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Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
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MOUNTAIN GOAT

Mary V Hicks, Editor

F&G

Grants W-24-4 and W-24-5
Study 12.0
December 1998

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
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DIVISION OF WILDLIFE CONSERVATION
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CONTENTS

LOCATION

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

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

BACKGROUND

Severe winter weather conditions during 1968–1975 resulted in up to 90% reductions in Unit 1A mountain goat populations (Smith 1984). Subsequent moderating weather enabled goat populations to recover, and we believe the subunit populations are stable at moderately high levels.

Steep, glacially created valleys and peaks in Unit 1A provides important escape terrain for resident goats from predating 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 forest provide necessary cover, and during critical winter months shrubs and evergreen forbs provide nourishment.

Although goats historically inhabited only the subunit's mainland, they now inhabit 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 translocation sites because they have suitable escape terrain and wintering habitat. The Swan Lake population has increased substantially since its introduction and now comprises about 250 goats. This increase prompted us to initiate a hunting season near Swan Lake in 1993. We estimate the Upper Mahoney Lake population consists of about 50–60 goats.

Hunter harvests from Unit 1A averaged 45 goats each season during 1972–1988. However, the average annual harvest dropped to just over 20 during the past 8 seasons as a result of 1989 legislation requiring nonresident goat hunters to hunt with registered guides. Cyclic, unpredictable weather severity, along with density-related overforaging of habitat, are believed to be more influential than hunting in modifying the unit's goat populations.

To monitor population changes caused by winter weather, overforaging, and predation, the department attempts to complete aerial surveys of established trend count areas each late summer and 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 that provide 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 unit's 12 established trend count areas (TCAs) each fall as weather and schedules allow. TCAs vary in size from 23–200 mi^2. We generally initiate surveys during September or early October between 1700–1900 hours. A pilot flies a PA-18 SuperCub with an observer at a height of 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 obtain harvest information through a mandatory hunt report that is part of a required registration permit. Information we collect includes the areas and numbers of days hunted, hunter success, dates 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

During fall 1995 we completed aerial surveys in TCAs K-3 (Smeaton Bay/Rudyerd Bay), K-7 (Yes Bay/Reflection Lake), K-9 (Chickamin River/Lake 2722), K-11 (Walker Cove/Rudyerd Bay), and K-12 (Swan Lake/Mt. Reid) (Table 1). We observed 345 goats in nearly 9 hours of flying. Our observation rate of 40 goats/hour was down from the previous year's but up from the historic low observed in 1993.

During fall 1996 we completed aerial surveys in TCAs K-6 (Southern Cleveland Peninsula), K-7 (Yes Bay/Reflection Lake), K-9 (Chickamin River/Lake 2722), K-10 (Chickamin River/Walker Cove), K-11 (Walker Cove/Rudyerd Bay), K-12 (Swan Lake/Mt. Reid), and K-13 (Mahoney Mtn.) (Table 1). We observed 421 goats in nearly 11 hours (40 goats/hour). The ratio of 36 kids:100 adults constitutes the highest percentage of kids observed during annual surveys since 1977. This may reflect an increasing population in the unit, perhaps following declines in at least some of the TCAs (e.g., K-7).

We observed notable increases in numbers of goats in TCA K-3 and in TCAs K-12 and K-13, the 2 areas where goats were introduced (Table 2). It appears that the transplanted populations are continuing to grow, further evidenced by the high percentage of kids in the 2 populations. The 6 sets of twins observed in TCA K-12 during 1996 is the highest number ever recorded during a survey in the unit. Twinning rates in TCA K-13 may be high as well, but because nannies and

kids in this area consistently bunch into large nursery bands, it has been difficult to differentiate maternal groups. Nonetheless, the 50 kids:100 adults ratio observed in TCA K-13 is among the highest ever recorded in the unit. We believe goat populations elsewhere in the subunit remained relatively stable during this report period.

Population Size

We developed population estimates for goats inhabiting Subunit 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 7300–10,200 goats (ADF&G Unpubl. rep., 1990, Ketchikan). In the absence of new information, this estimate is still a good indicator of population.

Population Composition

1995 surveys resulted in an overall productivity estimate for Subunit 1A of 19 kids:100 adults, the same observed the previous year (Table 1). Productivity varied among TCAs from 9–26 kids:100 adults. In 1996 our subunit productivity estimate increased to a 17-year high of 36 kids: 100 adults and ranged between 17 and 50 among TCAs (Table 2).

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 introduced Swan Lake population indicate these goats have mostly remained within a 6-mile radius of the original release site, although in 1992 at least 2 had traveled up to 12 miles from the release site (Larsen 1996). On August 25, 1995 we observed 2 adult billies on a steep cliff between Traitor's Cove and Bluff Lake on Revillagigedo Island. We believe these goats originated from the Swan Lake population. They were observed approximately 15 miles from the original translocation. Given the movements shown by goats from the Swan Lake translocation and from the Mahoney Mountain translocation (Larsen 1996), we consider it likely that intermingling of goats from the 2 releases will become increasingly common, and eventually create 1 large islandwide population.

MORTALITY

Harvest

Season and Bag Limit:		Resident and Nonresident Hunters
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	Aug. 1–Dec. 31	1 goat by registration permit only.

Orchard Creek, south of Orchard Creek, Orchard Lake, Shrimp Bay, and Gedney Pass.

Remainder of Unit 1A Aug. 1–Dec. 31 2 goats by registration permit only.

Hunter Harvest: The highest harvest during the past 8 seasons occurred in 1993 when 20 billies and 13 nannies were reported killed by 85 hunters (Table 3). The 1995 harvest of 14 billies and 10 nannies was taken by 78 hunters, and 70 hunters took the 1996 harvest of 14 billies and 8 nannies. A billy harvested from the Boca-de-Quadra region during 1995 qualified for entry into the Boone and Crockett (B&C) Club's all-time records book, scoring 50 2/8 points. Another billy, harvested from Revillagigedo Island during 1996, qualified for entry into the B&C Club's two-year awards book with a score of 48 6/8 points. A third billy, harvested from the Cleveland Peninsula in 1991, was submitted for scoring during this report period and qualified for B&C Club's all-time awards book with a score of 55 points.

The Swan Lake goat harvest on Revillagigedo Island has remained low since its inception in 1993. Rugged terrain and poor access are believed to be responsible for the low harvest. Two nannies and a billy were harvested during the first season and no goats were taken in 1994. One billy was harvested during 1995 and 2 billies and a nanny were harvested during 1996, resulting in a 4-year harvest of 4 billies and 3 nannies.

Permit Hunts: Goat hunting in Unit 1A has been regulated through registration permits for the past 17 years. During 1982–1993, we issued second permits to hunters who killed a goat and returned their first permit hunt report. Just before the 1994 season, this was changed so hunters can now harvest up to 2 goats during a single hunt in most of the subunit. In 1994, 2 of 18 successful hunters bagged 2 goats (Table 3). We issued 201 and 171 permits from our Ketchikan office during 1995 and 1996, respectively. Of these, 78 permittees hunted during 1995 and 70 permittees hunted during 1996.

Hunter Residency and Success: Two nonresidents unsuccessfully hunted goats in Unit 1A during 1995, and 3 nonresidents hunted unsuccessfully during 1996 (Table 4). Seventy-five and 64% of the 1995 and 1996 harvests, respectively, were by hunters residing within the subunit. Hunter success was 31% during both 1995 and 1996.

Harvest Chronology: For the third and fourth consecutive seasons, most of the 1995 and 1996 harvests occurred during September (Table 5). During the past 2 seasons, hunters harvested 8 goats from the subunit during August and 4 during October.

Transport Methods: Airplanes accounted for 88% and 82% of the transportation used by hunters during the past 2 seasons, respectively (Table 6). Airplanes have accounted for 70–88% of the transportation used by hunters during the past 5 seasons.

CONCLUSIONS AND RECOMMENDATIONS

Mountain goat populations have remained stable throughout most of Unit 1A during this report period. We have consistently met our objective of maintaining goat densities greater than 20 goats per hour of survey time. Low counts around Yes Bay/Reflection Lake on the northern Cleveland Peninsula during the past few years have probably been caused by declines associated with predation and overbrowsing. High productivity observed during 1996 indicates the population in this area may be rebounding.

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 markedly reduced nonresident participation in the subunit's goat hunting. However, at least 3 registered guides have established guide use areas within the subunit during the past couple of years; therefore, we anticipate increased future nonresident hunter participation.

The goat population introduced near Swan Lake on Revillagigedo Island continued to increase during this report period, and a hunting season remains open in the area. Four goats were harvested from the area during this report period, increasing the 4-year harvest to 7.

The 1991 Upper Mahoney Lake goat introduction was a success. Although 3 of the originally translocated goats have died, productivity remains high and the herd increased from the original 15 to a minimum of 39 in fall 1996. We have established a trend count area near Deer Mountain/Upper Mahoney Lake (K-13), which we will periodically survey along with the other TCAs in the subunit.

