and unknowns taken by 2. Weighted harvest rate was also determined for each subunit by dividing weighted total harvest by the estimated population in permit hunt areas.

A conservative maximum allowable harvest (MAH) for each year was established for each permit hunt area. It was calculated as a percentage of goats observed during the most recent survey. The percent applied ranged from 2.5% to 6.3%, 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 2.5% to 3.0% of goats observed in the last survey. Permit hunt areas were closed by emergency order if weighted harvest reached MAH.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We completed aerial surveys in all or part of 12 permit hunt areas in all subunits except 6C during this reporting period, counting 1621 goats (Table 1). Flights were a joint effort with the USFS, Cordova and Glacier Ranger Districts, who helped fund aircraft charter and provided an observer. We estimated 3001 goats in Unit 6 during 1990/91 and 2790 in 1994/95.

Population size and trend varied among subunits over the past 5 years. Unit 6D (West) had the largest number and was relatively stable. Units 6A, 6B and 6D (East) all had fewer goats than Unit 6D (West), and decreased by 27%, 23% and 10%, respectively. Unit 6C also had fewer goats than Unit 6D (West), and surveys completed in 1995/96 indicated an increasing population. No permit hunts were opened in Unit 6C since 1989.

Data for the past 8 years reveals the long-term trends in subunits (Fig. 3). Unit 6D (West) increased by 33% between 1987/88 and 1992/93, then decreased slightly during the following 2 years. Units 6A, 6B and 6D (East) showed continuous declines of 47%, 40%, and 31% respectively. Unit 6C increased 100%.

Results of aerial goat surveys can be extremely variable (Ballard 1975 and Fox 1977). We feel variability was reduced by standardizing methods and by surveying during excellent or good conditions. Of 23 sample units completed, 12 were rated as excellent, 11 were good, and none was poor.

Population Composition

The kid-to-older goat ratio and percent kids for all areas counted during 1993/94 was 21:100 and 17%, respectively (Table 1). These values for 1994/95 were 20:100 and 16%, respectively. These were lower than values from the previous 3 years.

Kid-to-older goat ratios during 1993/94 in Units 6A, 6B, 6D (East) and 6D (West) were 19:100, 22:100, 25:100 and 20:100, respectively. Percent kids in those subunits were 16%, 18%, 20% and 18%, respectively. Kid-to-older goat ratios during 1994/95 in Units 6A, 6B, and 6D (East) were 27:100, 20:100 and 18:100, respectively. Percent kids were 22%, 17% and 16%, respectively. No data were collected in Unit 6D (East) during 1994/95. Compared with the previous 3 years, both kid-to-older goat ratios and percent kids in Units 6A and 6D (east) were generally lower, and Units 6B and 6D (West) showed little change.

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, 6B, and 6D (East), where percentages of kids were 16-25%, 17-21% and 16-21%, respectively. During the same period, numbers were stable or slightly increasing in Unit 6D (West), where percent kids was 18-20%. On the Kenai Peninsula, percent kids were 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 had 17% kids (Smith and VanDaele 1987).

Differences between Unit 6 and other areas in southcentral Alaska that may account for this lack of comparability were poorly understood. Hunter harvest was conservative in all areas. However, differences in winter conditions and wolf predation could have 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. Permit hunts were opened in all subunits, except 6C.

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

Nine emergency orders were issued, closing 11 registration permit hunts. During 1993/94, hunt RG220 was closed before any goats were taken because surveys indicated too few goats to support a harvest. Additional closures were made when weighted harvest reached MAH in RG206, RG242, RG249, and RG266. During 1994/95, hunt RG212 was closed before any goats were killed because of low numbers seen during surveys. Other closures were made when weighted harvest reached MAH in hunts RG226, RG242, RG249, RG252 and RG266.

Hunter Harvest. Unweighted reported harvest was 52 and 53 during 1993/94 and 1994/95, respectively (Table 2). Weighted harvest during each year was 69. During 1993/94 and 1994/95, MAH was 73 and 74 goats, respectively. Among permit areas, weighted harvest reached MAH in 9 of 16 hunts that were open during the 2 regulatory years. Reported take included 35 (67%) males and 17 (33%) females during 1993/94. In 1994/95, the sex composition was 37 males (70%) and 16 (30%) females. These parameters changed little over the past 5 years. The exception was higher total harvest and MAH during 1990/91 than during the following 4 years.

Major changes occurred in 2 subunits over the past 5 years. In Unit 6D(West), total weighted harvest and MAH were increased by 17% and 45%, respectively. These increases were offset by decreases in Unit 6A of 67% and 28%, respectively.

Weighted harvest rates were historically low. In Unit 6A, they averaged 2.4% since 1989/90 (Fig. 4). In Unit 6B, the average was 3.0% since 1988/89 (Fig. 5). In Units 6D (East) and 6D (West), the averages were 3.3% and 4.8%, respectively, since 1986/87 (Figs. 6 and 7). Low rates in all subunits resulted primarily from our conservative MAH that has limited availability of goats to hunters. We took this approach because most hunted populations were declining and hunter take is additive to other mortality factors (Hebert and Turnbull 1977, Adams and Bailey 1982). We did allow a slightly higher harvest rate in Unit 6D (West) where the population increased in the late 1980s and early 1990s. Our rates were very conservative compared to the 7% unweighted rate applied on the Kenai Peninsula in Alaska (Del Frate 1994) and recommended for the Sawatch Range in Colorado (Adams and Bailey 1982).

Permit Hunts. Number of permits issued reached an historic low of 202 in 1994/95. Permits were first required in the entire unit in 1981/82. Number issued reached a peak of 796 in 1983/84, then declined steadily. The downward trend reflects the long-term decline in hunting opportunity.

Hunter Residency and Success. Most goat hunters during this reporting period were residents of Alaska (Table 3). Among those residents, most did not live in Unit 6. Hunter success during 1993/94 and 1994/95 was 41% and 45%, respectively. Both residency and success did not change significantly compared with the previous 3 years.

Harvest Chronology. September and October were consistently the most productive months for goat harvest (Table 4). Eighty-five percent and 89% of the harvest occurred in these months during 1993/94 and 1994/95, respectively. This was also the pattern during the previous 3 years.

Transport Methods. Airplanes were the most important means of hunter transport (Table 5). They provided transportation for 63% and 57% of hunters during 1993/94 and 1994/95, respectively. They were similarly important during previous years.

Other Mortality

Predation by wolves was a suspected source of natural mortality, particularly in Units 6A, 6B, and 6C and 6D (East) where wolf density was greatest. Goat numbers have declined sharply in all these subunits, except 6C, over the past 8 years. 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 over the past 20 years. Depth during March at Worthington Glacier east of Valdez (2100 ft elevation) was significantly greater ($p<.006$, Student's t-test) during 1975-95 (average = 73 in, SD = 17 in) than during 1958-74 (average = 57 in, SD = 16 in).

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 beginning the late 1960s has 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 the logging operation were major factors in the decline. Wolf predation and deep snow were also possible factors.

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

CONCLUSIONS AND RECOMMENDATIONS

We achieved the population size objective of 2400 goats. Estimated number at the end of this reporting period was 2790. However, the downward population trend in Units 6A, 6B and 6D (East) was a chronic problem. Reversal of this trend will require:

- Continued weighted harvest rate of <3.5% for declining populations;
- Establishment of minimum number of goats that must be present in each permit hunt area for harvest to continue;
- Continued cooperation with USFS wolf ecology research to improve understanding of the role of predation; and
- Evaluation of the potential for a goat introduction on Montague and Knight islands to increase the population.

We did not achieve the harvest objective of 70% males in the take. It declined to 67% during 1993/94. To correct this problem, our hunter information leaflet that presented methods of differentiating sexes of goats should be evaluated and revised by an information specialist.

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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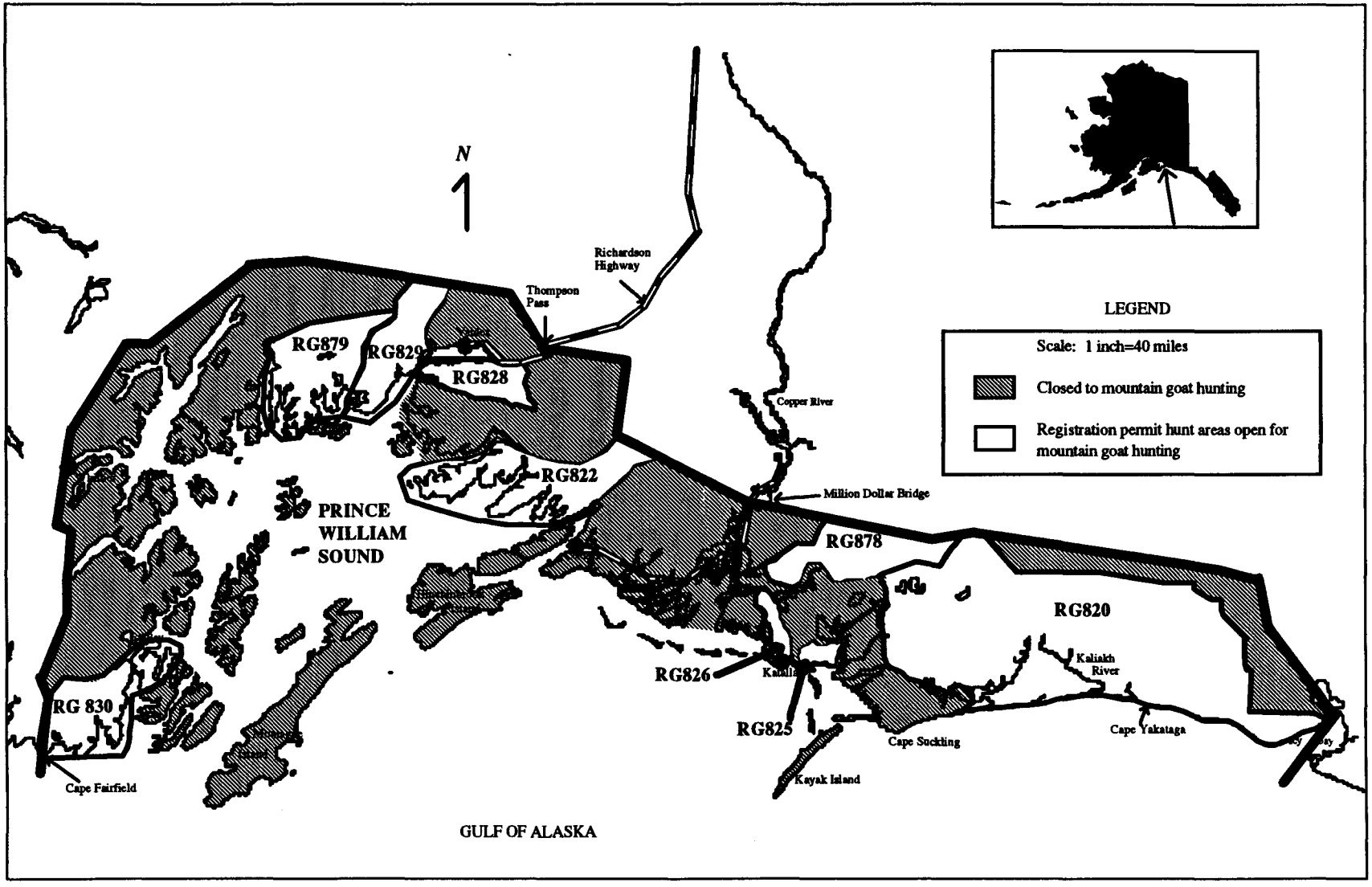