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Table 1 Mountain goat survey data, Unit 1A, 1968–1996

Survey dates[a]	Nr. of kids	Nr. of adults	Total goats	Kids: 100 adults	Count time (hrs.)	Goats/hour
Aug. 20 - Sep. 18, 1968	162	553	715	29	4.9	146
Sep. 13 - Sep. 16, 1971	111	357	468	31	3.9	120
Aug. 16 - Sep. 16, 1973	35	149	184	23	2.5	74
Aug. 27 - Sep. 21, 1974	14	50	64	28	1.8	35
Aug. 12 - Sep. 11, 1975	84	270	354	31	7.6	46
Sep. 1 - Sep. 11, 1976	73	283	356	26	8.0	44
Aug. 31 - Sep. 6, 1977	165	354	519	47	6.3	82
Sep. 5 - Sep. 9, 1978	126	404	530	31	5.2	102
Sep. 18 - Sep. 21, 1979	62	238	300	26	3.8	79
Aug. 20 - Sep. 12, 1980	215	617	832	35	9.6	87
Aug. 26 - Sep. 21, 1981	153	461	614	33	6.0	102
Aug. 29 - Sep. 18, 1982	167	515	682	32	6.9	99
Aug. 30 - Sep. 23, 1983	177	658	835	27	7.5	111
Sep. 5 - Sep. 24, 1984	174	666	840	26	7.1	118
Sep. 9 - Sep. 26, 1985	75	311	386	24	3.3	117
Sep. 12 - Sep. 15, 1986	64	359	423	18	4.0	106
Sep. 23 - Oct. 8, 1987	39	182	221	21	2.0	110
Sep. 3 - Sept. 19, 1988	104	304	408	34	4.4	93
Sep. 10 - Sep. 13, 1989	124	415	539	30	5.5	98
Sep. 6 - Oct. 3, 1990	193	603	796	32	9.3	85
Aug. 30 - Sep. 5, 1993	47	163	210	29	6.8	31
Sep. 8 - Oct. 1, 1994[b]	81	414	495	19	8.8	56
Aug. 28 - Sep. 4, 1995	55	290	345	19	8.7	40
Sep. 3 - Sep. 30, 1996	112	309	421	36	10.6	40

[a]Most comparable data are from 1975–1994.

[b]Includes a 48-minute survey of the Deer Mountain/Upper Mahoney Lake translocated population on September 8. Fourteen adults and 4 kids were observed.

Table 2 Trend count area surveys, Unit 1A, 1980–1996

Survey area	Year	Adults	Kids	Total Goats	Survey time (hrs.)	Goats observed/hr.	Kids: 100 Adults	Sets of Twins
K-3	1995	105	28	133	2.0	66	26	0
	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-6	1996	18	6	24	1.5	16	33	0
K-7	1996	65	25	90	2.5	36	38	1
	1995	22	2	24	2.2	11	9	0
	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

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs.)	Goats observed/hr.	Kids: 100 Adults	Sets of Twins
	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
K-9	1996	44	12	56	1.7	33	27	0
	1995	47	6	53	1.7	31	13	0
	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	1996	52	14	66	1.2	55	27	0
	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	1996	12	2	14	0.3	47	17	0
	1995	20	2	22	0.3	73	10	1
	1994	17	5	22	0.4	55	29	1
	1993[a]	5	0	5	0.2	25	0	0

Table 2 Continued

Survey area	Year	Adults	Kids	Total Goats	Survey time (hrs.)	Goats observed/hr.	Kids: 100 Adults	Sets of Twins
	1990	15	2	17	0.3	57	13	0
	1989	21	4	25	0.4	62	19	0
	1988	5	2	7	0.2	35	40	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
K-12[c]	1996	92	40	132	2.3	57	43	6
	1995	96	17	113	2.5	45	18	1
	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	--
K-13[e]	1996	26	13	39	1.0	39	50	0
	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 translocated population.

[d] Surveys were done using a Bell 206 Jet Ranger helicopter.

[e] Upper Mahoney Lake translocated population.

Table 3 Mountain goat harvest data for permit Hunt RG001/002, Unit 1A, 1985–1996

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[b]
1987	195	107	61	27	14	13	28[b]
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[c]	128	80	16	10	5	16[b]
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
1995	201	110	54	24	14	10	24
1996	171	91	48	22	14	8	22

[a] Number of permits issued from the Ketchikan office. Second permit holders are treated as separate hunters.

[b] The sex of some goats not reported.

[c] Three permits not returned.

[d] Regulation changed; hunters could take 2 goats during a single hunt.

[e] Two hunters killed 2 goats. Thus, 18 hunters killed 20 goats.

Table 4 Goat hunter residency and success, Unit 1A, 1985–1996

Year	Successful				Unsuccessful			
	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
1995	18	6	0	24	38	14	2	54
1996	14	8	0	22	30	15	3	48

[a] Local and nonlocal residents were combined during 1985 and 1986 regulatory seasons. Local resident hunters reside in Unit 1A.

Table 5 Goat harvest chronology, Unit 1A, 1985–96

Year	Aug	Sep	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
1995	3	19	2	0	0
1996	5	15	2	0	0
Totals	139	305	122	31	60

Table 6 Transportation methods used by successful goat hunters, Unit 1A, 1985–96

Year	% Using airplanes	% Using 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
1995	88	12
1996	82	18

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 Unit 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 during severe weather retreat to timbered areas, often descending to coastal shorelines. Although data is scarce, Unit 1B goat populations have been stable with the exception of the late 1960s and early 1970s, when severe winters reduced the herd.

Because hunters have limited access to goat habitat, hunting pressure is focused near access points. Alaska Department of Fish & Game, Division of Wildlife Conservation, biologists monitor harvest closely. In the last 5 years, annual harvest has ranged between 22 and 36 goats.

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, mode of transportation, 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 Unit 1B. The population seems stable.

Population Composition

Table 1 shows the past 5 years of age composition data from aerial trend counts. Differences in sample size occur because of inclement weather, which makes complete surveys difficult. In the September 1996 survey, kids composed 26% of the goats classified, a substantial increase from the June 1995 survey, which only documented 6% kids. Annual differences in survey intensity

(i.e., minutes/mile search time) and methods, and lack of information about seasonal goat movements, make it difficult to estimate goat abundance.

Habitat

In May 1997 Fish and Game and U. S. Forest Service biologists' inspected goat wintering range in the Crystal Creek drainage adjacent to a proposed timber sale. Blueberry (*Vaccinium* spp.) plants observed in old growth forest adjacent to alpine habitats showed 100% browsing during the winter by goats and moose.

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	1 goat by registration permit only. However, the taking of kids or nannies with kids is prohibited.
Remainder of Subunit 1B	Aug. 1–Dec. 31	2 goats by registration permit only.

Board of Game Actions and Emergency Orders. The Board of Game eliminated the regulation protecting kids and nannies accompanied by kids 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. The Federal Subsistence Board made a determination that all rural residents of Units 1B and 3 qualified as subsistence users of goats in Unit 1B. This action became affective July 1, 1997. Previously, no determination had been made, except that no subsistence use was allowed to residents of Petersburg, Kupreanof, and outlying areas.

Hunter Harvest. The 1995 and 1996 harvests of 28 and 22 goats, respectively, for Unit 1B was below our management harvest goal of 35 goats (Table 2). Hunter success was 40% in 1995 and 31% in 1996, which is in line with the management goal of 35%. The male component of the harvest was 82% and 68% for 1995 and 1996, respectively. These data from hunting reports were not verified by checking hunter kills. We distributed literature designed to help hunters identify male goats and encouraged hunters to select males.

In 1995, 5 subsistence hunters received a Federal permit to harvest a second goat in the RG004 area. Three of the hunters did not hunt, 1 was unsuccessful, and 1 hunter successfully harvested a male goat. In 1996, 2 Federal permits were issued and 1 hunter reported an unsuccessful hunt. The other permittee did not return the 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). The number of successful hunters is similar between local residents, nonlocal residents, and nonresidents. The number of unsuccessful local residents

greatly exceeds the unsuccessful nonlocal residents and nonresidents. This discrepancy is due to the lack of effort by locals. Many local hunters hunt the beach, hoping for an easy opportunity to harvest a goat.

Harvest Chronology: Most of the Unit 1B goat harvest takes place in August and September (Table 4). In 1995 more goats were taken in September. In 1996 hunters took a greater proportion of goats in August.

Transport Methods. In 1995 and 1996, 75 and 54%, respectively, of successful hunters accessed their hunting area by airplane; the remainder used boats (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

Goat populations seem stable in Unit 1B, but with possible low production in 1994. Hunting pressure is low and limited to areas of easy access. The population should be monitored closely in the upcoming year. I recommend no change in state regulations.

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Table 1 Unit 1B summer aerial mountain goat composition counts, 1991–96

Regulatory Year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 Adults	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
1996/97 (Sep. 1996)	59	(74)	21	(26)	0	36	80	52

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

Table 2 Unit 1B mountain goat harvest data by permit hunt, 1993–96

Hunt Nr.	Regulatory Year	Permits Issued	Number Did Not Hunt	(%) Did Not Hunt	Number of Successful Hunters	(%) Successful Hunters	Males	(%)	Females	Total Harvest
RG001	1993/94	18	0	0	11	(61)	5	(45)	6	11
	1994/95	6	0	0	6	(100)	1	(17)	5	6
	1995/96	11	0	0	6	(54)	3	(50)	3	6
	1996/97	10	0	0	1	(10)	0	(0)	1	1
RG004	1993/94	147	81	(55)	25	(38)	19	(76)	6	25
	1994/95	144	64	(44)	28	(35)	19	(68)	9	28
	1995/96	125	66	(52)	22	(40)	20	(90)	2	22
	1996/97	147	87	(59)	21	(35)	15	(71)	6	21
Combined	1993/94	165	81	(49)	36	(43)	24	(67)	12	36
	1994/95	150	64	(43)	34	(40)	20	(59)	14	34
	1995/96	136	66	(48)	28	(40)	23	(82)	5	28
	1996/97	157	87	(55)	22	(31)	15	(68)	7	22

Table 3 Unit 1B mountain goat hunter residency and success, 1993–96

Regulatory Year	Successful					Unsuccessful					Total Hunters
	Local[a] Resident	Nonlocal Resident	Non-Resident	Total	(%)	Local[a] Resident	Nonlocal Resident	Non-Resident	Total	(%)	
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
1995/96	10	9	9	28	(42)	27	8	3	38	(58)	66
1996/97	8	7	7	22	(32)	27	12	6	45	(67)	67

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

Table 4 Unit 1B mountain goat harvest chronology, percent by time period, 1993–96

Regulatory Year	Harvest Periods										
	August		September		October		November		December		Total Harvest
	n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	
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
1995/96	7	(25)	12	(43)	5	(18)	2	(7)	2	(7)	28
1996/97	10	(45)	6	(27)	3	(13)	2	(9)	1	(6)	22

Table 5 Unit 1B mountain goat harvest, percent by transport methods, 1993–96

Regulatory Year	Percent of Harvest						Total Harvest
	Airplane		Boat		Other		
	n	(%)	*n*	(%)	*n*	(%)	
1993/94	20	(56)	16	(44)	0	(0)	36
1994/95	22	(65)	12	(35)	0	(0)	34
1995/96	21	(75)	7	(25)	0	(0)	28
1996/97	12	(54)	9	(40)	1	(6)	22

LOCATION

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

GEOGRAPHIC DESCRIPTION: The southeast Alaska mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay

BACKGROUND

Mountain goats arrived in Southeast Alaska from southern refugia sometime after the retreat of Pleistocene glaciation (Chadwick, 1983). Because mountain goats use 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 extend range rather than act 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 trophy hunters from around the world, mountain goat populations in areas easily accessible near Juneau have been reduced significantly from historical high numbers. In the immediate vicinity of Juneau, goat populations may have been reduced to low numbers early in this century as mining activity increased. Sport hunting of the already depleted populations 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 the summer of 1989 to boost local goat numbers, mountain goats from the Whiting River were introduced to Mount Juneau, an area that formally supported goats. By 1992 all of these goats, individually marked during the introduction, had left the area. However, small numbers of mountain goats have been sighted both on Mt. Juneau and on Heintzelman Ridge above urban Juneau since the translocation, and aerial surveys of the Mt. Hawthorne area have found increasing numbers of goats. 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 snow often forces goats to lower elevations.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

1 Maintain goat densities of at least 30 goats per hour 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 of at least 50 goats per hour 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 collected harvest data from registration permit hunt reports for the 1995 and 1996 fall hunts. We conducted population surveys in a small portion of Unit 1C during the report period, using a fixed-wing aircraft. Telemetry flights were conducted to relocate goats radiocollared as part of 2 mine-monitoring projects.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Most information on mountain goat populations within Unit 1C came from comments gathered from hunters. Goat telemetry flights made at 2 Juneau area mine sites indicated that mountain goats 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. Mild weather could be allowing wider distribution of animals, decreasing goat numbers at lower elevations during hunting seasons. Little sign of contagious ecthyma (orf) has been seen during the report period, although in the early 1990s an orf outbreak occurred in this subunit. No goats handled during the period were observed to have symptoms of orf, 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.

An aerial population survey was conducted in the Chilkat Range of Unit 1C during this report period. Sighting rates and the ratio of kids to adults were both within the range of previous surveys (Table 1).

MORTALITY

Harvest

Season and Bag Limits	Resident and nonresident hunters	
Unit 1C, that portion draining into Lynn Canal and Stephens Passage between Antler River and Eagle Glacier and River	Oct. 1–Nov. 30	1 goat by registration permit only.

Unit 1C, that portion draining into Stephens Passage and Taku Inlet between Eagle Glacier and River and Taku Glacier, and all drainages of the Chilkat Range south of the Endicott River	No open season	
Remainder of Unit 1C	Aug. 1–Nov. 30	1 goat by registration permit only.

Board of Game Actions and Emergency Orders. At its fall 1996 meeting the Board of Game heard and approved a proposal to reopen goat hunting in the Chilkat Range south of the Endicott River.

Hunter Harvest. A total of 67 goats were taken during the reporting period, 32 in 1995 and 35 in 1996 (Table 2). Two of the goats taken in 1996 were killed illegally before the opening of the season in the northern part of Unit 1C, and a third hunter was cited for shooting a goat from a boat. Average harvest during the reporting period was lower than the preceding 2-year period but similar to the harvests from 1988 to 1992. Males again made up a large part of the harvest (73%), although this is down from 80% males in the previous reporting period. The predominantly male harvest probably stems from the increase in guided hunts within the area. Registered guides are aware that females are counted more heavily than males against harvest guidelines and that it is in their interest to restrict their hunters to taking billies. The reported sex ratio of the harvest is somewhat 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 declined from a mean of 163 in the previous reporting period to a mean of 141 in 1995–96. (Table 3). Compliance with reporting requirements has been good.

Hunter Residency and Success. Although most hunters were local residents, nonresidents accounted for most of the harvest during the reporting period (Table 4). The success rate averaged 53% during the reporting period, compared to 49% for the years 1993–94. The percentage of goats taken by nonresidents continued to increase, rising from 22% during 1988–1992 to 49% during 1993–94 and to 57% during this reporting period. This reflects the increased number of guided hunts within the subunit.

Successful hunters expended an average of 3.2 days per goat during the report period, an effort above the mean of 2.8 days per goat from 1990–1994 (Table 3). Unsuccessful hunters expended an average of 2.5 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 1995 and 66% in 1996. The preponderance of late season kills reflects the availability of goats at lower elevations and hunter desire to take an animal in winter pelage.

Transport Methods. Historically successful hunters have used boats as the primary means of transportation. This trend continued during the reporting period, with 78% of successful hunters using them (Table 5). Other means included airplanes and highway vehicles. Highway vehicles were used along the Juneau road system.

Commercial Services. The use of commercial services decreased slightly during this report period compared to 1994–1995 (Table 6). Forty-three percent of hunters used a commercial service during the reporting period, compared to 45% during 1993 and 1994. Twenty-three percent of the hunters used commercial transportation to the field because most hunt areas are away from human settlements. The commercial service used most often by resident hunters was transportation; as required by law, nonresidents used a registered guide.

Other Mortality

There is little data available concerning natural mortality. Holroyd (1967) cited several instances of goats killed in falls, rockslides, and avalanches. Several radiocollared study goats near Juneau have died in circumstances that may have involved accidents; abundant wolf sign at carcass locations obscures the actual cause of death.

HABITAT

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

Some loss of critical winter range could be expected if proposed mining projects in Unit 1C are implemented. Projects and associated transportation of infrastructure within goat range may displace goats from preferred habitat areas.

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

CONCLUSIONS AND RECOMMENDATIONS

Since aerial surveys were not completed in the northern part of the subunit during the report period, we do not know if management objectives regarding goat densities were met. In Tracy and Endicott arms, we met management objectives. Hunter effort and success was greater than in preceding seasons. During this period hunters killed predominantly males.

As weather and funding permit, we should continue to conduct aerial surveys to determine population trends. Goats added to the Juneau area goat population by the Mt. Juneau reintroduction have not been obvious contributors to population expansion, although goat numbers near Juneau have apparently increased. Survey results in the Chilkat Range indicate a recovery in goat numbers, and the Board of Game reauthorized hunting in that area.

Easily accessed areas such as Tracy and Endicott Arms are receiving heavier hunting pressure than the rest of the subunit. For this reason fine scale management of goat populations through

harvest guidelines for hunt subareas is being used for northern Southeast Alaska. This allows us to monitor harvest pressure in discrete areas within permit hunt boundaries. To minimize the amount of paper carried by hunters, we will continue to administer hunts in Unit 1C under 1 permit. This does not jeopardize our ability to track harvest from discrete locations in-season.

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, 1986–96

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 Surveys			
1993[1]	171	4	175	2	2	17
	62	15	77	25	19	77
1994	370	79	449	21	18	82
1995			No Surveys			
1996[2]	215	78	293	36	27	52

[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.

[2] Survey included all goat habitat in the Chilkat Range outside of Glacier Bay National Park, from Sullivan Is. down to the southern end of the Chilkat Mtns.