Figure 1. Unit 6 mountain goat registration permit hunts 1990-93

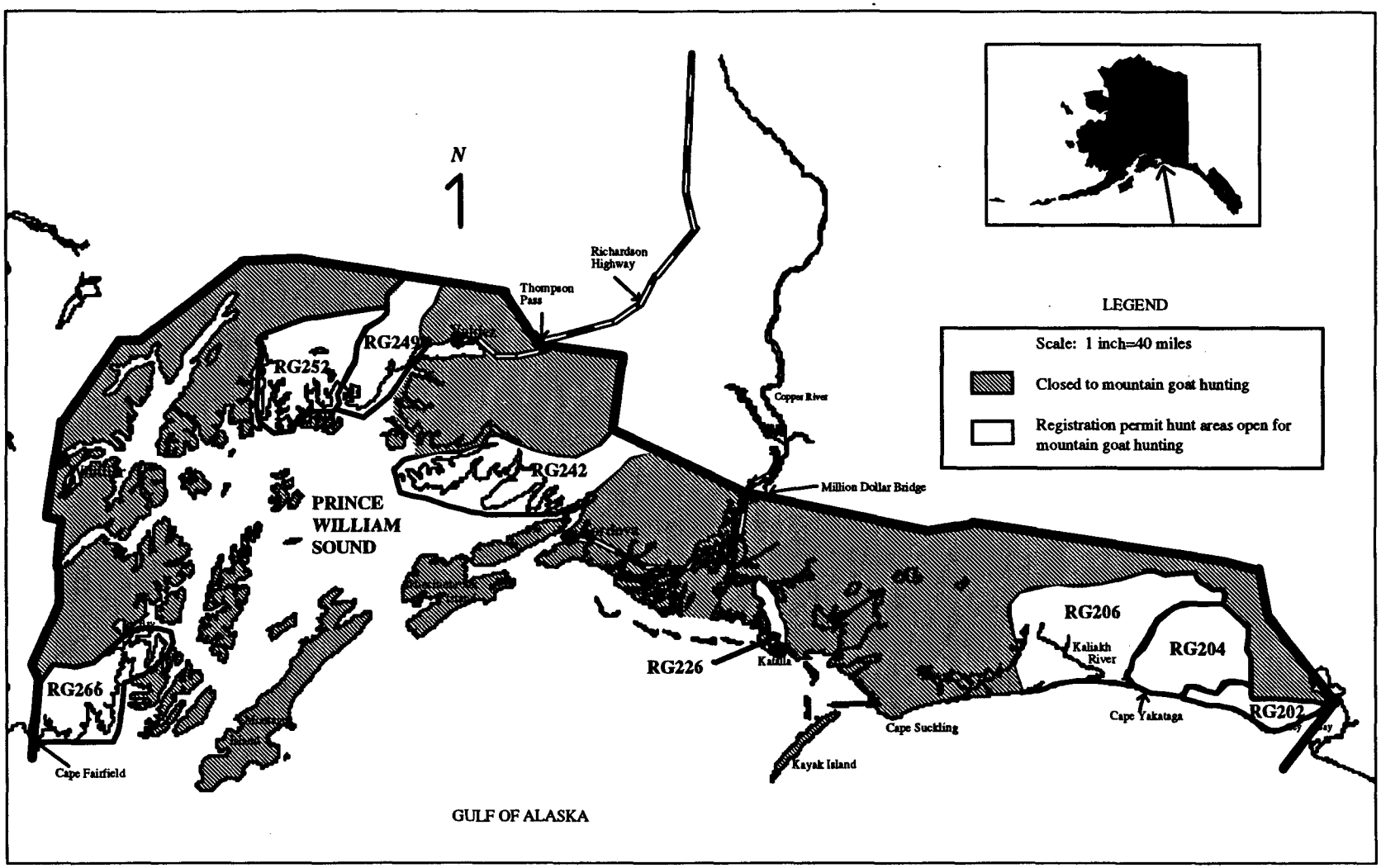

Figure 2. Unit 6 mountain goat registration permit hunts, 1993-95

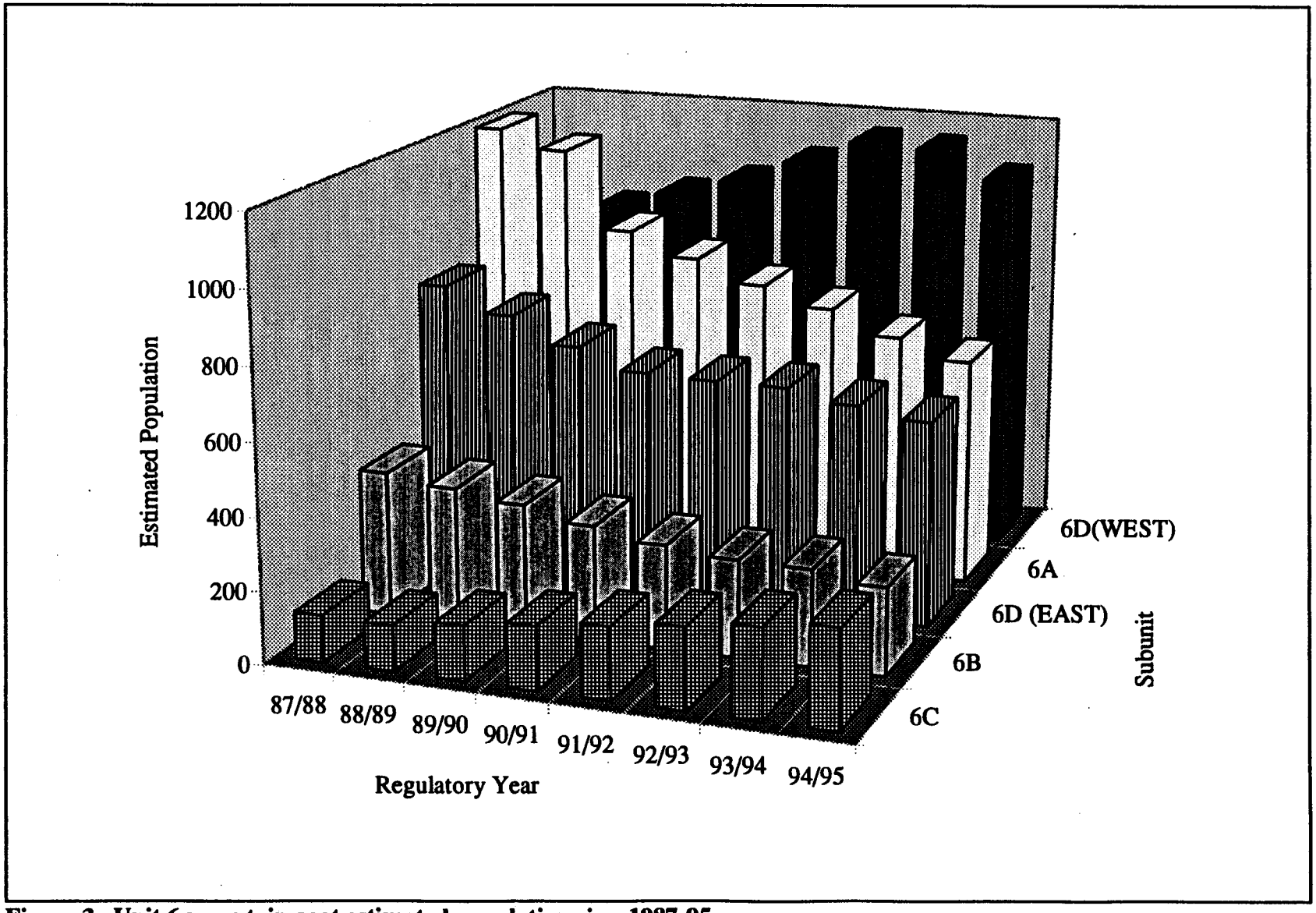

Figure 3. Unit 6 mountain goat estimated population size, 1987-95

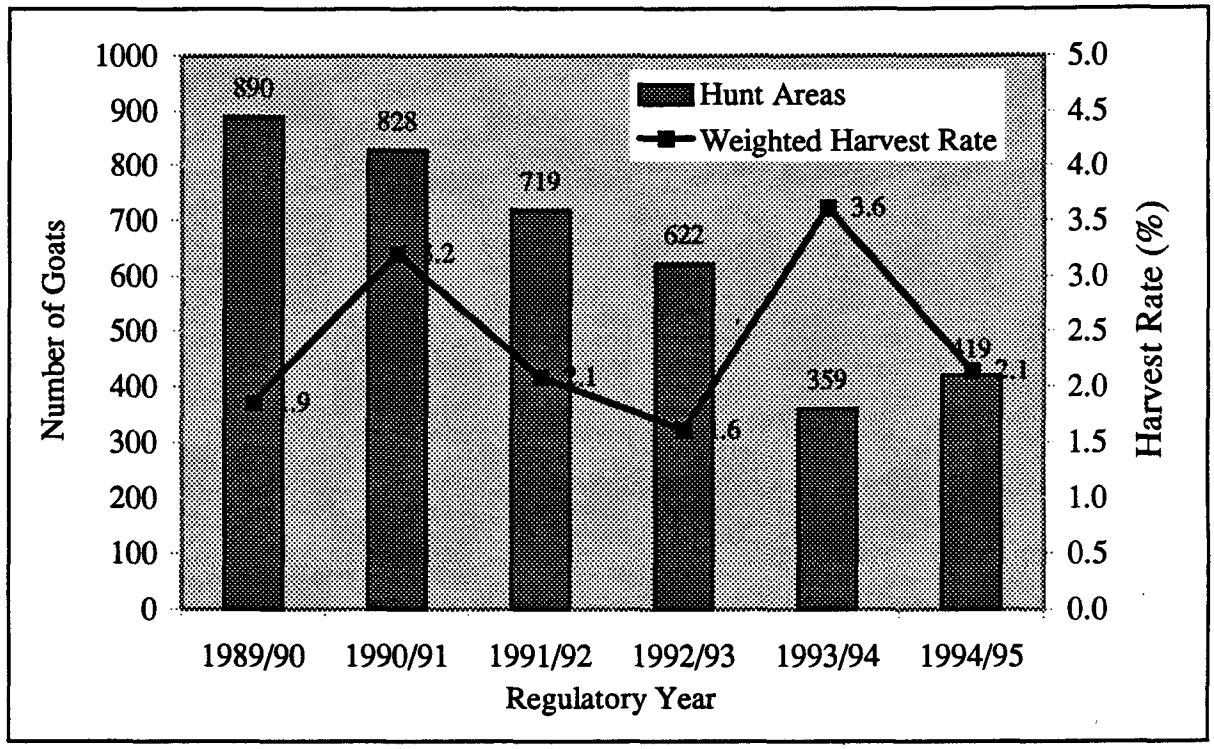

Figure 4. Subunit 6A mountain goat numbers in hunt areas and weighted harvest rates, 1989-95

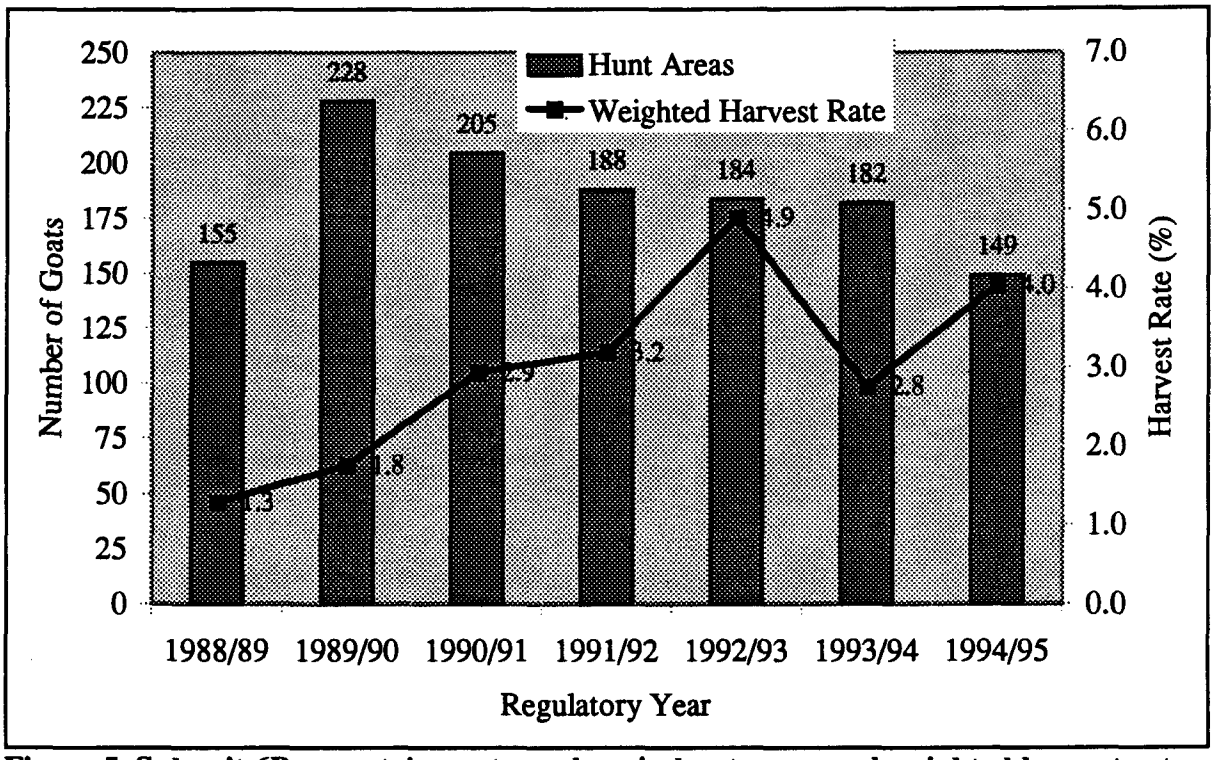

Figure 5. Subunit 6B mountain goat numbers in hunt areas and weighted harvest rates, 1988-95

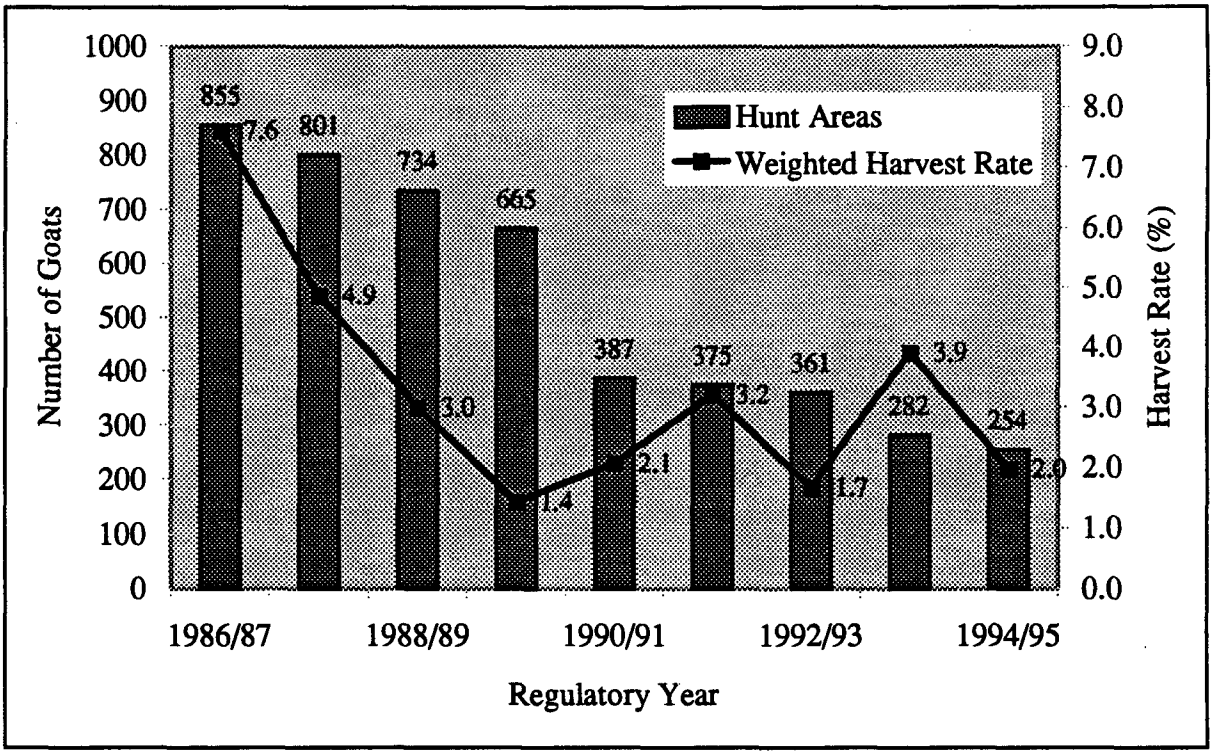

Figure 6. Subunit 6D(East) mountain goat numbers in hunt areas and weighted harvest rates, 1986-95

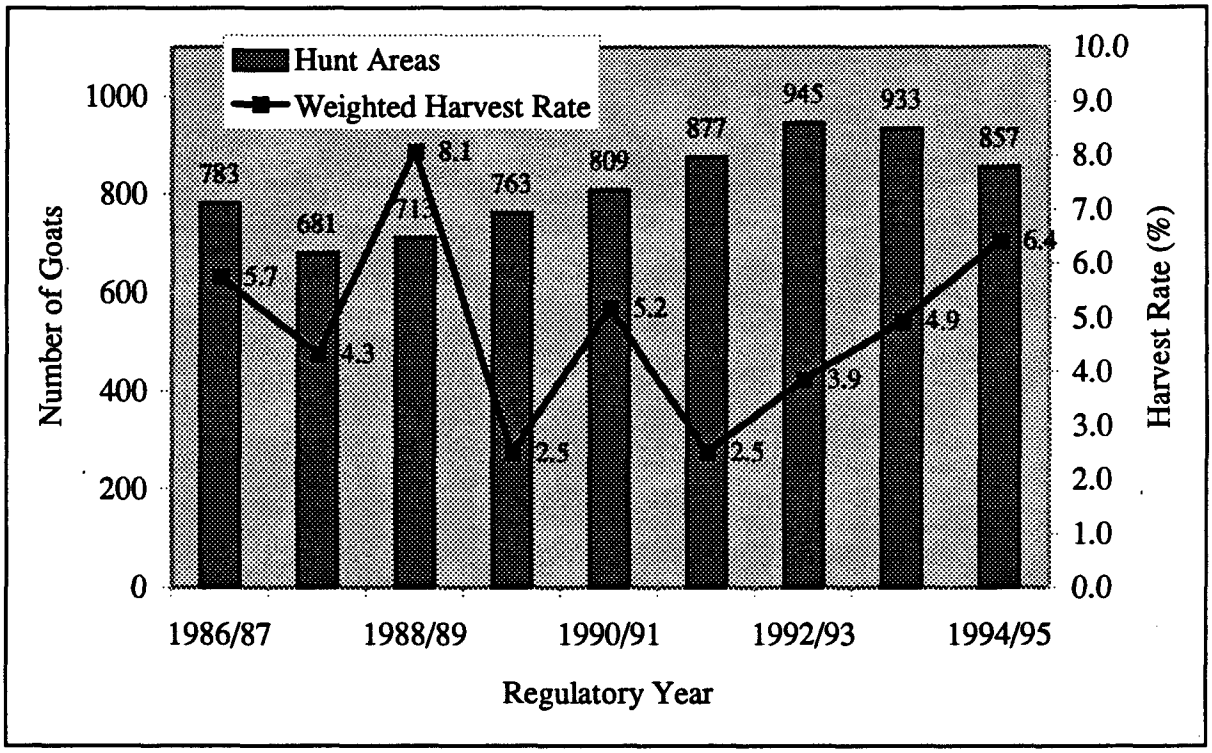

Figure 7. Subunit 6D(West) mountain goat numbers in hunt areas and weighted harvest rates, 1986-95

Table 1. Unit 6 summer/fall mountain goat composition counts and estimated population size, 1990-95.