Table 2 Unit 1C annual goat harvest, 1990–96

Year	Males	Females	Unknown	Total
1990	19	10	1	30
1991	14	8	0	22
1992	27	12	0	39
1993	35	12	0	47
1994	36	6	0	42
1995	25	7	0	32
1996	24	8	3	35[1]

[1] Three of these goats were taken illegally.

Table 3 Unit 1C hunter effort and success, 1990–96

		Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	Permits Issued	Nr. Hunters	Total Days	Avg. Days	Nr. Hunters	Total Days	Avg. Days	Nr. 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
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
1995	146	32	111	3.5	44	134	3.0	76	245	3.2
1996	135	35	101	2.9	21	42	2.0	56	143	2.6

Table 4 Unit 1C hunter success by community of residence, 1990–96

		Successful Hunters			Unsuccessful Hunters		
Year	Percent Success	Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1990	55	16	4	10	20	4	1
1991	35	14	3	5	34	4	3
1992	53	22	5	12	27	8	0
1993	48	22	4	21	40	7	3
1994	51	16	3	23	29	7	5
1995	43	12	2	18	36	5	2
1996	63	11	4	20	18	4	0

Table 5 Unit 1C transport methods used by successful hunters, 1990–96

Year	Airplane		Boat		Foot		Hwy. Vehicle		Other	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
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)
1993	7	(17	35	(85)	1	(2)	4	(10)	0	(0)
1994	9	(21)	31	(74)	0	(0)	2	(5)	0	(0)
1995	6	(19)	25	(78)	0	(0)	0	(0)	1	(3)
1996	4	(12)	26	(79)	0	(0)	3	(9)	0	(0)

Table 6 Unit 1C commercial services used by hunters, 1991–96

Year	Unit Residents		Other AK Residents		Non Residents		Total Use		Registered Guide	Transport	Othe
	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
1993	36	14	4	4	2	21	42	39	21	17	1
1994	38	4	7	1	1	27	46	33	28	4	0
1995	35	7	9	1	0	20	44	28	20	8	0
1996	20	3	5	2	0	19	25	24	20	4	0

LOCATION

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

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay

BACKGROUND

There are 3 separate registration permit hunts in Unit 1D (RG023, RG024, and RG026). In addition, there is an area near Skagway, bounded by the Taiya River, the Yukon and White Pass Railroad, and the Canadian border, that is closed to goat hunting. 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 that 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. Recent surveys indicate some degree of recovery in these populations.

Hundertmark and others (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. This additional hunting pressure and access to previously unhunted areas were considered as detrimental to goat populations as the habitat loss from logging and mining.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

1. Skagway closed area - Increase population to 100 animals.

2. Unit 1D north of Klehini/Chilkat River and Katzehin River - Increase estimated population from 600 to 1000 goats. Maintain hunter success of 25%.

3. Unit 1D south of Klehini/Chilkat River and Katzehin River - Increase estimated population from 300 to 500 goats. Maintain hunter success of 25%.

METHODS

ADF&G staff conducted aerial surveys within the subunit during 1995 and Bureau of Land Management personnel surveyed Unit 1D in 1995 and 1996. Results from the surveys conducted by the BLM were not received until January 1998 and are not included in the accompanying tables. A single registration permit was used to administer hunts RG023, RG024, and RG026. Harvest parameters, including hunter effort and success rates, could still be determined for each

hunt. However, the number of permittees who did not hunt could not be assigned to a precise hunt.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

With only occasional nonstandard surveys, mountain goat population status in Unit 1D is difficult to estimate. Survey results vary yearly 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 a given 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 entire area. Although some differences in the survey results for identical areas are most certainly related to survey conditions, the degree to which any one survey is influenced is unknown. We will attempt to use the BLM survey data in conjunction with that collected by ADF&G to arrive at a more comprehensive evaluation of the goat population in this area.

Historical data indicates that in easily accessible areas, such as in the area north and west of Skagway that is currently closed, hunting pressure has the potential to reduce goat numbers rapidly (Table 1a). Despite being closed to hunting since 1987, this area's goat population's recovery has been slow. A portion of the Takshanuk Mountains in Hunt Area RG023 is bordered by highways and is readily accessible. Because other areas in northern Southeast Alaska have exhibited low goat population growth rates even after several years of protection, this area merits yearly monitoring.

Population Size

A total of 514 goats were counted in Unit 1D in 1995. It is important to note that these surveys were not meant to be comprehensive for the entire unit, but rather allow us to monitor population trends and kid/adult ratios in certain areas. Of the total, 28, 291, and 195 goats were counted in the Skagway closed area and Hunt Areas RG023, RG024, and RG026, respectively (Tables 1a, 1b, and 1c). Although only about one-half of the Skagway closed area was surveyed, the low number of goats seen indicates the population remains low.

MORTALITY

Harvest

Season and Bag Limits	Resident and nonresident hunters
Unit 1D, that portion between Taiya Inlet/River and the White Pass and Yukon Railroad.	No Open Season

Unit 1D, that portion north or east of the Chilkat River and west of the Ferebee River/Glacier. (Hunt Area RG023)	Sep. 15–Nov. 15	1 goat by registration permit only.
Unit 1D, that portion south of the Klehini River/Chilkat River and that portion south of the Katzehin River. (Hunt Area RG026)	Aug. 1–Nov. 30	1 goat by registration permit only.
Remainder of Unit 1D (Hunt Area RG024)	Sept. 15–Nov. 30	1 goat by registration permit only.

Board of Game Actions and Emergency Orders. Harvest guidelines were used to establish safe harvest levels during the reporting period. No emergency orders were issued for this area during the first year of the reporting period. An emergency order was issued in late October 1996 to close goat hunting within Hunt Area RG023 to limit harvest to a level near the harvest guideline.

Hunter Harvest. A total of 42 goats were harvested during the reporting period, 22 in 1995 and 20 in 1996 (Table 2). In 1995, 14 were males and 8 were females, while in 1996 12 were males and 8 were females. Harvest during the report period was slightly lower than the mean annual harvest of 25 goats from the 1993–1994 report period (Table 2).

Permit Hunts. Mountain goat hunting within the subunit occurred under 3 registration permit hunts during the period (Hunts RG023, RG024, and RG026). These hunts were combined on a single permit (a practice that began prior to 1991) to reduce paperwork and hunter confusion. Hunt reports were combined for the three hunts. The main reason for maintaining 3 hunts in the subunit is to allow different opening and closing dates to adjust for relative differences in hunting pressure. The area between the Taiya River and the White Pass & Yukon Railroad remained closed to hunting.

Hunter Residency and Success. The number of permittees for Unit 1D during this period was nearly identical to the levels seen in the previous reporting period, with means of 173 and 176 permits issued (Table 3). A mean of 21% of the hunters was successful during the reporting period (Table 4). This is lower than the 1993–1994 report period mean of 26%.

Local residents continue to comprise the majority of goat hunters in Unit 1D. In 1995 and 1996 60% and 70%, respectively, 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 August 1 until the end of December. Over the years most goats have been taken in September and November.

Transport Methods. Hunters commonly use boats and highway vehicles as their transport methods (Table 5). Of successful hunters, 40% reported using boats or highway vehicles during the report period. This compares to the 1993–1994 2-year mean of 54% and 30% for boats and highway vehicles, respectively .

Commercial Services. Most goat hunters do not use commercial services in Unit 1D (Table 6). During the report period, only 6 of 42 successful hunters reported using a commercial service. Five hunters used a guide, and 1 sought commercial transport to the field.

CONCLUSIONS AND RECOMMENDATIONS

Finer scale management of mountain goats is becoming necessary in Unit 1D as hunting pressure increases. There are now 3 open permit hunt areas (RG023, RG024, and RG026) with harvest guidelines developed for each subarea. 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, and closures may be required to avoid excessive harvest in areas where hunting pressure is concentrated. 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 on goats from activities other than hunting increases.

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Table 1a Unit 1D mountain goat composition counts, Skagway closed area

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 Survey			
1992	1	0	1	0	0	3
1993			No Survey			
1994[1]	11	5	16	45	31	20
1995[2]	21	7	28	33	25	N/A
1996			No Survey			

[1] Skagway Pass side only, goats/hour is for the entire survey that included a portion of Hunt Area RG023.
[2] Includes only the west side of closed area, adjacent to the Taiya R.

Table 1b Unit 1D mountain goat composition counts, Hunt Areas RG023 and RG024

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	(%) Kids	Goats/hour
1990-91	No Surveys					
	Klukwah Mt. (K) and Ferebee Gl./River (F) to Chilkoot Inlet					
1989 (K)	26	9	35	35	(26)	60
1993	No Survey					
1994 (K,F)[1]	111	21	131	19	(16)	45
1995[2]	52	15	67	29	(22)	89
	Takshanuk Mtns. (E, W)					
1989 (E,W)	40	16	56	40	(29)	34
1993 (W)	27	7	35	26	(20)	59
1994 (E,W)	48	5	53	10	(9)	17
1995	19	4	23	21	(17)	N/A
	North of the Klehini River and West of the Chilkat River					
1989	23	6	29	26	(21)	70
1993	No Survey					
1994[1]	58	4	62	7	(6)	69
1995	55	9	64	16	(14)	116
	East of Ferebee Gl./River (F), Chilkoot/Taiya (C) Inlet					
1989 (F,C)	39	17	56	44	(30)	40
1992 (F,C)	30	10	40	33	(33)	19
1993	No Survey					
1994 (F,C)	119/13	21/33	140/163	18/25	(15/20)	46/59[3]
1995–96	No Surveys					
	Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass					
1995	64	9	73	14	12	50.5
	Twin Dewey peaks, Skagway Pass, Warm Pass					
1995	20	6	26	30	(23)	20

[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] Includes only the Chilkoot R. side of the mountain range from Klukwah Mtn. to Chilkoot Inlet.