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG820	1990/91	--	--	--	--	--	--	--	--	772
		1991/92	--	--	--	--	--	--	--	--	707
		1992/93	Partial	160	(77)	47	(23)	0	29	207	653
	RG202 [a]	1993/94	--	--	--	--	--	--	--	--	102
		1994/95	--	--	--	--	--	--	--	--	102
	RG204 [a]	1993/94	Full	167	(87)	26	(13)	0	16	193	217
		1994/95	--	--	--	--	--	--	--	--	181
	RG206 [a]	1993/94	Partial	75	(78)	21	(22)	0	28	96	142
		1994/95	--	--	--	--	--	--	--	--	137
	Berg	1993/94	--	--	--	--	--	--	--	--	79
	Lakes	1994/95	--	--	--	--	--	--	--	--	72

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
	RG825	1990/91	Full	34	(74)	12	(26)	2	35	48	58
		1991/92	--	--	--	--	--	--	--	--	62
		1992/93	Full	46	(82)	10	(18)	0	22	56	67
		1993/94	--	--	--	--	--	--	--	--	72
		1994/95	Full	51	(78)	14	(22)	0	27	65	72
	Brower	1993/94	--	--	--	--	--	--	--	--	46
	Ridge	1994/95	--	--	--	--	--	--	--	--	46
	Suckling	1990/91	Full	6	(86)	1	(14)	0	17	7	8
	Hills	1991/92	--	--	--	--	--	--	--	--	8
		1992/93	--	--	--	--	--	--	--	--	8
		1993/94	--	--	--	--	--	--	--	--	8
		1994/95	--	--	--	--	--	--	--	--	8

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
	Mount	1990/91	Partial	7	(70)	3	(30)	0	43	10	30
	Hamilton	1991/92	--	--	--	--	--	--	--	--	28
		1992/93	--	--	--	--	--	--	--	--	26
		1993/94	--	--	--	--	--	--	--	--	22
		1994/95	--	--	--	--	--	--	--	--	19
6A		1990/91	--	47	(75)	16	(25)	2	34	65	868
TOTAL		1991/92	--	--	--	--	--	--	--	--	805
		1992/93	--	206	(78)	57	(22)	0	28	263	754
		1993/94	--	242	(84)	47	(16)	0	19	289	688
		1994/95	--	51	(78)	14	(22)	0	27	65	637
6B	RG826	1990/91	Full	114	(83)	24	(17)	0	21	138	152
		1991/92	--	--	--	--	--	--	--	--	151
		1992/93	Full	102	(76)	33	(24)	0	32	135	162
	RG226 [b]	1993/94	Full	118	(81)	27	(19)	0	23	145	174
		1994/95	Full	103	(83)	21	(17)	0	20	124	149

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
	RG878	1990/91	--	--	--	--	--	--	--	--	53
		1991/92	--	--	--	--	--	--	--	--	37
		1992/93	--	--	--	--	--	--	--	--	22
		1993/94	Full	7	(100)	0	(0)	0	0	7	8
		1994/95	--	--	--	--	--	--	--	--	8
	Goat	1990/91	--	--	--	--	--	--	--	--	112
	Mountain	1991/92	--	--	--	--	--	--	--	--	98
		1992/93	Partial	61	(86)	10	(14)	0	16	71	85
		1993/94	--	--	--	--	--	--	--	--	85
		1994/95	--	--	--	--	--	--	--	--	85
6B		1990/91	--	114	(83)	24	(17)	0	21	138	317
TOTAL		1991/92	--	--	--	--	--	--	--	--	286
		1992/93	--	163	(79)	43	(21)	0	26	206	269
		1993/94	--	125	(82)	27	(18)	0	22	152	267
		1994/95	--	103	(83)	21	(17)	0	20	124	242

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
6C		1990/91	--	--	--	--	--	--	--	--	174
TOTAL		1991/92	--	--	--	--	--	--	--	--	198
		1992/93	--	--	--	--	--	--	--	--	222
		1993/94	--	--	--	--	--	--	--	--	246
		1994/95	--	--	--	--	--	--	--	--	270
6D	RG822	1990/91	Partial	166	(79)	43	(21)	0	26	209	310
		1991/92	--	--	--	--	--	--	--	--	309
		1992/93	Partial	176	(81)	42	(19)	0	24	218	304
	RG242 [b]	1993/94	Partial	32	(80)	8	(20)	0	25	40	282
		1994/95	Full	208	(85)	37	(15)	0	18	245	271
	Upper	1990/91	Full	76	(74)	27	(26)	0	36	103	113
	Port	1991/92	--	--	--	--	--	--	--	--	105
	Fidalgo	1992/93	Full	64	(74)	23	(26)	0	36	87	104
		1993/94	--	--	--	--	--	--	--	--	86
		1994/95	Full	48	(86)	8	(14)	0	17	56	62

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
	Tatitlek	1990/91	Full	81	(85)	14	(15)	0	17	95	110
		1991/92	--	--	--	--	--	--	--	--	126
		1992/93	Full	94	(76)	29	(24)	0	31	123	140
		1993/94	--	--	--	--	--	--	--	--	160
		1994/95	Full	131	(83)	26	(17)	0	20	157	181
	RG828	1990/91	--	--	--	--	--	--	--	--	77
		1991/92	--	--	--	--	--	--	--	--	66
		1992/93	Partial	22	(88)	3	(12)	0	14	25	56
		1993/94	--	--	--	--	--	--	--	--	47
		1994/95	--	--	--	--	--	--	--	--	34
	Heiden	1990/91	--	--	--	--	--	--	--	--	23
	Canyon	1991/92	--	--	--	--	--	--	--	--	23
		1992/93	--	--	--	--	--	--	--	--	23
		1993/94	--	--	--	--	--	--	--	--	23
		1994/95	--	--	--	--	--	--	--	--	23

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
6D (East)		1990/91	--	323	(79)	84	(21)	0	26	407	633
Total		1991/92	--	--	--	--	--	--	--	--	629
		1992/93	--	356	(79)	97	(21)	0	27	453	627
		1993/94	--	32	(80)	8	(20)	0	25	40	598
		1994/95	--	387	(84)	71	(16)	0	18	458	571
	RG829	1990/91	FULL	215	(81)	49	(19)	0	23	264	317
		1991/92	--	--	--	--	--	--	--	--	353
		1992/93	--	--	--	--	--	--	--	--	389
	RG249 [b]	1993/94	FULL	295	(83)	61	(17)	0	21	356	392
		1994/95	--	--	--	--	--	--	--	--	352
	RG830	1990/91	--	--	--	--	--	--	--	--	371
		1991/92	--	--	--	--	--	--	--	--	388
		1992/93	FULL	291	(83)	58	(17)	0	20	349	406
	RG266 [b]	1993/94	--	--	--	--	--	--	--	--	377
		1994/95	--	--	--	--	--	--	--	--	348

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
	RG879	1990/91	FULL	78	(77)	23	(23)	0	29	101	121
		1991/92	--	--	--	--	--	--	--	--	136
		1992/93	--	--	--	--	--	--	--	--	150
	RG252 [b]	1993/94	FULL	111	(81)	26	(19)	0	23	137	164
		1994/95	--	--	--	--	--	--	--	--	157
6D (West)		1990/91	--	--	--	--	--	--	--	--	200
Remainder		1991/92	--	--	--	--	--	--	--	--	204
		1992/93	--	--	--	--	--	--	--	--	207
		1993/94	--	--	--	--	--	--	--	--	211
		1994/95	--	--	--	--	--	--	--	--	213
6D (West)		1990/91	--	293	(80)	72	(20)	0	25	365	1009
Total		1991/92	--	--	--	--	--	--	--	--	1081
		1992/93	--	291	(83)	58	(17)	0	20	349	1152
		1993/94	--	406	(82)	87	(18)	0	21	493	1144
		1994/95	--	--	--	--	--	--	--	--	1070

Table 1. Continued

Unit	Hunt no. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Unk.	Kids:100 older goats	Total goats observed	Estimated population size
6D		1990/91	--	616	(80)	156	(20)	0	25	772	1642
TOTAL		1991/92	--	--	--	--	--	--	--	--	1710
		1992/93	--	647	(81)	155	(19)	0	24	802	1779
		1993/94	--	438	(82)	95	(18)	0	22	533	1742
		1994/95	--	387	(84)	71	(16)	0	18	458	1641
UNIT 6		1990/91	--	777	(80)	196	(20)	2	25	975	3001
TOTAL		1991/92	--	--	--	--	--	--	--	--	2999
		1992/93	--	1016	(80)	255	(20)	0	25	1271	3024
		1993/94	--	805	(83)	169	(17)	0	21	974	2943
		1994/95	--	541	(84)	106	(16)	0	20	647	2790

[a] New hunt area established in 1993/94.

[b] Hunt area renumbered in 1993/94.

Table 2. Unit 6 mountain goat harvest data by permit hunt, 1990-95

Subunit/ hunt no.	Regulatory year	Permits issued	No. did not hunt	Percent did not hunt	No. unsucc hunters	Percent unsucc hunters	No. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A/RG820	1990/91	42	15	36	8	30	19	70	12	(67)	6	(33)	1	19	26	23
	1991/92	26	9	35	5	29	12	71	10	(83)	2	(17)	0	12	14	22
	1992/93	45	25	56	12	60	8	40	8	(100)	0	(0)	0	8	8	17
6A/RG202 [d]	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	7	2	29	3	60	2	40	2	(100)	0	(0)	0	2	2	4
6A/RG204 [d]	1993/94	18	8	44	4	40	6	60	3	(50)	3	(50)	0	6	9	10
	1994/95	9	5	56	0	0	4	100	3	(75)	1	(25)	0	4	5	10
6A/RG206 [d]	1993/94	9	5	56	1	25	3	75	2	(67)	1	(33)	0	3	4	4
	1994/95	4	1	25	2	67	1	33	0	(0)	1	(100)	0	1	2	4
6A/RG212	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6A/RG825	1990/91	3	2	67	0	0	1	100	1	(100)	0	(0)	0	1	1	2
	1991/92	2	1	50	0	0	1	100	1	(100)	0	(0)	0	1	1	2
	1992/93	14	8	57	3	50	3	50	3	(100)	0	(0)	0	3	3	3
6A/RG215 [e]	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6A TOTAL	1990/91	48	17	35	11	35	20	65	13	(68)	6	(32)	1	20	27	25
	1991/92	28	10	36	5	28	13	72	11	(85)	2	(15)	0	13	15	24
	1992/93	59	33	56	15	58	11	42	11	(100)	0	(0)	0	11	11	20
	1993/94	27	13	48	5	36	9	64	5	(56)	4	(44)	0	9	13	14
	1994/95	20	8	40	5	42	7	58	5	(71)	2	(29)	0	7	9	18

Table 2. Continued

Subunit/ hunt no.	Regulatory year	Permits issued	No. did not hunt	Percent did not hunt	No. unsucc hunters	Percent unsucc hunters	No. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6B/RG826	1990/91	14	7	50	3	43	4	57	3	(75)	1	(25)	0	4	5	6
	1991/92	22	15	68	3	43	4	57	3	(75)	1	(25)	0	4	5	7
	1992/93	20	12	60	2	25	6	75	4	(67)	2	(33)	0	6	8	7
6B/RG226 [e]	1993/94	13	7	54	1	17	5	83	5	(100)	0	(0)	0	5	5	7
	1994/95	21	10	48	5	45	6	55	6	(100)	0	(0)	0	6	6	6
6B/RG878	1990/91	5	2	40	2	67	1	33	1	(100)	0	(0)	0	1	1	3
	1991/92	12	9	75	2	67	1	33	1	(100)	0	(0)	0	1	1	2
	1992/93	9	6	67	2	67	1	33	1	(100)	0	(0)	0	1	1	2
6B/RG220 [e]	1993/94	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6B TOTAL	1990/91	19	9	47	5	50	5	50	4	(80)	1	(20)	0	5	6	9
	1991/92	34	24	71	5	50	5	50	4	(80)	1	(20)	0	5	6	9
	1992/93	29	18	62	4	36	7	64	5	(71)	2	(29)	0	7	9	9
	1993/94	13	7	54	1	17	5	83	5	(100)	0	(0)	0	5	5	7
	1994/95	21	10	48	5	45	6	55	6	(100)	0	(0)	0	6	6	6
6D/RG822	1990/91	39	28	72	6	55	5	45	4	(80)	1	(20)	0	5	6	12
	1991/92	47	25	53	13	59	9	41	8	(89)	1	(11)	0	9	10	12
	1992/93	39	20	51	14	74	5	26	4	(80)	1	(20)	0	5	6	11
6D/RG242 [e]	1993/94	49	30	61	10	53	9	47	7	(78)	2	(22)	0	9	11	11
	1994/95	21	11	52	5	50	5	50	5	(100)	0	(0)	0	5	5	5
6D/RG828	1990/91	32	21	66	9	82	2	18	2	(100)	0	(0)	0	2	2	2
	1991/92	33	23	70	8	80	2	20	2	(100)	0	(0)	0	2	2	2
	1992/93	7	5	71	2	100	0	0	0	0	0	0	0	0	0	0
6D/RG245 [e]	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Continued

Subunit/ hunt no.	Regulatory year	Permits issued	No. did not hunt	Percent did not hunt	No. unsucc hunters	Percent unsucc hunters	No. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D (EAST)	1990/91	71	49	69	15	68	7	32	6	(86)	1	(14)	0	7	8	14
TOTAL	1991/92	80	48	60	21	66	11	34	10	(91)	1	(9)	0	11	12	14
	1992/93	46	25	54	16	76	5	24	4	(80)	1	(20)	0	5	6	11
	1993/94	49	30	61	10	53	9	47	7	(78)	2	(22)	0	9	11	11
	1994/95	21	11	52	5	50	5	50	5	(100)	0	(0)	0	5	5	5
6D/RG829	1990/91	54	18	33	18	50	18	50	13	(72)	5	(28)	0	18	23	16
	1991/92	40	19	48	8	38	13	62	10	(77)	3	(23)	0	13	16	13
	1992/93	37	20	54	6	35	11	65	8	(73)	3	(27)	0	11	14	11
6D/RG249 [d]	1993/94	80	44	55	20	56	16	44	12	(75)	4	(25)	0	16	20	20
	1994/95	59	23	39	21	58	15	42	10	(66)	5	(33)	0	15	20	20
6D/RG830	1990/91	39	21	54	7	39	11	61	7	(64)	4	(36)	0	11	15	10
	1991/92	36	20	56	10	63	6	38	6	(100)	0	(0)	0	6	6	8
	1992/93	68	32	47	22	61	14	39	9	(69)	4	(31)	1	14	19	13
6D/RG266 [d]	1993/94	68	31	46	27	73	10	27	4	(40)	6	(60)	0	10	16	15
	1994/95	67	29	43	23	61	15	39	9	(60)	6	(40)	0	15	21	18
6D/RG879	1990/91	34	19	56	12	80	3	20	2	(67)	1	(33)	0	3	4	5
	1991/92	29	16	55	11	85	2	15	2	(100)	0	(0)	0	2	2	5
	1992/93	28	19	68	7	78	2	22	2	(100)	0	(0)	0	2	2	5
6D/RG252 [d]	1993/94	34	20	59	11	79	3	21	2	(67)	1	(33)	0	3	4	6
	1994/95	14	4	29	5	50	5	50	2	(40)	3	(60)	0	5	8	7
6D (WEST)	1990/91	127	58	46	37	54	32	46	22	(69)	10	(31)	0	32	42	31
TOTAL	1991/92	105	55	52	29	58	21	42	18	(86)	3	(14)	0	21	24	26
	1992/93	133	71	53	35	56	27	44	19	(73)	7	(27)	1	27	35	29
	1993/94	182	95	52	58	67	29	33	18	(62)	11	(38)	0	29	40	41
	1994/95	140	56	40	49	58	35	42	21	(60)	14	(40)	0	35	49	45

Table 2. Continued

Subunit/ hunt no.	Regulatory year	Permits issued	No. did not hunt	Percent did not hunt	No. unsucc hunters	Percent unsucc hunters	No. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D TOTAL	1990/91	198	107	54	52	57	39	43	28	(72)	11	(28)	0	39	50	45
	1991/92	185	103	56	50	61	32	39	28	(88)	4	(13)	0	32	36	40
	1992/93	179	96	54	51	61	32	39	23	(74)	8	(26)	1	32	41	40
	1993/94	231	125	54	68	64	38	36	25	(66)	13	(34)	0	38	51	52
	1994/95	161	67	42	54	57	40	43	26	(65)	14	(35)	0	40	54	50
UNIT 6	1990/91	265	133	50	68	52	64	48	45	(71)	18	(29)	1	64	83	79
TOTAL	1991/92	247	137	55	60	55	50	45	43	(86)	7	(14)	0	50	57	73
	1992/93	267	147	55	70	58	50	42	39	(80)	10	(20)	1	50	61	69
	1993/94	271	145	54	74	59	52	41	35	(67)	17	(33)	0	52	69	73
	1994/95	202	85	42	64	55	53	45	37	(70)	16	(30)	0	53	69	74

[a] Unweighted harvest; males counted as 1, females counted as 1 and unknowns counted as 1.
[b] Weighted harvest; males counted as 1, females counted as 2 and unknowns counted as 2.
[c] Set for unweighted harvest from 1990/91-1992/93 and weighted harvest 1993/94-1994/95.
[d] New hunt area established in 1993/94.
[e] Hunt area renumbered in 1993/94.