[3] Goats/hour includes two surveys, one at 98 goats/hour (survey included a portion of Hunt Area RG026) and one at 20 goats/hour (survey included a portion of Skagway closed area).

Table 1c Unit 1D mountain goat composition counts, Hunt Area RG026

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)[1,2]	129	29	156	22	(19)	48
1995–96			No Surveys			
			Remainder of Area West of Chilkoot Inlet			
1974	39	3	42	8	7	72
1975	20	9	29	45	31	---[3]
1993			No Survey			
1994[1]	184	32	213	17	15	49
1995–96			No Surveys			
			East of Chilkoot Inlet			
1993			No Survey			
1994	32	10	42	31	24	98
1995[5]	153	42	195	27	22	98
1996			No Survey			

[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.
[5] Includes all drainages of the Katzehin R.

Table 2 Unit 1D annual goat harvest, 1988–96

Year	Males	Females	Unknown	Total
1990	18	12	1	31
1991	18	5	2	25
1992	9	11	3	23
1993	15	8	2	25
1994	12	12	1	25
1995	14	8	0	22
1996	12	8	0	20

Table 3 Unit 1D hunter effort and success, 1990–96

		Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	Permits Issued	Nr. Hunters	Nr. Days	Avg.# Days	Nr. Hunters	Nr. Days	Avg. # Days	Nr. Hunters	Nr. 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
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
1995	169	22	36	1.7	81	226	2.9	103	262	2.7
1996	176	20	32	1.6	75	152	2.2	95	184	2.1

Table 4 Unit 1D hunter success by community of residence, 1990–96

		Successful Hunters			Unsuccessful Hunters		
Year	Percent Success	Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1990	30	20	9	2	60	11	0
1991	34	21	4	0	32	16	0
1992	33	21	2	0	38	8	1
1993	27	17	6	2	51	16	0
1994	24	15	9	1	54	25	0
1995	21	13	7	2	61	20	0
1996	21	14	3	3	51	21	3

Table 5 Unit 1D transport methods used by successful hunters, 1990–96

	Airplane		Boat		Foot		Hwy Vehicle		Other	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	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)
1993	3	(12)	12	(48)	0	(0)	8	(32)	2	(8)
1994	0	(0)	15	(60)	3	(12)	7	(28)	0	(0)
1995	1	(5)	8	(36)	0	(0)	11	(50)	2	(9)
1996	0	(0)	8	(44)	5	(28)	5	(28)	0	(0)

Table 6 Unit 1D commercial services used by hunters, 1991–96

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
1993	57	2	14	0	2	0	73	2	0	1	1
1994	64	0	28	1	0	1	92	2	1	1	0
1995	67	0	22	3	0	2	89	5	2	3	0
1996	56	0	19	1	0	4	75	5	4	1	0

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

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 translocation of 18 animals from the Southeast Alaska mainland (Burris and McKnight 1973). Hunting was initiated in 1949, and seasons have continued to date. In 1976 a registration permit system was initiated. Since that time the harvest has ranged from 28 to 75 animals.

In the mid-1950s goats were translocated to Chichagof Island (Burris and McKnight 1973), but a huntable population has not resulted. The last report of a goat sighting on the island was in 1978 (Johnson 1981). Mountain goats are not present on Admiralty or any other island in the unit. However, goats are increasing both in their numbers and distribution on Baranof Island.

Severe winters, which may have 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 hunter effort and 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 hunted, days hunted, kill date, transportation method, and use of commercial services. Successful hunters are also encouraged to bring in the horns from their goat for age determination.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

An aerial survey has not been done since fall 1994. At that time the aerial survey of known goat habitat on northern Baranof Island documented 717 goats. In 1989, 523 goats were observed in the same approximate area. The ratio of kids to adults (24.3 to 100 adults) was high, indicating

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

MORTALITY

Harvest

Season and Bag Limit		Resident and Nonresident Hunters
Unit 4	Aug. 1–Dec. 31	One goat by registration permit only.

Regulations adopted by the Federal Subsistence Board for goat hunting mirror State regulations.

Board of Game Actions and Emergency Orders. No Board actions were taken and no emergency orders were issued during the period.

Hunter Harvest. In 1995, 319 permits were issued and 49 goats were harvested. In 1996, 272 permits were issued and 42 goats were taken. The percent of permittees who actually hunted each year was 44%. Of those who hunted, 35% were successful in both 1995 and 1996. Five-year averages for 1992–1996 are as follow: permits issued, 305; hunters afield, 145; and reported harvest, 50 goats. Hunters reported sex of goats as 69% males in 1995 and 62% males in 1996. With the apparent 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). Because 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. In 1995 most goats were taken between August and October, and in 1996 the take was distributed throughout the season.

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

CONCLUSIONS AND RECOMMENDATIONS

The interest in hunting mountain goats on Baranof Island has been fairly stable since 1984. Harvest levels relate closely to actual hunting effort, which is highly affected by weather. Although survey data are limited, 1994 survey data and public comments indicate the population is still growing and expanding 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 815, 1992–1996

Reg. Year	Permits Issued	Did Not Report	Did Not Hunt	Unsucc. Hunters	Success. Hunters	Nr. Males	Nr. Females	Sex Unk.	Illegal	Total Harvest
1992	290	2	144	94	50	30	19	1	0	50
1993	313	3	148	105	57	42	15	0	0	57
1994	331	2	170	107	52	32	20	0	0	52
1995	319	2	178	90	49	34	15	0	0	49
1996	272	0	152	78	42	26	15	1	0	42

Table 2 Unit 4 mountain goat hunter residency and success for Registration Permit Hunt 815, 1992–1996

	Successful				Unsuccessful				
Reg. Year	Local[a] Resident	Nonlocal Resident	Nonres.	Total	Local Resident	Nonlocal Resident	Nonres.	Total	Total Hunters
1992	45	2	3	50	81	12	1	94	144
1993	47	8	2	57	91	9	5	105	162
1994	45	3	4	52	88	17	2	107	159
1995	42	6	1	49	74	15	1	90	139
1996	41	1	0	42	66	11	1	78	120

[a]Residents of Baranof Island.

Table 3 Unit 4 mountain goat harvest chronology for Registration Permit Hunt 815, 1992–1996

Regulatory Year	Harvest Periods					
	August	September	October	November	December	Total
1992	17	11	8	9	5	50
1993	16	16	16	1	8	57
1994	13	8	12	3	16	52
1995	6	21	12	7	3	49
1996	4	13	3	9	13	42

Table 4 Unit 4 mountain goat harvest by transport method for Registration Permit Hunt 815, 1992–1996

Regulatory Year	Airplane	Boat	Snow Machine	Offroad Vehicle	Vehicle	Walked	Total
1992	13	34	0	0	0	3	50
1993	14	38	0	0	0	5	57
1994	12	34	0	1	5	0	52
1995	15	28	0	0	2	4	49
1996	12	25	1	0	3	1	42

LOCATION

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

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

BACKGROUND

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

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

In 1971 the Alaska Department of Fish and Game first conducted aerial surveys. In that year, 283 goats (33 kids:100 adults) were enumerated 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. Surveys in Game Management Unit (Unit) 5A during the 1980s and anecdotal accounts from guides, pilots, and hunters indicate that goat numbers are now 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 report period because of weather, staffing changes, and loss of the assistant area biologist position for northern Southeast Alaska. Hunters were required to obtain registration permits from Fish and Game offices to allow in-season monitoring of harvest effort and success. Information collected from registration reports included hunt dates, number of hunting days, method of transportation, commercial services (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 that the population was increasing, as the number of goats seen per hour increased (Table 1). The Unit 5 goat population probably numbers 1000 animals. No information has been received that would indicate population declines, although if wolf numbers are increasing in the unit as some believe, predation pressure on goats may be increasing.

MORTALITY

Harvest

Season and Bag Limits	Resident and nonresident hunters	
Unit 5	Aug. 1–Dec. 31	1 goat by registration permit.

Hunter Harvest. Hunters harvested 13 goats during the report period, 6 in 1995 and 7 in 1996. The percentage of males harvested was 67% in 1995 and 69% over the 2-year period, slightly higher 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 appeared to be related more to decreased effort rather than reduced success rate or a decline in goat numbers until this reporting period. In 1995–96 the number of hunters increased by 10 over the previous recording period (Table 4), but the number of goats harvested decreased from 18 to 13 animals (Table 2).

Illegal harvest remains unquantified, but we believe it is small.