Table 3. Unit 6 mountain goat hunter residency and success, 1990-95.

		Successful					Unsuccessful					
Subunit	Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
6A	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)	28
	1992/93	0	1	10	11	(42)	1	10	4	15	(58)	26
	1993/94	0	1	8	9	(64)	0	1	4	5	(36)	14
	1994/95	0	2	5	7	(58)	0	2	3	5	(42)	12
6B	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
	1993/94	0	1	4	5	(83)	0	0	1	1	(17)	6
	1994/95	1	2	3	6	(55)	2	3	0	5	(45)	11
6D	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
	1993/94	7	24	6	38[b]	(36)	18	44	4	68[c]	(64)	106
	1994/95	8	24	8	40	(43)	14	39	1	54	(57)	94

Table 3. Continued

Subunit	Regulatory year	Successful: Local [a] resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total	Successful: (%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total	Unsuccessful: (%)	Total hunters
UNIT 6	1990/91	8	38	18	64	(50)	19	40	6	65	(50)	129
TOTAL	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
	1993/94	7	26	18	51	(41)	18	45	9	72	(59)	123
	1994/95	9	28	16	53	(45)	16	44	4	64	(55)	117

[a] Resident of Unit 6.

[b] Includes 1 successful hunter with unknown residency.

[c] Includes 2 unsuccessful hunters with unknown residency.

Table 4. Unit 6 mountain goat harvest chronology percent by time period, 1990-95.

Subunit	Regulatory year	Harvest Periods						*n*
		August	September	October	November	December	January	
6A	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
	1993/94	11	44	33	11	0	0	9
	1994/95	14	29	43	0	14	0	7
6B	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
	1993/94	60	0	40	0	0	0	5
	1994/95	50	17	33	0	0	0	6
6D	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
	1993/94	3	37	55	3	0	3	38
	1994/95	0	35	63	3	0	0	40
UNIT 6 TOTAL	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
	1993/94	10	35	50	4	0	2	52
	1994/95	8	32	57	2	2	0	53

Table 5. Unit 6 mountain goat harvest percent by transport method, 1990-95.

Subunit	Regulatory year	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
6A	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
	1993/94	100	0	0	0	0	0	0	9
	1994/95	100	0	0	0	0	0	0	7
6B	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
	1993/94	100	0	0	0	0	0	0	5
	1994/95	100	0	0	0	0	0	0	6
6D	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
	1993/94	50	50	0	0	0	0	0	38
	1994/95	43	58	0	0	0	0	0	40
UNIT 6	1990/91	58	39	2	0	0	2	0	64
TOTAL	1991/92	78	18	2	0	0	2	0	50
	1992/93	72	28	0	0	0	0	0	50
	1993/94	63	37	0	0	0	0	0	52
	1994/95	57	43	0	0	0	0	0	53

LOCATION

GAME MANAGEMENT UNITS: 7 and 15 (8,397 mi^2)

GEOGRAPHIC DESCRIPTION: Kenai Peninsula

BACKGROUND

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

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, and 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 (Del Frate and Spraker 1994).

Spruce bark beetles (*Dendroctonus rufipennis*) 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. Various landowners have planned salvage operations throughout the Kenai peninsula which may affect mountain goat 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 mountain goat range is divided into 35 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 (Lentfer 1955, Nichols 1980). We fly surveys before hunting season in

a Piper PA-18 Super Cub or Cessna 305 Birddog with an observer during early morning and evening hours in July and August. 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 first estimated by combining the most recent aerial count of each survey area. Assuming 70% to 90% (Nichols 1980) of goats present during aerial surveys are observed, we estimate population expressed as a range reflecting sightability variations.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We observed 3049 goats during the latest surveys of count areas on the Kenai Peninsula. This excluded the KFNP that contained an estimated 800-1000 goats. We estimated 4187 (90% observability) to 5355 goats (70% observability) inhabit the Kenai Peninsula. We suspected that poor weather conditions caused temporary population declines over much of the Kenai.

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). Since then, surveys have fluctuated but may have stabilized around 393 goats.

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 have fluctuated in the 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). Surveys were completed in 2 of 3 areas. These areas indicated a substantial decline in Kachemak Bay goats from the population high in 1992. Winter weather during 1992 and 1993 was characterized as warm and mild but may have been extreme in mountainous terrain.

Population Composition

In 1993 we surveyed 8 count areas and tallied 822 goats with 20% kids (Table 2). In 1994 we counted 1056 goats in 10 count areas. There were 18.8% kids in the population in 1994.

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. Harvest rates for individual count areas were increased to 7% of countable goats to stabilize goat numbers within management objectives.

Board of Game Actions and Emergency Orders. In November 1992 the Joint Boards of Fish and Game established nonsubsistence areas to address subsistence needs in parts of Alaska. The Board of Game followed by changing 2 hunt areas (TG352 and TG363) from Tier II subsistence areas to general drawing hunts. In the fall of 1993 the courts invalidated the state's nonsubsistence areas. The boards suspended all regulations pertaining to these areas, reverting the 2 hunts back to subsistence hunting. Recently, the original court decision was overturned and the boards reinstated the nonsubsistence areas and the associated regulations. Currently there are 2 subsistence mountain goat hunts (TG364 and TG365) left on the Kenai.

The Board of Game also increased the maximum number of permits the department could issue to 500 during the Fall 1992 Board meeting.

Registration permit hunts were managed for a harvestable quota. When the quota has been reached, emergency orders were issued closing the respective hunt areas. Three emergency orders were issued on October 21 (RG333, 347 and 364), October 29 (RG336, 352, 360 and 363), and November 9 (RG340 and 359), 1993. In 1994, 2 emergency orders were issued on October 22 (RG333, 347, 360 and 363), and November 1 (RG345, 346, 352, and 359).

Hunter Harvest. Hunters harvested 176 goats on the Kenai Peninsula in 1993. Drawing permittees killed 100 goats (58 males, 42 females) throughout 27 hunt areas (Table 5). Permittees harvested 70 goats (45 males and 25 females) from 14 hunt areas during the registration permit hunt (Table 6). Subsistence hunters harvested 5 billy and 1 nanny goat in the 2 Tier II subsistence hunts (Table 7).

Hunters harvested 148 goats on the Kenai Peninsula in 1994. Drawing permittees killed 68 goats (44 males, 24 females) throughout 25 hunt areas (Table 8). Permittees harvested 53 goats (41 males, 11 females and 1 unspecified sex) from 14 hunt areas during the registration permit hunt (Table 9). Subsistence hunters harvested 27 goats (21 males and 6 females) in the Tier II hunts (Table 7).

Hunter Residency and Success. Success rates varied 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 3% of total hunters in both 1993 and 1994 (Tables 13 & 14). However, nonresidents usually had high success rates (> 75%) because of guiding requirements. The overall success rate of nonresidents was 83% and 85% for 1993 and 1994, respectively.

Harvest Chronology. Drawing permittees harvested a higher proportion of goats during the last part of September in 1993 (Table 15). In 1994 the harvest was more evenly distributed. 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 5-7 days.

Transport Methods. Transportation methods varied between units because of accessibility. In 1993 successful hunters in Unit 7 used highway vehicles (43%), boats (24%), and aircraft (27%) (Table 16). In Unit 15, successful hunters used boats (41%), aircraft (39%), and horses (8%) (Table 17). All other transportation methods were less than 4%.

In 1994 the transportation types used were similar to the previous year. Successful hunters in Unit 7 used highway vehicles (38%), boats (34%), and aircraft (23%) (Table 16). In Unit 15 successful hunters used aircraft (73%) and boats (23%) (Table 17).

HABITAT

Spruce bark beetles have infested much of the Kenai Peninsula. The infestation affects primarily white (*Picea glauca*) and Lutz (*Picea* x *lutzii*) spruce trees greater than 5" in diameter. In response several agencies and landowners have begun salvage logging throughout the Kenai (Steve Albert ADF&G Habitat Division, pers. commun.). Several parcels of land are scheduled for logging that may include mountain goat winter habitat. ADF&G estimated that over 8,500 acres of potential winter habitat will be logged in 1996. More importantly, over 2,500 acres have been scheduled for harvest in the 2 state subsistence hunt areas. (TG364 and TG365) in Unit 15C.

CONCLUSIONS AND RECOMMENDATIONS

We estimated population size from the most recent surveys of count areas. We observed 3049 goats on the Kenai Peninsula, excluding KFNP. An estimated 800 to 1000 goats inhabited the KFNP. Including KFNP, we estimated between 4187 (assuming 90% observability) and (assuming 70% observability) 5355 goats 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 1968-1994, 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 greater than 30 kids:100 older goats and greater than 23% 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. A comprehensive evaluation was reported at the Northern

Wild Sheep and Goat Symposium in 1994 (Del Frate and Spraker 1994). We do not recommend any changes in goat harvest management on the Kenai Peninsula at this time.

Forestry practices on the Kenai peninsula may affect winter mountain goat habitat through loss of canopy cover. The department should delineate all winter habitat and work closely with landowners to ensure this habitat is protected.

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Table 1. Kenai Peninsula mountain goat trends 1968-94.

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
G345,G346)	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
	1994	20.6	17.1	393	+2
West Slope	1968	44.0	30.6	36	
(Count areas	1977	25.0	20.0	25	-31
G355,G356,G357)	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
G358,G359,G360)	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, 1988-94.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG331	1990/91[a]	--	--	--	--	--	--	--
	1991/92	29	7	--	24	36	--	36
	1992/93	34	12	--	35	46	--	46
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG332	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	2	0	--	0	2	--	2
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG333	1990/91[a]	--	--	--	--	--	--	--
	1991/92	131	23	--	18	154	--	154
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	89	23	--	26	112	--	112
DG334	1990/91[a]	--	--	--	--	--	--	--
	1991/92	66	16	--	24	82	--	82
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	67	24	--	36	91	--	91

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG335	1990/91[a]	--	--	--	--	--	--	--
	1991/92	72	13	--	18	85	--	85
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	63	19	--	30	82	--	82
DG336	1990/91[a]	--	--	--	--	--	--	--
	1991/92	154	30	--	19	184	--	184
	1992/93[a]	--	--	--	--	--	--	--
	1993/94	119	23	--	19	142	--	142
	1994/95[a]	--	--	--	--	--	--	--
DG337	1990/91	16	3	0	19	19	--	19
	1991/92	20	5	0	25	25	--	25
	1992/93	20	6	0	30	26	--	26
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	12	1	--	8	13	--	13
DG338	1990/91	12	3	0	25	15	--	15
	1991/92	16	7	0	44	23	--	23
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG339	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	118	33	0	28	151	--	151
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG340	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94	52	16	--	31	68	--	68
	1994/95[a]	--	--	--	--	--	--	--
DG341	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	41	12	0	29	53	--	53
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG342	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	71	25	0	35	96	--	96
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG343	1990/91	34	8	0	23	42	--	42
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	80	29	0	36	109	--	109
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG344	1990/91[a]	--	--	--	--	--	--	--
	1991/92	67	17	0	25	84	--	84
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	53	13	0	25	66	--	66
DG345	1990/91[a]	--	--	--	--	--	--	--
	1991/92	216	49	0	23	265	--	265
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	146	25	0	17	171	--	171
DG346	1990/91[a]	--	--	--	--	--	--	--
	1991/92	94	26	0	28	120[d]	--	173
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	180	42	0	23	222	--	222

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG347	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94	128	41	--	--	169	--	169
	1994/95[a]	--	--	--	--	--	--	--
DG348	1990/91	142	32	0	23	174	--	174
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG349	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	31
DG350	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	222

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG351	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	335
DG352	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	110	44	0	40	154	--	154
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG353	1990/91[a]	--	--	--	--	--	--	--
	1991/92	0	0	0	N/A	0	--	0
	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG354	1990/91	59	12	0	20	71	--	71
	1991/92	78	23	0	29	101	--	101
	1992/93	70	28	0	40	98	--	98
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG355	1990/91	11	3	0	27	14	--	14
	1991/92	26	6	0	23	32	--	32
	1992/93	16	4	0	25	20	--	20
	1993/94[f]	18	4	0	22	22	--	22
	1994/95[a]	--	--	--	--	--	--	--
DG356	1990/91	25	14	0	56	39	--	39
	1991/92	46	19	0	41	65	--	65
	1992/93	50	15	0	30	65	--	65
	1993/94	38	10	0	26	48	--	48
	1994/95	34	4	0	12	38	--	38
DG357	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
	1993/94	41	17	0	41	58	--	58
	1994/95[a]	--	--	--	--	--	--	--
DG358	1990/91	72	23	0	32	95	--	95
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	87	28	0	32	115	--	115
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG359	1990/91	128	14	0	34	172	--	172
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	147	54	0	37	201	--	201
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	75	17	0	23	92	--	92
DG360	1990/91	149	47	0	32	196	--	196
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	180	48	0	27	228	--	228
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	138	31	0	22	169	--	169
DG361	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	107	33	0	31	140	--	140
	1993/94	87	13	0	15	100	--	100
	1994/95[a]	--	--	--	--	--	--	--
DG362	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	67	21	--	31	88	--	88
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

Table 2. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG363	1990/91[a]	--	--	--	--	--	--	--
	1991/92	235	41	0	17	276[e]	--	276
	1992/93[a]	--	--	--	--	--	--	--
	1993/94	175	40	0	23	215[e]	--	215
	1994/95[a]	--	--	--	--	--	--	--
DG364	1990/91[a]	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--
	1992/93	98	21	0	21	119	--	119
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
DG365	1990/91[a]	--	--	--	--	--	--	--
	1991/92	120	28	0	23	148	--	148
	1992/93	129	30	0	23	159	--	159
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--

[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.
[f]Combined Ground observations with aerial counts.

Table 3. Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1984-94.

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
1993	10 Aug. - 30 Sept.	420	215	47	58	42		100
1994	10 Aug. - 30 Sept.	395	216	31	44	24		68
Total					447	211	5	663

Table 4. Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984-94.

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
1993	15 Oct. - 30 Nov.	481	281	25	45	25		70
1994	15 Oct. - 30 Nov.	438	245	22	41	11	1	53
Total					452	247	12	711

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

Table 5. Kenai Peninsula mountain goat drawing permit hunt summary, 1993[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	2	2	100	0	2		2
DG333	6	2	50	0	1		1
DG334	6	4	75	2	1		3
DG335	8	6	50	2	1		3
DG336	25	19	32	2	4		6
DG337	2	1	100	1	0		1
DG338	2	2	50	1	0		1
DG339	10	7	14	1	0		1
DG340	25	7	57	3	1		4
DG341	2	2	100	1	1		2
DG342	15	13	61	5	3		8
DG343	10	8	75	3	3		6
DG344	20	9	0	0	0		0
DG345[b]	40	16	63	4	6		10
DG346	36	15	53	5	3		8
DG347	12	5	60	1	2		3
DG352	25	14	64	8	1		9
DG354	16	6	33	2	0		2
DG355[b]	4	2	0	0	0		0
DG356	8	6	50	2	1		3
DG357	10	5	20	0	1		1
DG358	20	8	25	2	0		2
DG359[b]	28	14	43	4	2		6
DG360	28	14	50	2	5		7
DG361[b]	20	10	30	1	2		3
DG362	16	7	43	2	1		3
DG363	24	11	45	4	1		5
Totals	420	215	47	58	42	0	100

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

[b] One permit report was not returned.

Table 6. Kenai Peninsula mountain goat registration permit hunt summary, 1993[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG333	98	60	8	3	2		5
RG336	84	48	10	2	3		5
RG340	5	2	100	2	0		2
RG344	68	35	9	3	0		3
RG347	49	26	31	4	4		8
RG352[b]	4	3	100	2	1		3
RG354	36	16	19	3	0		3
RG358	10	6	100	4	2		6
RG359	14	14	43	4	2		6
RG360	27	17	41	5	2		7
RG361	17	10	20	2	0		2
RG363[b]	33	24	67	10	6		16
RG364[b]	16	14	21	1	2		3
RG365[b]	20	6	17	0	1		1
Totals	481	281	25	45	25	0	70

[a] Season Dates: 15 October - 30 November

[b] Limited to residents of Alaska

Table 7. Kenai Peninsula subsistence harvest, 1986-94.

Year	Season Dates	No. Permits Issued	No. Hunters	Percent Success	Harvest M	F	U	Total
1986	6 Sept. - 31 Oct.	15	6	50	1	2		3
1987	10 Aug. - 31 Oct.	7	5	40	1	1		2
1988	10 Aug. - 31 Oct.	7	3	0	0	0		0
1989[a]	1 Aug. - 31 Oct.				0	0	3	3
1990[b]	28 Sept.-.18 Dec.				1	4		5
1991[c]	1 Aug.-. 30 Sept.	94	42	31	13	0		13
1992[c]	1 Aug.-. 30 Sept.	94	53	45	19	5		24
1993	1 Aug.-. 30 Sept.	50	27	22	5	1		6
1994	1 Aug.-. 30 Sept.	105	66	41	21	6		27
Total					61	19	3	83

[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, 1994[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	2	1	0%	0	0		0
DG333	15	8	13%	0	1		1
DG334	10	9	33%	3	0		3
DG335	12	8	50%	4	0		4
DG336	25	9	11%	1	0		1
DG337	2	1	0%	0	0		0
DG338	2	1	0%	0	0		0
DG339	10	7	43%	2	1		3
DG340	20	10	20%	1	1		2
DG341	4	3	33%	0	1		1
DG342	14	10	50%	2	3		5
DG343[b]	10	9	56%	4	1		5
DG344[b]	20	8	0%	0	0		0
DG345	40	13	31%	1	3		4
DG346	36	24	38%	8	1		9
DG347	15	11	45%	3	2		5
DG354	20	9	22%	2	0		2
DG355	4	1	0%	0	0		0
DG356	8	6	33%	0	2		2
DG357	12	8	38%	1	2		3
DG358	20	13	38%	1	4		5
DG359	28	11	18%	1	1		2
DG360[b]	30	16	31%	5	0		5
DG361	20	11	18%	2	0		2
DG362	16	9	44%	3	1		4
Totals	395	216	31%	44	24	0	68

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

[b]One hunter in DG343, DG344, TG360 did not return a report.

Table 9. Kenai Peninsula mountain goat registration permit hunt summary, 1994[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG333	95	48	4%	2	0		2
RG336	63	34	9%	3	0		3
RG340	0	0		0	0		0
RG344	50	29	10%	3	0		3
RG345	13	8	50%	3	0	1	4
RG346	68	35	34%	9	3		12
RG347	30	17	24%	1	3		4
RG352	7	7	86%	6	0		6
RG354	25	15	7%	1	0		1
RG359	16	12	25%	3	0		3
RG360	22	12	50%	2	4		6
RG361	8	4	50%	2	0		2
RG363	19	11	45%	4	1		5
RG364[b]	22	13	15%	2	0		2
Totals	438	245	22%	41	11	1	53

[a]General Registration Season Dates: 15 October - 30 November. Hunt areas RG333, RG347, RG360 and RG363 closed by emergency order October 22, 1994. Hunt areas RG345, RG346, RG352 and RG359 closed by emergency order November 1, 1994.

[b] Limited to residents of Alaska.

Table 10. Units 7 & 15 mountain goat harvest data by drawing permit hunt, 1990-94.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG331	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
	1993/94	2	0	0	100	0	2	--	--	2
	1994/95	2	50	100	0	0	0	--	--	0
DG332	1990/91	0	--	--	--	--	--	--	--	--
	1991/92	0	--	--	--	--	--	--	--	--
	1992/93	0	--	--	--	--	--	--	--	--
	1993/94	0	--	--	--	--	--	--	--	--
	1994/95	0	--	--	--	--	--	--	--	--
DG333	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
	1993/94	6	67	50	50	0	1	--	--	1
	1994/95	15	47	87	13	0	1	--	--	1
DG334	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
	1993/94	6	33	25	75	2	1	--	--	3
	1994/95	10	10	67	33	3	0	--	--	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
DG335	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
	1993/94	8	25	50	50	2	1	--	--	3
	1994/95	12	33	50	50	4	0	--	--	4
DG336	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
	1993/94	25	24	65	32	2	4	--	--	6
	1994/95	25	64	89	11	1	0	--	--	1
DG337	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
	1993/94	2	50	0	100	1	0	--	--	1
	1994/95	2	50	100	0	0	0	--	--	0
DG338	1990/91	--	--	--	--	--	--	--	--	--
	1991/92	--	--	--	--	--	--	--	--	--
	1992/93	--	--	--	--	--	--	--	--	--
	1993/94	2	0	50	50	1	0	--	--	1
	1994/95	2	50	100	0	0	0	--	--	0

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
DG339	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
	1993/94	10	30	86	14	1	0	--	--	1
	1994/95	10	30	57	43	2	1	--	--	3
DG340	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
	1993/94	25	72	43	57	3	1	--	--	4
	1994/95	20	50	80	20	1	1	--	--	2
DG341	1990/91	0	--	--	--	--	--	--	--	0
	1991/92	0	--	--	--	--	--	--	--	0
	1992/93	2	0	0	100	1	1	--	--	2
	1993/94	2	0	0	100	1	1	--	--	2
	1994/95	4	25	67	33	0	1	--	--	1
DG342	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
	1993/94	15	13	39	61	5	3	--	--	8
	1994/95	14	29	50	50	2	3	--	--	5

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
DG343	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
	1993/94	10	20	25	75	3	3	--	--	6
	1994/95	10	10	44	56	4	1	--	--	5
DG344	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
	1993/94	20	55	100	0	0	0	--	--	0
	1994/95	20	60	100	0	0	0	--	--	0
DG345	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
	1993/94	40	60	37	63	4	6	--	--	10
	1994/95	40	68	69	31	1	3	--	--	4
DG346	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
	1993/94	36	58	47	53	5	3	--	--	8
	1994/95	36	33	62	38	8	1	--	--	9

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
DG347	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
	1993/94	12	58	40	60	1	2	--	--	3
	1994/95	15	27	55	45	3	2	--	--	5
DG352	1990/91[a]	--	--	--	--	--	--	--	--	--
	1991/92[a]	--	--	--	--	--	--	--	--	--
	1992/93[a]	--	--	--	--	--	--	--	--	--
	1993/94	25	44	36	64	8	1	--	--	9
	1994/95[a]	--	--	--	--	--	--	--	--	--
DG354	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
	1993/94	16	63	67	33	2	0	--	--	2
	1994/95	20	55	78	22	2	0	--	--	2
DG355	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
	1993/94	4	50	100	0	0	0	--	--	0
	1994/95	4	75	100	0	0	0	--	--	0

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
DG356	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
	1993/94	8	25	50	50	2	1	--	--	3
	1994/95	8	25	67	33	0	2	--	--	2
DG357	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
	1993/94	10	50	80	20	0	1	--	--	1
	1994/95	12	33	62	38	1	2	--	--	3
DG358	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
	1993/94	20	60	75	25	2	0	--	--	2
	1994/95	20	35	62	38	1	4	--	--	5
DG359	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
	1993/94	28	50	67	43	4	2	--	--	6
	1994/95	28	61	82	18	1	1	--	--	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
DG360	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
	1993/94	28	50	50	50	2	5	--	--	7
	1994/95	30	47	69	31	5	0	--	--	5
DG361	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
	1993/94	20	50	70	30	1	2	--	--	3
	1994/95	20	45	82	18	2	0	--	--	2
DG362	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
	1993/94	16	56	57	43	2	1	--	--	3
	1994/95	16	44	56	44	3	1	--	--	4
DG363	1990/91[a]	0	--	--	--	--	--	--	--	--
	1991/92[a]	0	--	--	--	--	--	--	--	--
	1992/93[a]	0	--	--	--	--	--	--	--	--
	1993/94	24	54	55	45	4	1	--	--	5
	1994/95[a]	0	--	--	--	--	--	--	--	--

[a]Subsistence season.

Table 11. Units 7 & 15 mountain goat harvest data by registration permit hunt, 1990-94.

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG333	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	58	47	68	32	7	3	--	--	10
	1992/93	130	40	94	6	5	0	--	--	5
	1993/94	98	39	92	8	3	2	--	--	5
	1994/95	95	49	96	4	2	0	--	--	2
RG335	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	74	55	91	9	2	1	--	--	3
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95[a]	0	--	--	--	--	--	--	--	0
RG336	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	107	51	90	10	4	1	--	--	5
	1992/93	44	30	71	29	9	0	--	--	9
	1993/94	84	43	90	10	2	3	--	--	5
	1994/95	63	46	91	9	3	0	--	--	3
RG339	1990/91	91	47	79	21	9	4	--	--	13
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93	99	33	67	33	12	10	--	--	22
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95[a]	0	--	--	--	--	--	--	--	0

Table 11. Continued

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG340	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
	1993/94	5	60	0	100	2	0	--	--	2
	1994/95[b]	0	--	--	--	--	--	--	--	0
RG344	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	12	50	83	17	0	1	--	--	1
	1992/93	9	67	100	0	0	0	--	--	0
	1993/94	68	49	91	9	3	0	--	--	3
	1994/95	50	42	90	10	3	0	--	--	3
RG345	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
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95	13	39	50	5	3	0	1	--	4
RG346	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95	68	49	66	34	9	3	--	--	12

Table 11. Continued

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG347	1990/91	55	55	76	24	2	3	1	2	8
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	49	47	69	31	4	4	--	--	8
	1994/95	30	43	76	24	1	3	--	--	4
RG352	1990/91[a]	0						--	--	0
	1991/92	7	14	17	83	3	2	--	--	5
	1992/93	8	38	20	80	3	1	--	--	4
	1993/94	4	25	0	100	2	1	--	--	3
	1994/95	7	0	14	86	6	0	--	--	6
RG354	1990/91	14	50	57	43	2	1	--	--	3
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93	27	59	91	9	1	0	--	--	1
	1993/94	36	56	81	19	3	0	--	--	3
	1994/95	25	40	93	7	1	0	--	--	1
RG355	1990/91	26	54	75	25	1	2	--	--	3
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95[a]	0	--	--	--	--	--	--	--	0

Table 11. Continued

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG358	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
	1993/94	10	40	0	100	4	2	--	--	6
	1994/95[a]	0	--	--	--	--	--	--	--	0
RG359	1990/91	9	66	0	100	3	0	--	--	3
	1991/92	6	50	33	67	2	0	--	--	2
	1992/93	10	50	0	100	3	2	--	--	5
	1993/94	14	0	57	43	4	2	--	--	6
	1994/95	16	25	75	25	3	0	--	--	3
RG360	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	37	51	83	17	3	0	--	--	3
	1992/93	25	20	50	50	7	3	--	--	10
	1993/94	27	37	59	41	5	2	--	--	7
	1994/95	22	45	50	50	2	4	--	--	6
RG361	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93	7	43	100	0	0	0	--	--	0
	1993/94	17	41	80	20	2	0	--	--	2
	1994/95	8	50	50	50	2	0	--	--	2

Table 11. Continued

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG363	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	15	20	42	58	4	3	--	--	7
	1992/93	11	18	44	56	5	0	--	--	5
	1993/94	33	27	33	67	10	6	--	--	16
	1994/95	19	42	55	45	4	1	--	--	5
RG364	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92[a]	0	--	--	--	--	--	--	--	0
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	16	13	79	21	1	2	--	--	3
	1994/95	22	41	85	15	2	0	--	--	2
RG365	1990/91[a]	0	--	--	--	--	--	--	--	0
	1991/92	7	57	0	100	2	1	--	--	3
	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	20	70	83	17	0	1	--	--	1
	1994/95[a]	0	--	--	--	--	--	--	--	0

[a]No hunt held
[b]Hunt held but no permits issued

Table 12. Units 7 & 15 mountain goat harvest data by Tier II subsistence permit hunt, 1988-94.

Hunt No. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
TG352	1990/91[a]	--	--	--	--	--	--	--	--	5[a]
	1991/92	20	70	67	33	2	0	--	--	2
	1992/93	20	60	50	50	3	1	--	--	4
	1993/94[b]	0	--	--	--	--	--	--	--	0
	1994/95	25	68	62	38	2	1	--	--	3
TG363	1990/91[a]	--	--	--	--	--	--	--	--	5[a]
	1991/92	12	33	37	63	5	0	--	--	5
	1992/93	24	42	43	57	6	2	--	--	8
	1993/94[b]	0	--	--	--	--	--	--	--	0
	1994/95	30	27	59	41	7	2	--	--	9
TG364	1990/91[a]	--	--	--	--	--	--	--	--	5[a]
	1991/92	20	50	80	20	2	0	--	--	2
	1992/93	20	25	80	20	3	0	--	--	3
	1993/94	20	45	64	36	4	0	--	--	4
	1994/95	20	30	79	21	3	0	--	--	3
TG365	1990/91[a]	--	--	--	--	--	--	--	--	5[a]
	1991/92	42	57	78	22	4	0	--	--	4
	1992/93	30	47	44	56	7	2	--	--	9
	1993/94	30	47	87	13	1	1	--	--	2
	1994/95	30	27	45	55	9	3	--	--	12

[a]Tier II subsistence 865T, 875T. Data not available. Total harvest of 5 goats (1 male and 4 females).
[b]Drawing hunt only.