Permit Hunts. We issued 57 and 51 registration permits during 1995 and 1996, respectively (Table 4). This is higher than the 1988–1994 mean of 41. A mean of 19.5 hunters hunted each year of the report period, slightly higher than during 1988–1994. The registration permit strategy remains a viable method for effectively managing goat hunting in the unit.

Hunter Residency and Success. The goat hunter success rate averaged 33% during the report period, substantially lower than that of the previous 2-year period (Table 3). In 1995, 4 of 6 successful hunters were nonresidents; in 1996, 3 of 7 were nonresidents. The number of Alaska residents hunting during the 1995–1996 period outnumbered nonresidents 26 to 13. Of the 26 resident hunters, 19 were local Unit 5 residents. Nonresidents still account for a significant portion of the effort and harvest, with nonlocal resident effort and harvest the smallest. The relatively low harvest by nonlocal Alaskans is partly due to the presence of other huntable goat populations in the state. The requirement that a guide must accompany nonresidents has not affected goat hunting in the Yakutat area.

Harvest Chronology. The Unit 5 goat harvest is distributed throughout the season, although the greatest number of goats is usually taken during September and October. Harvest during this report period followed this pattern, although 2 goats were taken in August of 1995.

Transport Methods. Aircraft were used by 100% of successful hunters in 1995, but in 1996 aircraft and boats were used by 43% and 57% of successful hunters, respectively. At least some local hunters used snow machines to access goats at Harlequin Lake, although their hunt reports failed to convey this.

Other Mortality

Guides and hunters reported wolf predation on goats, but we found no evidence of a major effect on the population.

CONCLUSIONS AND RECOMMENDATIONS

Efforts to obtain mountain goat population information through aerial sex and age composition counts should continue. Although recent population information is not available, hunting effort is quite low, and it is likely that goat populations are moderately high and could support additional harvest. However, areas easily accessible to snowmachines within Unit 5A late in the hunting season warrant increased attention to prevent localized population depressions.

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Table 1 Mountain goat composition counts, Unit 5, 1986–96

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	Percent Kids	Goats/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
1990–96	No Surveys					

Table 2 Annual goat harvest, Unit 5, 1990–96

Year	Males	Females	Unknown	Total
1990	11	2	0	13
1991	4	4	0	8
1992	2	2	0	4
1993	4	2	0	6
1994	6	6	0	12
1995	4	2	0	6
1996	5	2	0	7

Table 3 Hunter success, Unit 5, by community of residence, 1990–96

		Successful Hunters			Unsuccessful Hunters		
Year	Percent Success	Unit Resident	Other AK	Non-Resident	Unit Resident	Other AK	Non-Resident
1990	43	3	4	6	3	11	3
1991	47	2	5	1	1	2	6
1992	31	2	2	0	1	2	6
1993	50	0	0	6	3	0	3
1994	71	8	3	1	2	1	2
1995	29	2	0	4	10	2	3
1996	39	3	1	3	4	4	3

Table 4 Hunter effort and success, Unit 5, 1990–96

Year	Permits Issued	Successful Hunters Nr. Hunters	Successful Hunters Total Days	Successful Hunters Avg. # Days	Unsuccessful Hunters Nr. Hunters	Unsuccessful Hunters Total Days	Unsuccessful Hunters Avg. # Days	Total Hunters Nr. Hunters	Total Hunters Total Days	Total Hunters Avg. # Days
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
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
1995	57	6	19	3.2	14	47	3.4	20	66	3.3
1996	51	7	17	2.4	11	48	4.4	18	65	3.6

Table 5 Transport methods used by successful hunters, Unit 5, 1990–96

Year	Airplane Total	Airplane %	Boat Total	Boat %	Snowmachine Total	Snowmachine %	Highway Vehicle Total	Highway Vehicle %	Foot Total	Foot %
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
1993	4	66	1	17	0	0	0	0	1	17
1994	0	0	9	75	3	25	0	0	0	0
1995	6	100	0	0	0	0	0	0	0	0
1996	3	43	4	57	0	0	0	0	0	0

Table 6 Commercial services used by hunters in Unit 5, 1990–96

Year	Unit Residents No	Unit Residents Yes	ther AK Residents No	ther AK Residents Yes	Nonresidents No	Nonresidents Yes	Total Use No	Total Use Yes	Registered Guide
1990[b]	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
1993	0	0	0	0	0	6	0	6	6
1994	8	0	0	1	0	3	8	4	4
1995	11	1	2	0	0	7	13	8	7
1996	4	0	1	3	0	5	5	8	6

LOCATION

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

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Mountain goats are endemic to mountains on the mainland in Unit 6 and to Bainbridge, Culross and Knight Islands. Captain Cook in 1785 (Beaglehole 1966), Edmond Heller in 1908 (1910), Clarence 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.

Several significant events caused reductions in the population. Art Sheets, game biologist with ADF&G, reported evidence that military personnel stationed in Whittier reduced goat numbers in Port Wells in the 1940s. 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. Goats may not have recovered because of predation (Reynolds 1981) and hunter harvest. Hunting during the early 1980s caused additional declines (Griese 1988*a*), while wolf predation increased (Griese 1988*b*). By 1987 the population was approximately 3400. It declined to 2790 by 1994 but showed signs of recovery during this reporting period.

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

Harvest management evolved as biologists recognized the need to manage based on small geographic units (Foster 1977) to reduce harvest and to distribute hunting pressure. Long seasons with bag limits of 1 or 2 goats 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.

We have monitored harvest 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 35 goats in 1996–97.

Management guidelines were clarified in 1993 when a tracking harvest strategy (Smith 1984) (Caughley 1977) was fully implemented. Populations in most of the unit were declining, and we responded by reducing harvest and prohibiting hunting of small groups of goats (<60). Two of the 3 elements essential for implementation of the strategy were already in place. Improved aerial survey methods were providing population trend information, and registration permit hunts were allowing careful monitoring of harvest distribution and magnitude. The third element was established when a minimum population objective of 2400 goats was formalized. Implementation of the strategy provided the conceptual framework necessary to guide decisions about harvest.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a minimum population of 2400 goats
- 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 during August and September at 2- to 3-year intervals. Each area was divided in 1 or more sample units. Units were 5 to 70 mi^2 and encompassed alpine cover types above 1000 ft elevation. Large glaciers (>1mi^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 movement of goats among units. Boundaries were drawn on 1:63,360 scale, topographic maps.

Sample units were searched using a Piper Super Cub (PA-18) or Bellanca Scout aircraft on floats or on wheels. We maintained airspeed of 60 to 70 mph and stayed 300 to 500 ft from slopes or cliffs. 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 tops of ridges and repeating passes downward in elevation, or starting at treeline and repeating passes upward in elevation. Width of the search area between passes was limited to no more than 500 ft elevation or 1/8 mile. 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) calculated. Goat observations were plotted on sample unit maps. Number of kids and goats older than kids were recorded for each group.

Environmental conditions were recorded 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 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. Size of the 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. 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. Hunters were not required to have horns checked by department staff to identify sex, as during previous reporting periods.

We also summarized data from Unit 6D into western and eastern portions. In addition to standard ADF&G harvest parameters, we calculated a weighted total harvest 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 unit by dividing weighted total harvest by the estimated population in permit hunt areas.

A maximum allowable harvest (MAH) for each year was established for each permit hunt. It was calculated as a percentage of goats observed during the most recent survey. The percent applied ranged from 2.2% to 5.5%, depending upon population trend, estimated mortality, and elapsed time since the last survey. For example, hunts with decreasing population trend, high mortality, and survey data several years old had an MAH of 2.2% to 3.0%. Permit hunts 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 14 permit hunt areas in all units during this reporting period. We counted 2045 goats (Table 1). Flights were a joint effort with USFS, Cordova and Glacier Ranger Districts, who helped fund aircraft charter and provided an observer. We estimated 2866 goats unitwide in 1995–96 and 3234 goats in 1996–97.

Population size and trend varied among units over the past 5 years. Units 6D(West) and 6D(East) had the largest numbers of goats. Both subunits declined during 1993–94 and 1994–95 and rebounded to 5-year highs by 1996–97. The Unit 6C population doubled, with the greatest improvement during this reporting period. No permit hunts were opened in Unit 6C since 1989. Units 6A and 6B decreased by 9% and 18%, respectively.

Data for the past 10 years reveal long-term trends (Fig. 3). Unit 6D (West) increased by 33% between 1987–88 and 1992–93, decreased slightly during the next 2 years, then recovered. Unit 6D (East) decreased by 31% between 1987–88 and 1994–95, then improved during this reporting period. The Unit 6C goat population more than doubled. Units 6A and 6B populations decreased by 49% and 37%, respectively.

Results of aerial goat surveys can be extremely variable (Ballard 1975, Fox 1977). We feel variability was reduced by standardizing methods and by surveying mostly during excellent or good conditions. Of 28 sample units completed, 11 were rated as excellent, 16 were good, and 1 was poor.

Population Composition

The kid-to-older goat ratio and percent kids for all areas counted during 1995–96 was 18:100 and 15%, respectively (Table 1). These values for 1996–97 were 27:100 and 21%, respectively. Over a 5-year period, values during this reporting period were the lowest and highest estimated.