Table 13. Units 7 & 15 mountain goat hunter drawing permit hunt residency and success, 1990-94.

Regulatory year	Successful			Unsuccessful			Total hunters
	resident	Nonresident	Total (%)	resident	Nonresident	Total (%)	
1990/91	52	3	55 (37)	95	0	95 (63)	150
1991/92	59	3	62 (36)	109	1	110 (64)	172
1992/93	75	1	76 (42)[a]	102	1	103 (58)[a]	179
1993/94	90	2	95 (47)[b]	107	1	109 (53)[b]	204
1994/95	63	5	68 (31)	147	1	148 (69)	216

[a]Three unspecified successful and 1 unspecified unsuccessful.
[b]Two unspecified successful and 2 unspecified unsuccessful hunters.

Table 14. Units 7 & 15 mountain goat hunter registration permit hunt residency and success, 1990-94.

Regulatory year	Successful			Unsuccessful			Total hunters
	resident	Nonresident	Total (%)	resident	Nonresident	Total (%)	
1990/91	32	4	36 (31)	80	1	81 (69)	117
1991/92	51	4	59 (28)[a]	153	1	154 (72)[a]	213
1992/93	64	10	75 (29)[b]	183	1	184 (71)	258
1993/94	67	3	70 (25)	211	0	211 (75)	281
1994/95	47	6	53 (21)	192	1	194 (79)[c]	247

[a]One unspecified successful and 4 unspecified unsuccessful hunters.
[b]Four unspecified successful hunters.
[c]One unspecified unsuccessful.

Table 15. Units 7 & 15 mountain goat harvest chronology for 1990-1994.

Regulatory year	Harvest periods 10-19 August	20-31 August	1-15 September	16-30 September	15-31 October	1-15 November	16-31 November	Unknown	Total[a] Harvest
1990/91	--	--	--	--	34	1	0	58	93
1991/92	9	12	16	25	45	10	1	16	134
1992/93	13	14	16	34	71	0	3	31	182
1993/94	18	11	23	42	65	4	1	12	176
1994/95	17	11	21	18	50	0	1	30	148

[a]Including Tier II subsistence and unreported harvest.

Table 16. Unit 7 mountain goat harvest percent by transport method, 1990-94.

Regulatory year	Percent of harvest Airplane	Horse	Boat	3 or 4-Wheeler	Highway Snowmachine	ORV	vehicle	Unknown	*n*
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
1993/94	27	0	24	3	0	0	43	3	94
1994/95	23	1	34	3	0	0	38	1	77

Table 17. Unit 15 mountain goat harvest percent by transport method, 1990-94.

Regulatory year	Percent of harvest								*n*
	Airplane	Horse	Boat	3 or 4-Wheeler	Highway Snowmachine	ORV	vehicle	Unknown	
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
1993/94	39	8	41	0	0	1	6	4	71
1994/95	73	5	23	0	0	0	0	0	44

LOCATION

GAME MANAGEMENT UNIT: 8 (5,097^2)

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

Mountain goats were introduced to Kodiak Island in 1952 and 1953. From the transplant site at Ugak Bay in northeastern Kodiak Island, goats have spread throughout the major mountain ranges. Highest densities occur in the Ugak, Terror, Uganik and Kiliuda drainages of northern Kodiak. The population continued to increase from an estimated 550 goats in 1990 to 800 goats in 1994. Goats have been hunted by permit since 1968. The annual harvest ranged from 29 to 48 goats since 1990.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Maintain a prehunting population of at least 700 goats that will sustain an annual harvest of > 50% males.

METHODS

Each year in August and September, we used fixed-wing aircraft for composition counts. Count areas approximated boundaries of permit hunts, but in 1993 only the 4 northernmost count areas were covered. In 1994 aerial surveys included approximately 90% of the goat range. We collected 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

In 1994 we counted 719 goats during aerial surveys and estimated the population at a minimum of 800 goats. The highest previous estimate was 675 goats in 1990 when 449 goats were counted with 70% of the habitat covered (Smith 1996).

An increasing trend in the goat population in the Chiniak Bay and northeastern Ugak Bay drainages was apparent from comparing results of the 1990 and 1994 surveys. Although adult goats were occasionally seen there in the 1970s, the first kid was observed in a 1986 survey. This area was not surveyed annually, but 21 goats were seen in 1989 and 68 goats, including 23 kids, were seen in 1994.

Although the total count in 1994 was higher than in 1990, much of the increase was attributed to increased coverage. Although counts for individual areas were slightly higher in 1994 than in 1990, the goat population in most areas was stable (Table 1).

Population Composition

The kid: adult ratio was 23-24 kids:100 adults in 1993 and 1994; little has changed from ratios in earlier years (Table 1). The lowest kid:adult ratios occurred in the southernmost survey areas where goats are relatively recent colonizers.

MORTALITY

Harvest

Seasons 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 1993 the Board of Game authorized an increase from 125 to 150 drawing hunt permits. The board approved a staff proposal to open a drawing permit hunt in the Chiniak and northeastern Ugak Bay drainages in 1995. The board also authorized an increase to 175 drawing hunt permits.

Hunter Harvest. The annual harvest ranged from a low of 29 goats in 1990 to a high of 48 goats in 1993 (Table 2). Among the 7 permit hunts, the annual take ranged from 2 to 9 goats. More males than females were killed every year, but female harvest exceeded male harvest in 2 individual permit hunts in 1994.

The mean age of harvested goats ranged from 3.3 to 4.7 years for males and from 3.7 to 5.7 years for females in the past 7 seasons (Table 3). The oldest goats harvested since 1988 were a 13-year-old male and a 13-year-old female.

Hunter Residency and Success. Average hunter success ranged from 46% in 1991 to 60% in 1993(Table 4). For the 1990-1994 period, the harvest by hunter residency was: non-resident-6%; GMU-8 residents-52%; other Alaskan residents-42%. An average of 57% of the permits available in the past 5 years were used by hunters.

Harvest Chronology. The harvest in October exceeded that in September in 4 of 5 years (Table 5).

Transportation Methods. Hunters used airplanes as the predominant method (Table 6).

Other Mortality

No data were collected on mortality from sources other than hunting. Wounding loss and illegal harvest was estimated at approximately 10% of the reported harvest.

Occasional years with low kid production correlate with winter severity (Smith 1996). The recent increase in goat numbers indicates high survival since 1990.

HABITAT

Assessment

Mountain goats are in the central mountains of Kodiak Island and in several adjacent ranges where peaks exceed 700 m elevation. Goat habitat is mostly remote from human population centers located along the coast. Some winter range occurring on southerly exposures near the coast would be susceptible to disturbance from land development. Goats are most vulnerable in the Chiniak Bay and Ugak Bay drainages where roads and off-road vehicular trails occur. Wintering goats are within 300 m of the Chiniak highway, and recreational use of off-road vehicles is increasing in those drainages.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Research of habitat carrying capacity and relationships between winter severity and productivity could provide managers with more precise estimates of sustainable harvest rates. Mountain goat densities in northern Kodiak Island approach 3 goats/mi^2 (1.2 goats/km^2). The goat population may be near carrying capacity in those areas. Harvest averages about 8% of the annual count.

CONCLUSIONS AND RECOMMENDATIONS

The goat population was stable to increasing in all count areas. Based on a comprehensive aerial survey of goat range in 1994, we estimated the population comprises 800 goats. Issuing more hunting permits in 1993 and 1994 increased harvest from an average of 33 goats in 1990-1992 to 48 goats in 1993 and 42 goats in 1994.

Population management objectives were changed to reflect increases in the population. The recommended objective is to maintain a preseason population of 700 goats that will sustain an annual harvest of >50% males.

The present permit hunting system was effective in maintaining a stable annual harvest. The goat population sustained a harvest rate of 8% of the annual composition count. Population trends in each hunt were closely monitored and permit numbers were adjusted accordingly. No changes in seasons or bag limits are recommended.

LITERATURE CITED

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Table 1. Unit 8 Aerial summer mountain goat composition counts and estimated population size, 1990-94.

Area	Regulatory year	Adults	(%)	Kids	(%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
	1990/91[a]	388	(79)	106	(21)	27	494	43.7	550
All	1991/92	211	(78)	58	(22)	27	269	59.8	--
permit	1992/93	346	(83)	73	(17)	21	419	144.5	--
hunts	1993/94	238	(82)	54	(18)	23	292	83.4	--
	1994/95	579	(81)	140	(21)	24	719	49.2	800
471	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	--	--
	1993/94	79	(88)	11	(12)	14	90	--	--
	1994/95	94	(79)	25	(21)	27	119	--	--
472	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	--	--
	1993/94	35	(95)	2	(5)	6	37	--	--
	1994/95	40	(82)	9	(18)	23	49	--	--
473	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	--	--
	1993/94	79	(81)	18	(19)	23	97	--	--
	1994/95	93	(74)	33	(26)	36	126	--	--
474	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	--	--
	1993/94	--	--	--	--	--	--	--	--
	1994/95	55	(75)	18	(25)	33	73	--	--
475	1991/92	11	(100)	0	(0)	--	11	--	--
	1992/93	--	--	--	--	--	--	--	--
	1993/94	--	--	--	--	--	--	--	--
	1994/95	98	(88)	13	(12)	13	111	--	--
476	1990/91	18	(69)	8	(31)	44	26	--	50-60
	1991/92	10	(91)	1	(9)	10	11	--	--
	1992/93	--	--	--	--	--	--	--	--
	1993/94	--	--	--	--	--	--	--	--
	1994/95	33	(94)	2	(6)	6	35	--	--

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

Table 2. Unit 8 mountain goat harvest data by permit hunt, 1990-94

HuntNo/ Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
	1990/91	100	35	51	49	18 (62)	10 (33)	1	0	29
All	1991/92	125	53	52	48	17 (53)	15 (47)	0	0	32
permit	1992/93	111	58	38	62	22 (58)	16 (42)	1	0	39
hunts	1993/94	143	43	40	60	31 (64)	17 (36)	0	0	48
	1994/95	135	39	42	58	22 (52)	20 (48)	0	0	42
471	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
	1993/94	30	43	44	56	6 (67)	3 (33)	0	0	9
	1994/95	25	64	44	56	5 (56)	4 (44)	0	0	9
472	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
	1993/94	8	37	0	100	3 (60)	2 (40)	0	0	5
	1994/95	10	40	33	67	1 (25)	3 (75)	0	0	4
473	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
	1993/94	25	64	56	44	3 (75)	1 (25)	0	0	4
	1994/95	25	45	33	67	3 (37)	5 (63)	0	0	8
474	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
	1993/94	15	33	30	70	5 (72)	2 (28)	0	0	7
	1994/95	15	33	40	60	6 (60)	4 (40)	0	0	10
475	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
	1993/94	30	47	56	44	5 (71)	2 (29)	0	0	7
	1994/95	30	57	62	38	3 (60)	2 (40)	0	0	5
476	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
	1993/94	25	36	44	56	3 (67)	6 (33)	0	0	9
	1994/95	20	65	57	43	2 (67)	1 (33)	0	0	3
477	1991/92	10	20	13	75	2 (29)	5 (71)	0	0	7
	1992/93	8	0	50	50	1 (25)	3 (75)	--	--	4
	1993/94	10	20	13	87	6 (86)	1 (14)	0	0	7
	1994/95	10	20	62	38	2 (67)	1 (33)	0	0	3

Table 3. Unit 8 mountain goat harvest mean age data from horn rings, 1988-94.

Year	Males	(*N*)	Females	(*N*)
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)
1993/94	3.8	(31)	3.7	(16)
1994/95	4.7	(21)	5.7	(19),

Table 4. Unit 8 mountain goat hunter residence and success, 1988-94.

	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
1993/94	20	22	6	48	(60)	14	17	1	32	(40)	80
1994/95	22	15	5	42	(58)	14	18	0	32	(42)	74

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

Table 5. Unit 8 mountain goat harvest chronology percent by time period, 1988-94.

Area	Regulatory year	Harvest periods		
		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
	1993/94	35	65	48
	1994/95	43	57	42

Table 6. Unit 8 mountain goat harvest by transport method and hunter success, 1988-94.

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
1993/94	35	(73)	12	(25)	0	(0)	1	(2)	48	25	(78)	5	(16)	1	(3)	1	(3)	32
1994/95	35	(88)	5	(12)	0	(0)	0	(0)	40	21	84)	4	(16)	0	(0)	0	(0)	25

Regulatory Year	All hunters								
	Airplane		Boat		ORV		Other		Total
	No.	(%)	No	(%)	No.	(%)	No.	(%)	Reporting
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
1993/94	60	(75)	17	(21)	1	(1)	2	(3)	80
1994/95	56	(86)	9	(14)	0	(0)	0	(0)	65

LOCATION

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

GEOGRAPHIC 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, harvests before 1972 were probably low. The season length and bag limit were reduced in the mid-1970s because of an increase in hunting pressure and harvest.

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

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 periodically during aerial surveys of sheep trend count areas. Harvest and hunting pressure are controlled by registration permit.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The 1995 survey of MacColl Ridge resulted in a count of 45 goats, 10% lower than the 1994 count of 50 (Table 1). In 1981 during a helicopter survey, the highest count on MacColl Ridge was 65 goats. Fixed-wing counts since 1985 have averaged 47 (range = 34-55) goats a year. The mountain goat population on MacColl Ridge appeared stable; however, it is difficult to detect a trend in mountain goat numbers because of yearly fluctuations in count figures due to varying survey conditions.

Biologists estimated 700 mountain goats inhabit the southern Wrangell and Chugach Mountains in Unit 11. This population estimate was obtained 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 1995 was 45:100; kids composed 31% of goats observed (Table 1). Kid production has been high the last 2 years, up from an average 8 kids per year between 1991 and 1993. The number of adults observed in 1995 declined from the previous 2 years.

Distribution and Movements

In the past, observers 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; goats often use lower elevations during winter. East-west movements also occur; 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 the BOG established the Unit 11 goat hunt as a registration permit hunt only. This action was necessary because much of the unit 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, aligning 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 16 mountain goats during the 1993 season and 14 in 1994. The average yearly take since 1980 was 16 goats. The 1994 harvest was composed of 12 (86%) males and 2 (14%) females. With the exception of 1992, males have historically composed the majority of animals taken (Table 2). High male harvest is attributable to the selection of larger trophy animals, especially by nonresidents on guided hunts.

Hunter Residency and Success. Fifty-two registration permits were issued in 1994; this was a decline from 74 permits issued the previous year. The highest number of permits ever issued for this hunt was 97 in 1986. The hunter success rate was 22% in 1993 and 27% in 1994. Although declining somewhat the last 2 years, the hunter success rate is considered high for goat hunters in Unit 11 (Table 2). Successful hunters reported spending 2.0 days afield compared with 2.8 days for unsuccessful hunters in 1992. The hunting effort reported by Unit 11 goat hunters changes litttle from year to year. Nonresident hunters took 10 goats (71%) in 1994 and had a 77% success rate compared with a 24% success rate for Alaskan residents (Table 3). Since 1986 nonresidents have taken 63% of goats harvested and have a higher success rate (73%) than residents (36%).

Permit Hunts. Each year during this report period, an unlimited number of registration permits were available for mountain goat hunting on a first-come, first-served basis. Permits could be obtained in person or by mail from the ADF&G office in Glennallen. Hunters could report hunting results at ADF&G offices in person or by mail.

Harvest Chronology. In 1993, 82% of the harvest occurred during the initial 3 weeks of the season. However, the following year, only 57% of the harvest occurred during this same period (Table 4). During the last 10 years, the highest harvests have occurred early in the season. Before 1986 more goats were taken later in the season, especially in October. The change in harvest chronology was partially the result of 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. Also, locals harvested goats later in the season in the park portions of the unit accessible by road. Reclassifying mountain goats as a nonsubsistence animal ended that traditional harvest.

Transport Methods. Most successful goat hunters used aircraft. Highway vehicles were also a popular method of transportation. Transportation used 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 suggest wolf predation may be common; however, predation rates have not been determined.

HABITAT

Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. Goat habitat in these areas is limited, however. Goats occur in substantial numbers north of the Chitina River, from east of the Lakina River to the Canadian border. The remainder of the Wrangell Mountains west of the Lakina River is marginal goat habitat. Goat habitat in the Chugach Range south of the Chitina River may be more suitable.

CONCLUSIONS AND RECOMMENDATIONS

The count of mountain goats in the MacColl Ridge trend area declined slightly this year. The biggest change was the observed decline in adults, but kid production was very high. Between 1991 and 1993 survey results showed higher numbers of adults observed but lower kid production. A decline in adults in 1995 could possibly be a result of poor recruitment in these previous 3 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 the rugged terrain and vegetation in the trend count areas. Also, the behavioral response of mountain goats to approaching aircraft is to hide in caves, under ledges, and in dense vegetation. 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 seems stable; trends south of the Chitina River are unknown because of poor survey coverage. Mountain goats are numerous only 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 to 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 25% (22 goats) of the total unit harvest from MacColl Ridge. The average annual harvest has been over 4 goats, or approximately 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 14 (16%) 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 is thought to also approach 10% of the estimated population.

Mountain goats in the popular hunting areas of 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 and 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 periodically in heavily hunted areas such as Hawkins and Barnard glaciers. Harvest rates are currently 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 and Hawkins and Barnard glaciers exceeds 12 goats or 10% of the observed goat population. Timely emergency order closures will be difficult because a majority 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 implement reductions in the length of season.

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Table 1. Unit 11 MacColl Ridge trend count area mountain goat composition counts and estimated population size, 1990-95.

Area	Regulatory year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
MacColl Ridge	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
	1994/95	39 (78)	11 (22)	0	28.2	50	50
	1995/96	31 (69)	14 (31)	0	45.2	45	45

[a] Estimate considered to be total count as all goat habitat on ridge counted.

Table 2. Unit 11 mountain goat harvest data by permit hunt, 1990-95.

Hunt No. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
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
R880	1992/93	53	51	17	32	8 (47)	9 (53)	0	0	17
RG580	1993/94	74	43	35	22	13 (81)	3 (19)	0	0	16
RG580	1994/95	52	41	31	27	12 (86)	2 (14)	0	0	14

Table 3. Unit 11 mountain goat hunter residency and success, 1990-95.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Non-resident	Total (%)	
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
1993/94	2	3	11	16 (38)	4	13	9	26 (62)	42
1994/95	2	2	10	14 (47)	2	11	3	16 (53)	30

[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, 1990-95.

Regulatory year	September				October					
	1-7	8-15	16-23	24-30	1-7	8-15	16-23	24-31	1-30	*n*
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
1993/94	38	38	6	6	6	--	6	--	--	16
1994/95	14	29	14	--	7	29	7	--	--	14

Table 5. Unit 11 mountain goat harvest percent by transport method, 1990-95.

Regulatory year	Percent of harvest							
	Airplane	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
1990/91	88	--	--	--	--	12	--	16
1991/92	80	4	4	--	--	4	--	24
1992/93	65	6	--	--	--	23	--	17
1993/94	94	--	--	--	--	6	--	16
1994/95	86	7	--	--	--	7	--	14

LOCATION

GAME MANAGEMENT UNITS: Units 13D and 14 (12,370 mi^2)

GEOGRAPHIC DESCRIPTION: Talkeetna Mountains and western 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, 14A, and 14C) has increased slightly. The number of goats observed during aerial surveys in 14C ranged from 326 to 530 between 1982 and 1989. Between 1990 and 1994, counts ranged from 524 to 619. 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 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 Unit 14A and Unit 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 liberalized 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, however, there were no areas in Unit 14C closed to goat hunting. In 1973 the recently created Chugach State Park, encompassing most of the mountains west of the Lake George and Twentymile River drainages, was closed to goat hunting. Historically, however, these closed areas have not included a substantial segment of the goat population in Unit 14C.

Numbers of hunters are increasing in Units 13D and 14. In the past, most registration permits were issued for the Lake George drainage in Subunit 14C. About half of the goats harvested in Unit 14 are taken in the Lake George drainage. Since 1988 the number of registered goat hunters has increased in Unit 14. Annual goat harvests in this unit have ranged from 23 to 38, 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 (Talkeetna Mountains) is to allow the population to reach an observable minimum of 50 goats before allowing harvest, at which time annual harvest should not exceed 5% of observable goats and should be composed of at least 60% males.

The goat management objective for Unit 14A (Chugach Mountains) is to maintain a minimum observable population of 60 goats that will sustain an annual harvest of 7% of observable goats and at least 70% males.

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 monitored sex and age composition and trend of goat populations through periodic aerial surveys. We monitored harvests by requiring successful hunters to present goat horns for sexing and aging. All hunters were required to return hunt reports, which prompted nearly 100% compliance.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Aerial surveys were conducted throughout most goat range in the Talkeetna Mountains in 1991 and in the western Chugach Mountains from 1990 to 1994 (except 1993) (Tables 1-4). Goat populations in Units 13D and 14 are increasing slowly.

Variations in count conditions and movement may account for 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.

Aerial survey data collected over the past several years indicate that at least 1000 goats inhabited the Talkeetna and northwestern Chugach mountains in August 1994 (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 because of good goat

counting conditions during 1991 and 1992. Goat surveys in southern Unit 14A and Unit 14B are conducted on a 3-year and 3- to 5-year cycle.

Distribution and Movements

Goats were seldom found far from escape cover that includes broken, rocky, steep terrain. Goat distribution during summer has been documented from aerial surveys. During summer, goats were found feeding in early morning and late evening on open grassy slopes, often adjacent to glaciers or snowfields. During midday they seek relief from the heat in dense shrub cover, 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 chiefly inhabit 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 goats are hunted. The future of mountain goats in Unit 13 depends largely on winter weather conditions and secondarily on predation. Deep snowfall during the early 1970s greatly reduced goat numbers.

Most mountain goats in Unit 14 are in the Chugach Mountains; however, small numbers are found in the Talkeetna mountains. Given favorable winter conditions, low predator populations, and low, controlled harvest rates, goats may continue to increase in the Chugach Mountains portion of the unit. The Talkeetna Mountains are the northern limit of mountain goat range and are probably 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. From 1990 to 1994 the bag limit was 1 goat by drawing permit; the taking of kids with horn lengths of 3 inches or less or nannies accompanied by kids was prohibited.

In Units 14A (south of the Matanuska River) and 14C, the hunting season for residents and nonresidents was 1 September-31 October. In Unit 14C goats could only be taken by bow and arrow from 16 October through 31 October. 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 1990 and 1991 the Unit 14B goat season was closed by emergency order. The Board of Game closed the goat hunting season in this unit effective 1992. The goat season in Unit 14A south of the Matanuska River was extended 2 weeks (16-31 October) by the board in 1993. Beginning in 1995 the board authorized 2 drawing permit hunts for goats in Unit 14C, one in the Glacier and Winner creek drainages (near Girdwood), the

other in the East Fork of the Eklutna River drainage in Chugach State Park. Both drawing permit hunts were open from the day after Labor Day to October 15. The bag limit was 1 goat. The number of permits are based on the number of goats observed during aerial surveys in these drainages, keeping harvests less than 5-7% of the observed number to allow continued growth of the population. Initially 3 and 5 drawing permits will be issued for Glacier and East Fork drainages, respectively.

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 resulted in a substantial increase in the Unit 14C harvest. Most of this increase occurred 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, few archers participate during this late archery-only season (Table 6). The number of hunters has increased in the Twentymile River drainage since 1992, with a concomitant increase in harvest, while the number of hunters in the Lake George drainage has remained relatively stable and harvests have declined by about one-half (Table 6).

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

Hunter Residency and Success. Most goat hunters in Units 13 and 14 are local residents. Local residents composed 92% and nonresidents only 4% of goat hunters in Unit 14 in 1994. Legislation passed in 1989 that required all nonresident goat hunters to be accompanied by a guide-outfitter or an Alaskan resident within the second degree of kindred has reduced the number of nonresident hunters (Tables 8 and 9). In Unit 14 all nonresidents hunted in the Knik River drainage (hunt areas 866 and 869).

Success rates from 1990 to 1994 in Unit 14 have ranged from 29% to 39% (Table 9). Guided, nonresident hunters in the Knik River drainage (hunt areas 866 and 869) were more successful than unguided, resident hunters (Table 8).

Harvest Chronology. In the last 5 years, most of the goat harvest in Unit 14C has moved back into September (Table 10). 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 deteriorating 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. The proportion of successful hunters using highway vehicles has increased in Unit 13D, while airplane use has declined (Table 11). The proportion of successful hunters using highway vehicles and boats has increased in the Twentymile River portion of Unit 14C, while airplane use has declined (Table 12). In Unit 14A and the Lake George portion of Unit 14C, aircraft remain the primary mode of transport for successful hunters.

CONCLUSIONS AND RECOMMENDATIONS

All management objectives were met. Aerial surveys 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. At least 25 goats were harvested in Unit 14C annually during this reporting period, and goat harvests averaged 61% males.

We should continue to monitor mountain goat populations; however, because of the low harvest in Unit 13D, goats need to be surveyed only every 2 to 3 years. In Unit 14C, because of budget limitations and the apparent stability of the goat population, surveys can be conducted biennially unless severe winter weather conditions occur.

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. Maximum allowable harvest should not exceed 7% of the number of goats observed during surveys in the Chugach Mountains or 5% in the Talkeetna Mountains.

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 soon leave the state.

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

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Table 1. Unit 13D aerial mountain goat composition counts and estimated population size, 1990-94.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1990/91	--	--	--	--	--	--
1991/92	--	--	--	--	--	--
1992/93[b]	66 (79)	18 (21)	27	84	--	--
1993/94[c]	62 (79)	17 (22)	27	79	--	--
1994/95[d]	36 (75)	12 (25)	33	48	16	175

[a] Based on 80-85% sightability (snow conditions).
[b] Partial survey (count areas 3-5, 11, 12); reliable information indicated at least 60 goats in unsurveyed count areas.
[c] Partial survey (count areas 11, 12).
[d] Partial survey (count areas 5, 7, 16).

Table 2. Unit 14A aerial mountain goat composition counts and estimated population size, 1990-94.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1990/91[b]	37 (88)	5 (12)	14	42	5.9	--
1991/92	--	--	--	--	--	--
1992/93	75 (76)	24 (24)	32	99	8.2	120
1993/94	--	--	--	--	--	--
1994/95	--	--	--	--	--	--

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

Table 3. Unit 14B aerial mountain goat composition counts and estimated population size, 1990-94.

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1990/91	--	--	--	--	--	--
1991/92	28 (93)	2 (7)	7	30	2.1	35
1992/93	--	--	--	--	--	--
1993/94	--	--	--	--	--	--
1994/95	--	--	--	--	--	--

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

Table 4. Unit 14C aerial mountain goat composition counts and estimated population size, 1990-94.[a]

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
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
1993/94	--	--	--	--	--	--
1994/95	495 (83)	124 (17)	25	619	72[d]	750

[a] Data include all goats observed in Unit 14C; S&I reports prior to 1984 included only goats in registration hunt areas.
[b] Based on 80-85% sightability (snow conditions).
[c] Partial survey (excludes Twentymile River drainage).
[d] Does not include goats counted incidental to sheep survey or Penguin Creek.

Table 5. Annual mountain goat harvest by unit, 1990-94.

Regulatory year	Unit				Total
	13D[a]	14A[b]	14B[c]	14C[b]	
1990/91	5	4	--	28	37
1991/92	8	4	--	36	48
1992/93	5	1	--	38	44
1993/94	6	4	--	25	35
1994/95	2	6	--	26	34

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

Table 6. Unit 14 mountain goat harvest data by permit hunt, 1990-94.

Area[a]	Regulatory year	Permits issued	Percent did not hunt[b]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unknown sex	Total harvest
866	1990/91	39	28	79	21	3 (75)	1 (25)	--	4
Unit 14A	1991/92	23	48	67	33	3 (75)	1 (25)	--	4
	1992/93	22	55	90	10	0 (0)	1 (100)	--	1
	1993/94	42	52	80	20	3 (75)	1 (25)	--	4
	1994/95	32	31	73	27	4 (67)	2 (33)	--	6
868	1990/91	69	36	97	3	1 (100)	0 (0)	--	1
Unit 14C	1991/92	82	56	81	19	5 (71)	2 (29)	--	7
Twentymile	1992/93	95	45	77	23	5 (42)	7 (58)	--	12
River	1993/94	117	49	83	17	7 (70)	3 (30)	--	10
	1994/95	93	50	79	21	8 (80)	2 (20)	--	10
869	1990/91	107	30	58	42	15 (56)	12 (44)	--	27
Unit 14C	1991/92	103	49	45	55	19 (70)	8 (30)	2	29
Lake	1992/93	120	41	63	37	14 (56)	11 (44)	1	26
George	1993/94	96	43	76	34	9 (69)	4 (31)	--	13
	1994/95	116	42	76	24	7 (44)	9 (56)	--	16
878 (881)	1990/91	1	0	100	0	0 (0)	0 (0)	--	0
Unit 14C	1991/92	4	100	--	--	0 (0)	0 (0)	--	0
Twentymile	1992/93	5	100	--	--	0 (0)	0 (0)	--	0
River	1993/94	13	54	100	0	0 (0)	0 (0)	--	0
(archery)	1994/95	1	100	--	--	0 (0)	0 (0)	--	0
879 (882)	1990/91	3	0	100	0	0 (0)	0 (0)	--	0
Unit 14C	1991/92	4	75	100	0	0 (0)	0 (0)	--	0
Lake	1992/93	5	100	--	--	0 (0)	0 (0)	--	0
George	1993/94	6	17	60	40	2 (100)	0 (0)	--	2
(archery)	1994/95	4	100	--	--	0 (0)	0 (0)	--	0

Table 6. Continued

Area[a]	Regulatory year	Permits issued	Percent did not hunt[b]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unknown sex	Total harvest
Totals	1990/91	180	48	70	30	16 (57)	12 (43)	--	28
for all	1991/92	193	53	60	40	24 (71)	10 (29)	2	36
Unit 14C	1992/93	225	45	69	31	19 (51)	18 (49)	1	38
	1993/94	232	46	80	20	18 (72)	7 (28)	--	25
	1994/95	214	47	77	23	15 (58)	11 (42)	--	26
Totals	1990/91	219	48	72	28	19 (59)	13 (41)	--	32
for all	1991/92	216	53	61	39	27 (71)	11 (29)	2	40
Unit 14	1992/93	247	46	71	29	19 (50)	19 (50)	1	39
permit	1993/94	274	47	80	20	21 (72)	8 (20)	--	29
hunts	1994/95	246	45	77	23	19 (59)	13 (41)	--	32

[a] Previous hunt number in parentheses.
[b] Includes permittees who did not report.
[c] Closed to mountain goat hunting.