Kid-to-older goat ratios during 1995–96 in Units 6A, 6C, and 6D(West) were 14:100, 20:100, and 20:100, respectively. Percent kids in those units were 13%, 17%, and 17%, respectively. No data were collected in Unit 6B. Data from Unit 6D (East) were unreliable because only 14 goats were observed. Kid-to-older goat ratios during 1996–97 in Units 6B, 6C, 6D (East) and 6D (West) were 22:100, 29:100, 25:100, and 26:100, respectively. Percent kids were 18%, 22%, 23%, and 20%, respectively. No data were collected in Unit 6A.

Over a 5-year period, values in Unit 6A during 1995–96 were the lowest obtained, indicating the downward population trend in that unit will continue. Unit 6B values were mostly unchanged. Values in Units 6D (East) and 6D (West) improved during 1995–96, indicating a population recovery in both units.

Kids seen during aerial surveys over the past 10 years averaged 19% (SD = 3%). Less than 20% kids was considered poor on the Kenai Peninsula (Del Frate 1996), and 17% kids was poor on Kodiak Island (Smith & VanDaele 1987). These proportions in each area indicated declining populations

MORTALITY

Harvest

Season and Bag Limit. The season in Unit 6 was 20 August to 31 January. The bag limit was 1 goat by registration permit only. Permit hunts were opened in all units, except 6C.

Board of Game Actions and Emergency Orders. The Board of Game changed the opening date for seasons in Units 6C, 6D (East) and 6D (West) from 20 August to 15 September. The change will not take effect until next reporting period. It was a public proposal prompted by objections to increasing harvest that was occurring early in the season when trophy quality of hides was poor. This shift occurred because hunters concentrated effort early in the season in response to lower MAH and emergency closures of hunt areas. We supported the proposal because we agreed that trophy quality was poor early in the season. We also felt that harvest control problems in Units 6D (East) and 6D (West) would be solved if the season opening were delayed until mid-September when hunter access was more difficult.

Eleven emergency orders were issued closing registration permit hunts when MAH was reached. During 1995–96, hunts RG202, RG226, RG242, RG249, RG252, and RG266 were closed. During 1996–97, hunts RG202, RG226, RG242, RG249, and RG266 were closed. These were routine management actions.

Hunter Harvest. Unweighted and weighted harvest during 1995–96 was 43 and 50, respectively (Table 2). Harvest during 1996–97 was 35 and 38, respectively. The kill included 36 males

(84%) and 7 females (16%) during 1995–96. In 1996–97, the sex composition was 32 males (91%) and 3 females (9%).

Over the past 5 years, harvest declined to the lowest level in the history of goat hunting in Unit 6, and the proportion of males in the kill increased. The higher proportion of males in the harvest was possibly due to incorrect reporting of sex.

MAH during 1995–96 and 1996–97 was 46 and 44, respectively. Over the past 5 years, we reduced MAH in response to declining populations. Fewer goats available for harvest and continuing high interest in goat hunting resulted in problems controlling harvest using our registration permit system. Weighted harvest exceeded MAH in 6 of 16 hunts during this reporting period. Five of the 6 problem hunts were in Units 6D (East) and 6D (West) where hunters have relatively easy access to goats.

Weighted harvest rates were historically low. In Unit 6A, rates averaged 2.3% since 1989–90 (Fig. 4). In Unit 6B, the average was 3.1% since 1988–89 (Fig. 5). In Units 6D (East) and 6D (West), the averages were 2.4% and 4.6%, respectively, since 1986–87 (Figs 6 and 7). Low rates resulted primarily from our conservative MAH that limited availability of goats to hunters. This approach was part of our tracking harvest strategy. Most hunted populations were declining, kid survival was poor, and hunter take was considered additive to other mortality factors (Hebert & Turnbull 1977) (Adams & Bailey 1982). We did allow a higher harvest rate (8.2% and 6.2%) in Unit 6D (West) when the population increased in the late 1980s and early 1990s. Most of our harvest rates were conservative compared to unweighted rates of 7% in Colorado (Adams & Bailey 1982), 5% in Alberta (Hall 1977), and 4% in Idaho (Kuck 1977).

Permit Hunts. Number of permits issued reached an historic low of 148 in 1995–96, then increased slightly to 162 in 1996–97 (Table 2). Permits were first required in the entire unit in 1981–82. The number issued reached a peak of 796 in 1983–84 and then steadily declined. 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, and most of these residents did not live in Unit 6 (Table 3). Hunter success during 1995–96 and 1996–97 was 57% and 39%, respectively. These 2 values were the highest and lowest seen in 5 years.

Harvest Chronology. September and October were the most productive months for goat harvest during 1995–96 and during the previous 4 years (Table 4). However, the pattern changed in 1996–97, when most (54%) of the goats were taken in August. This shift occurred because hunters concentrated effort early in the season in response to lower MAH and emergency closures of hunt areas. Many hunters complained about being forced to hunt goats with summer hair that was poor quality for trophies.

Transport Methods. Airplanes were the most important means of hunter transport (Table 5). They provided transportation for 63% and 66% of hunters during 1995–96 and 1996–97, 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, 6C and 6D (East) where wolf density was greatest. Over the past 8 years, goat numbers have declined sharply in all these units, except 6C. We cooperated with a USFS study of wolf ecology to improve our understanding of prey–predator relationships.

Deep snow during winter (Smith 1984) and spring (Adams & Bailey 1982, Swenson 1985) may increase mortality and decrease reproductive success. It was possibly a factor in Unit 6. Depth during March at Worthington Glacier east of Valdez (2100 ft elevation) was significantly greater ($p<0.006$, 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 Kirchoff 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 subsequent improved human access. Logging roads can result in increased legal harvest, illegal harvest, and disturbance (Arnett & Irwin 1989, Fox et al. 1989).

Habitat loss due to clearcut logging may occur on state land in Unit 6A between Icy Bay and the Duktoth River. The University of Alaska and the State of Alaska Mental Health Trust have extensive logging operations in the area. They are treated as private landowners under Alaska's Forest Practices Act and, therefore, are not required to consider goat habitat in their operational plans. Nonbinding agreements with ADF&G prevented loss of habitat during this reporting period. However, lack of formal agreements endangers the goat population.

CONCLUSIONS AND RECOMMENDATIONS

We achieved our objective for maintaining a minimum population size of 2400 goats. Estimated number at the end of this reporting period was 3234. The population increased by 16% since the last reporting period, indicating that our tracking harvest strategy was successful. Weighted harvest rate of chronically declining populations was restricted to <3.5%, and hunting was closed where goat numbers approached minimum acceptable levels. This facilitated some population improvement, in spite of poor kid survival. We allowed higher harvest of stable or increasing populations. However, weighted harvest rate in the future should not exceed 6%, unless kid survival improves.

We achieved our objective of 70% males in the harvest. However, hunter reports were perhaps biased. The requirement that hunters have sex verified by ADF&G staff was suspended during this reporting period, and hunters may have been reluctant to voluntarily report harvest of females. Suspension of the verification requirement should be evaluated during the next reporting period.

The tracking harvest strategy should be refined by establishing minimum acceptable populations in each permit hunt area. This would simplify decision-making in chronically declining

situations. It would be clear when to apply a lower harvest rate and when to close the season. Currently, decisions in hunt areas can be complicated because the minimum population objective applies unitwide.

MAH should be increased in Units 6D (East) and 6D (West) if the populations continue to improve. Permit hunts should also be opened in Unit 6C because the population has increased sufficiently to sustain a harvest. Unit 6C should be divided into 3 separate hunt areas to achieve adequate distribution of hunters. Also, the number of hunters must be limited to assure control of the harvest. Hunter interest will be high, number of goats available for harvest will be relatively small, and access will be easy because of the road system.