Table 7. Unit 13D mountain goat harvest data by permit hunt, 1990-94.

Area[a]	Regulatory year	Permits issued	Percent did not hunt[b]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
718 (818,827)	1990/91	10	50	40	60	3 (100)	0 (0)	3
Unit 13D	1991/92	10	60	25	75	2 (67)	1 (33)	3
West	1992/93	10	70	33	67	1 (50)	1 (50)	2
	1993/94	10	50	40	60	1 (33)	2 (67)	3
	1994/95	10	30	100	0	0 (0)	0 (0)	0
719 (819,828)	1990/91	16	69	60	40	1 (50)	1 (50)	2
Unit 13D	1991/92	25	48	61	39	4 (80)	1 (20)	5
East	1992/93	25	56	73	27	1 (33)	2 (67)	3
	1993/94	25	67	80	20	3 (100)	0 (0)	3
	1994/95	25	52	83	17	1 (50)	1 (50)	2
Totals	1990/91	26	62	50	50	4 (80)	1 (20)	5
for all	1991/92	35	51	53	47	6 (75)	2 (25)	8
Unit 13D	1992/93	35	60	64	36	2 (40)	3 (60)	5
	1993/94	35	43	70	30	4 (67)	2 (33)	6
	1994/95	35	46	90	10	1 (50)	1 (50)	2

[a] Previous hunt number in parentheses; changed to 718 and 719 in 1993/94.
[b] Includes permittees who did not report.

Table 8. Unit 13D mountain goat hunter residency and success, 1990-94.

Area[a]	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)	Total hunters
718	1990/91	0	3	0	3 (60)	0	2	0	2 (40)	5
Unit 13D	1991/92	0	3	0	3 (75)	0	1	0	1 (25)	4
West	1992/93	0	2	0	2 (67)	0	1	0	1 (33)	3
	1993/94	0	2	1	3 (60)	0	1	0	2 (40)[b]	5
(818,827)	1994/95	0	0	0	0 (0)	1	5	0	7 (100)[b]	7
719	1990/91	0	2	0	2 (40)	0	3	0	3 (60)	5
Unit 13D	1991/92	0	5	0	5 (39)	0	7	1	8 (61)	13
East	1992/93	1	2	0	3 (27)	0	8	0	8 (73)	11
	1993/94	0	3	0	3 (20)	0	12	0	12 (80)	15
(819,828)	1994/95	0	1	1	2 (17)	0	10	0	10 (83)	12
Totals	1990/91	0	5	0	5 (50)	0	5	0	5 (50)	10
for all	1991/92	0	8	0	8 (47)	0	8	1	9 (53)	17
Unit 13D	1992/93	1	4	0	5 (36)	0	9	0	9 (64)	14
	1993/94	0	5	1	6 (30)	0	13	0	14 (70)[b]	20
	1994/95	0	1	1	2 (10)	1	15	0	17 (90)[b]	19

[a] Previous hunt number in parentheses; changed to 718 and 719 in 1993/94.
[b] Includes hunters with unspecified residency.

Table 9. Unit 14 mountain goat hunter residency and success, 1990-94.

		Successful				Unsuccessful				
Area[a]	Regulatory year	Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	Total hunters
866	1990/91	3	0	1	4 (21)	14	0	0	15 (79)[b]	19
Unit 14A	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)[b]	10
	1993/94	0	0	4	4 (20)	13	1	2	16 (80)	20
	1994/95	4	0	2	6 (27)	14	2	0	16 (73)	22
868	1990/91	1	0	0	1 (3)	30	0	0	31 (97)[b]	32
Unit 14C	1991/92	6	1	0	7 (19)	26	2	0	29 (81)[b]	36
Twentymile	1992/93	12	0	0	12 (23)	39	1	0	40 (77)	52
River	1993/94	10	0	0	10 (18)	46	0	0	47 (82)[b]	57
	1994/95	10	0	0	10 (21)	37	0	0	37 (79)	47
869	1990/91	25	0	2	27 (47)	27	3	1	31 (53)	58
Unit 14C	1991/92	24	1	4	29 (55)	23	1	0	24 (45)	53
Lake	1992/93	17	1	8	26 (37)	40	3	2	45 (63)	71
George	1993/94	9	2	2	13 (25)	37	2	0	41 (75)[b]	54
	1994/95	12	3	1	16 (24)	45	4	2	51 (76)	67

Table 9. Continued

Area[a]	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)	Total hunters
878 (881)	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	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	1993/94	0	0	0	0 (0)	5	1	0	6 (100)	6
	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
879 (882)	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	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	1993/94	1	1	0	2 (40)	2	1	0	3 (60)	5
	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
Totals	1990/91	26	0	2	28 (30)	61	3	1	66 (70)[b]	94
for all	1991/92	30	2	4	36 (40)	50	3	0	54 (60)[b]	90
Unit 14C	1992/93	29	1	8	38 (31)	79	4	2	85 (69)	123
	1993/94	20	3	2	25 (21)	90	4	0	97 (79)	122
	1994/95	22	3	1	26 (23)	82	4	2	88 (77)	114
Totals	1990/91	29	0	3	32 (28)	75	3	1	81 (72)[b]	113
for all	1991/92	34	2	4	40 (39)	56	4	1	62 (61)[b]	102
Unit 14	1992/93	29	1	9	39 (29)	87	4	2	94 (71)[b]	133
	1993/94	20	3	6	29 (21)	103	5	2	113 (79)[b]	142
	1994/95	26	3	3	32 (24)	96	6	2	104 (76)	136

[a] Previous hunt number in parentheses.
[b] Includes hunters with unspecified residency.

Table 10. Unit 14 mountain goat harvest chronology percent by time period, 1990-94.

Area	Regulatory year	Harvest period						
		August	September	October	November	December	Unknown	*n*
Unit 14A	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
	1993/94	0	25	75	0	0	0	4
	1994/95	0	50	50	0	0	0	6
Unit 14C	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
	1993/94	0	50	50	0	0	1	25
	1994/95	0	56	44	0	0	1	26
Totals for all Unit 14	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
	1993/94	0	46	54	0	0	1	29
	1994/95	0	55	45	0	0	1	32

[a] No open season.

Table 11. Unit 13D successful mountain goat hunter transport methods, 1990-94.

Regulatory year	Percent of harvest							
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	*n*
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
1993/94	67	0	0	0	0	0	33	6
1994/95	50	0	0	0	0	0	50	2

Table 12. Unit 14C successful mountain goat hunter transport methods, 1990-94.

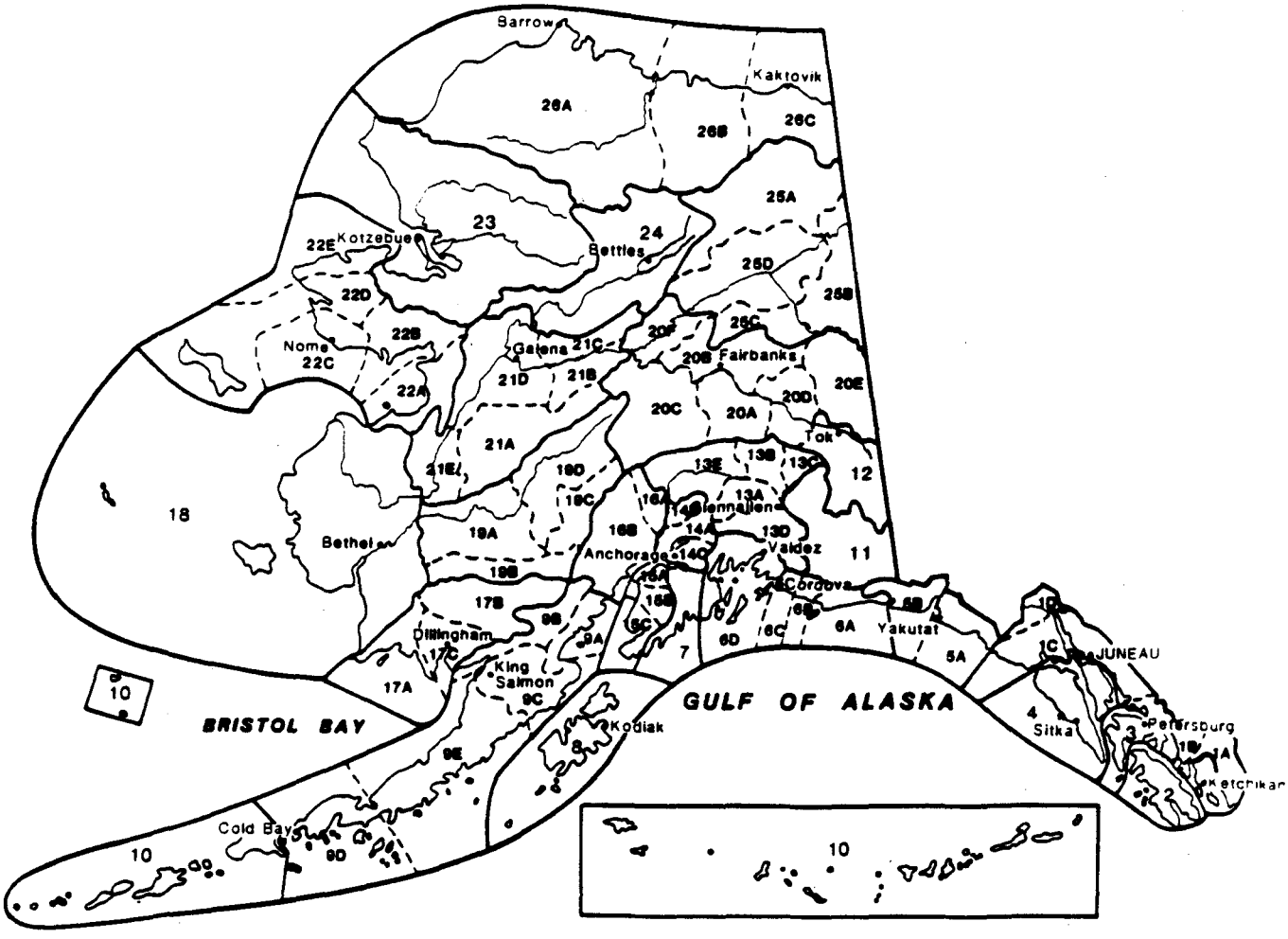
Area[a]	Regulatory year	Percent of harvest								
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
866	1990/91	100	0	0	0	0	0	0	0	4
Unit 14A	1991/92	100	0	0	0	0	0	0	0	4
	1992/93	100	0	0	0	0	0	0	0	1
	1993/94	100	0	0	0	0	0	0	0	4
	1994/95	100	0	0	0	0	0	0	0	6
868	1990/91	0	0	100	0	0	0	0	0	1
Unit 14C	1991/92	29	0	29	0	0	0	29	14	7
Twentymile	1992/93	17	0	42	0	0	0	33	8	12
River	1993/94	10	0	40	0	0	0	40	10	10
	1994/95	20	0	50	0	0	0	20	10	10
869	1990/91	93	0	4	0	0	0	0	4	27
Unit 14C	1991/92	97	3	0	0	0	0	0	0	29
Lake	1992/93	93	0	0	0	0	0	4	4	27
George	1993/94	100	0	0	0	0	0	0	0	13
	1994/95	88	0	0	0	0	0	6	6	16
879	1990/91	0	0	0	0	0	0	0	0	0
Unit 14C	1991/92	0	0	0	0	0	0	0	0	0
Lake	1992/93	0	0	0	0	0	0	0	0	0
George	1993/94	50	0	50	0	0	0	0	0	2
(archery)	1994/95	0	0	0	0	0	0	0	0	0

Table 12. Continued

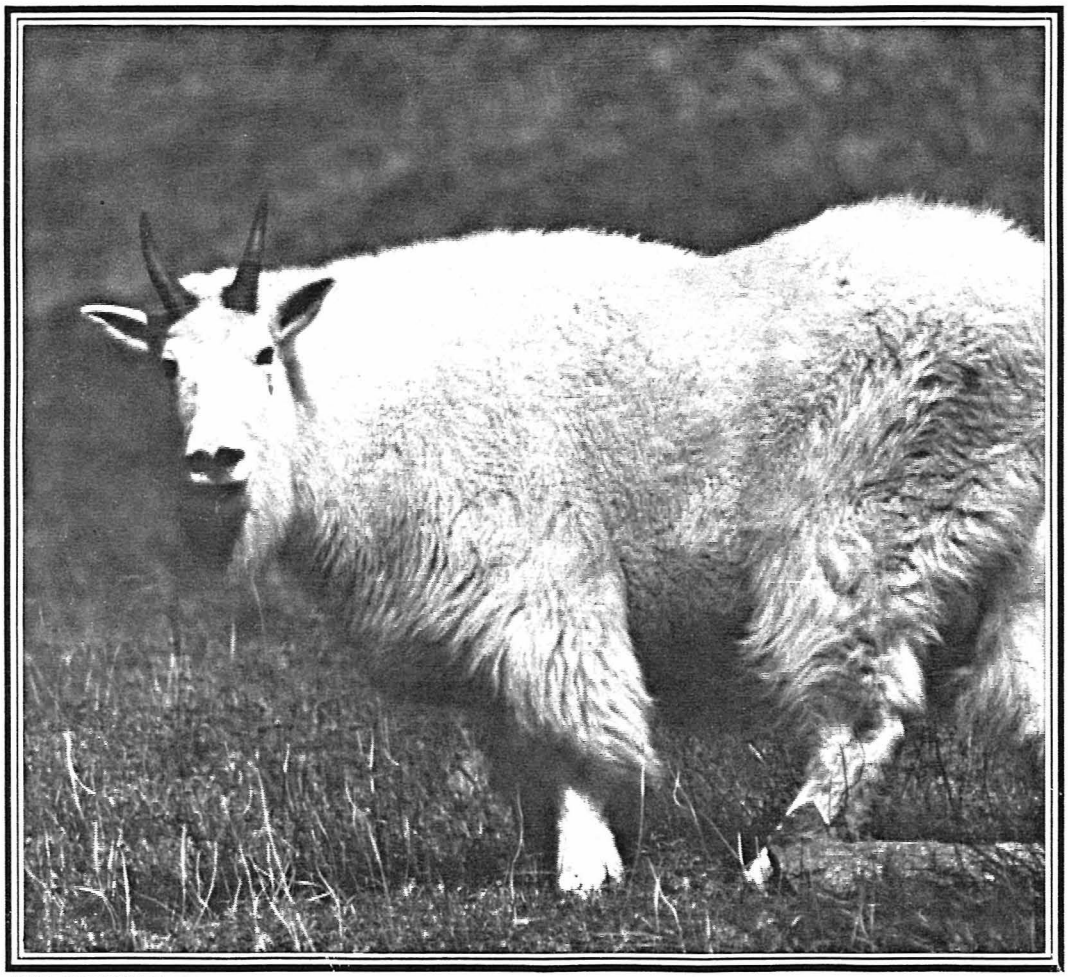
Area[a]	Regulatory year	Percent of harvest								
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
Totals for all Unit 14C	1990/91	89	0	7	0	0	0	0	4	28
	1991/92	83	3	6	0	0	0	6	3	36
	1992/93	71	0	13	0	0	0	13	3	38
	1993/94	60	0	20	0	0	0	16	4	25
	1994/95	62	0	19	0	0	0	12	8	26
Totals for all Unit 14	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
	1993/94	66	0	17	0	0	0	14	3	29
	1994/95	69	0	16	0	0	0	9	6	32

[a] Archery-only registration hunt 878 (Twentymile River drainage) had no successful hunters.

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 attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.



PAT COSTELLO