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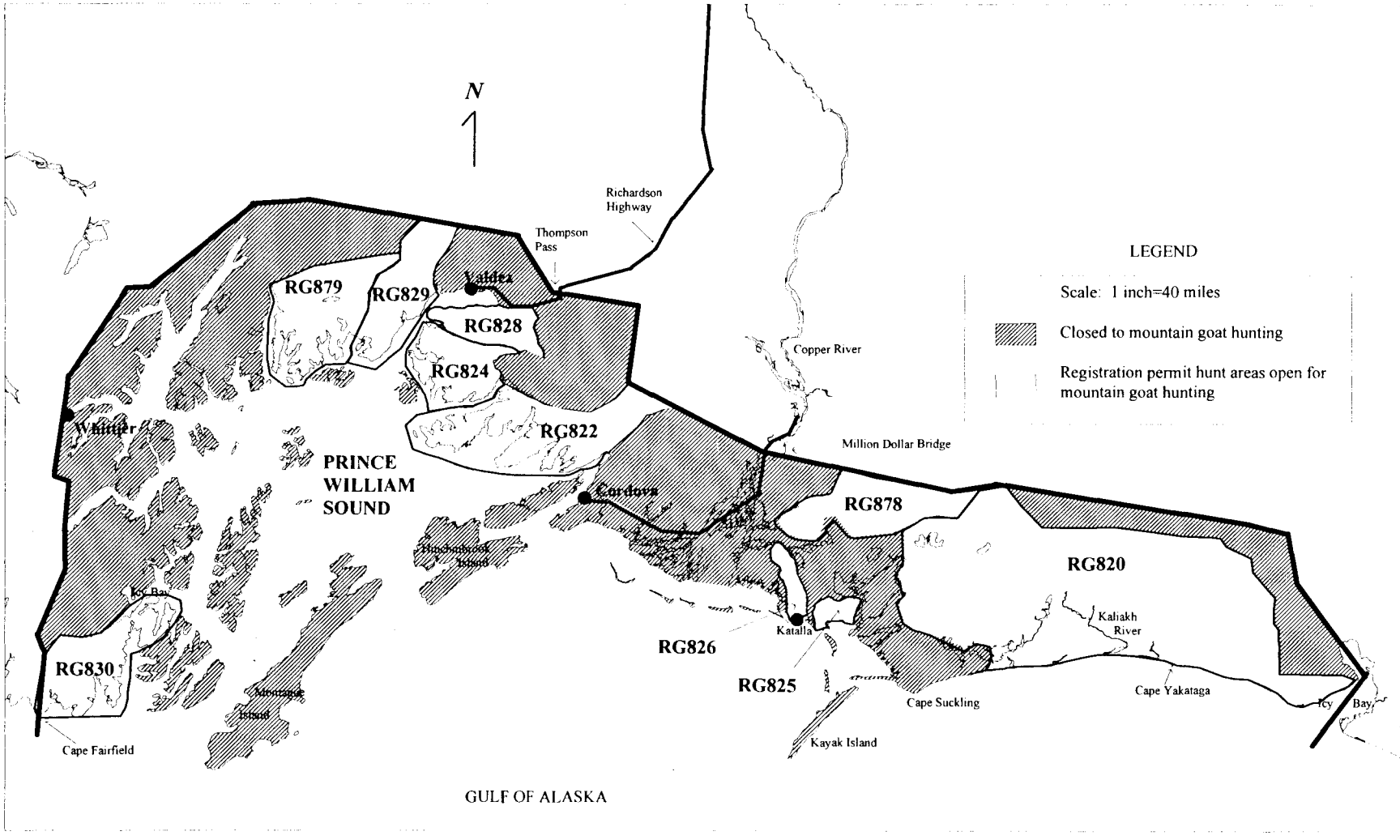

Figure 1 Unit 6 mountain goat registration permit hunts 1992

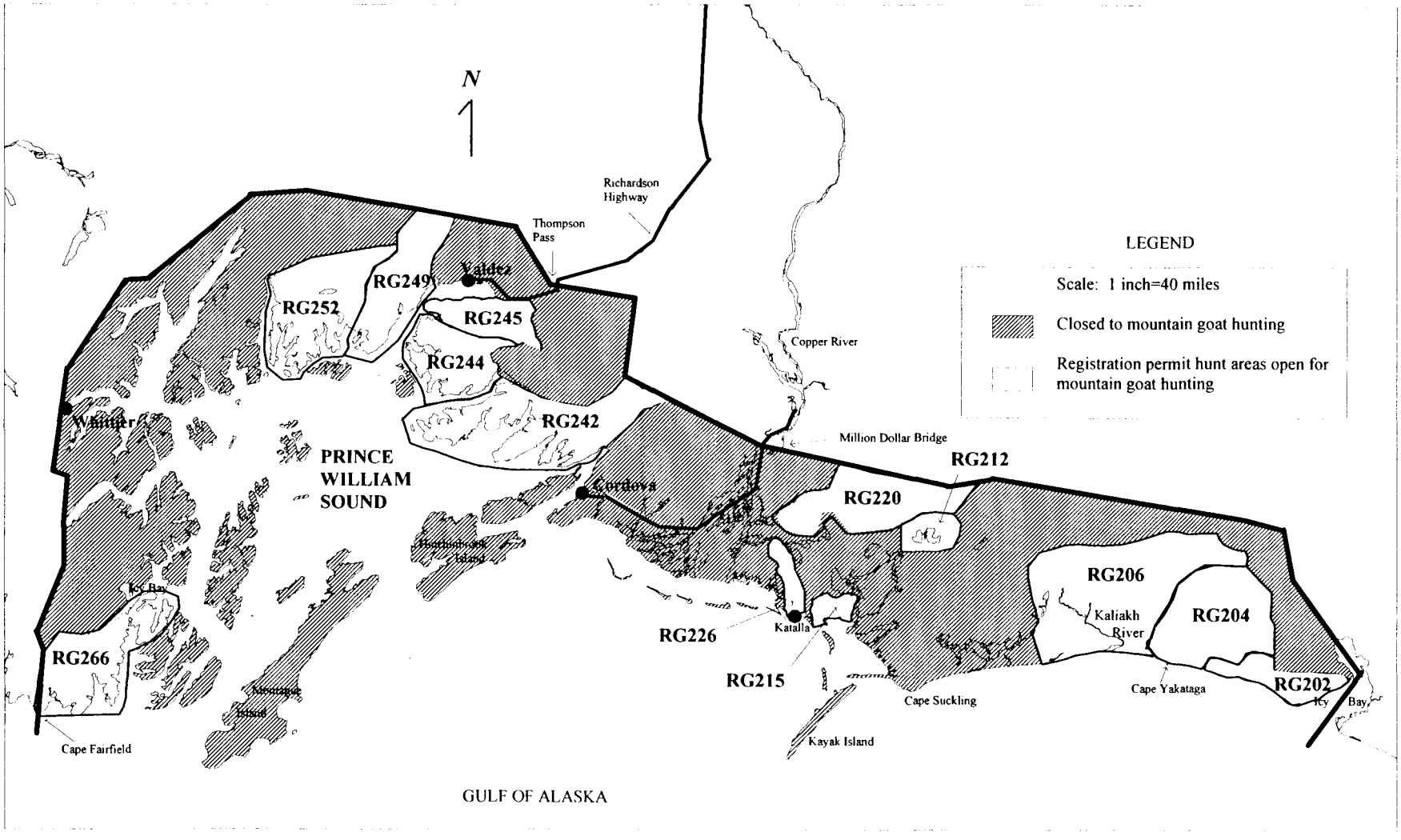

Figure 2 Unit 6 mountain goat registration permit hunts 1993-96

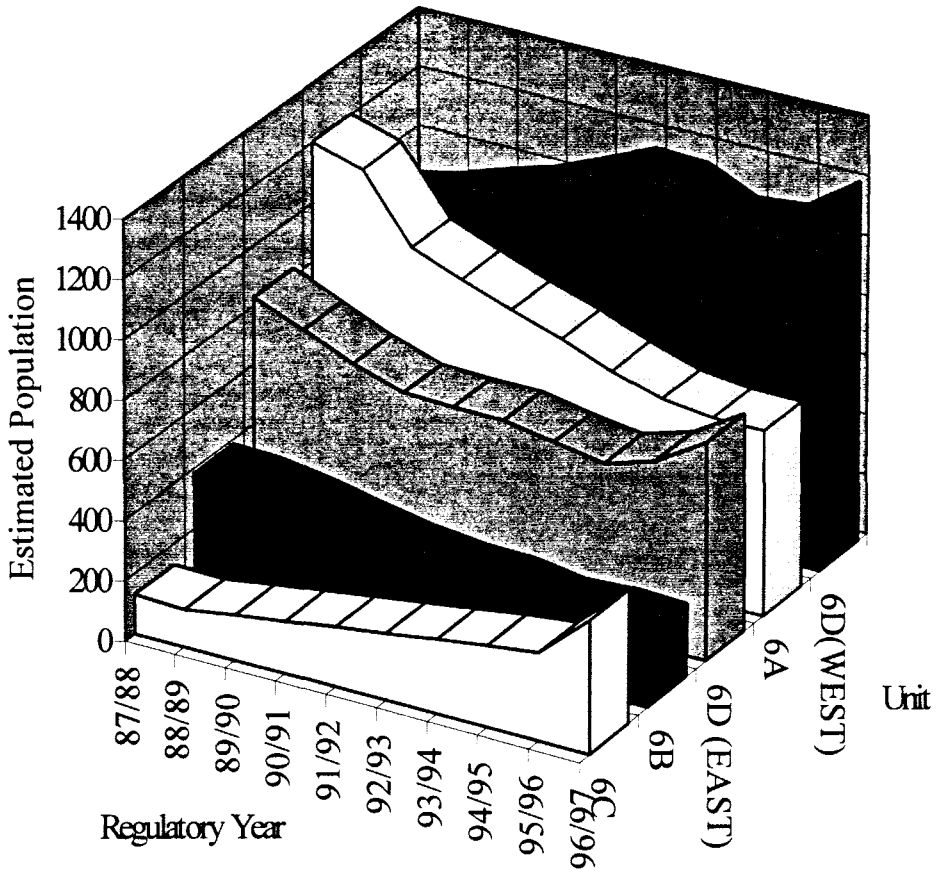

Figure 3 Unit 6 mountain goat estimated population size 1987-96

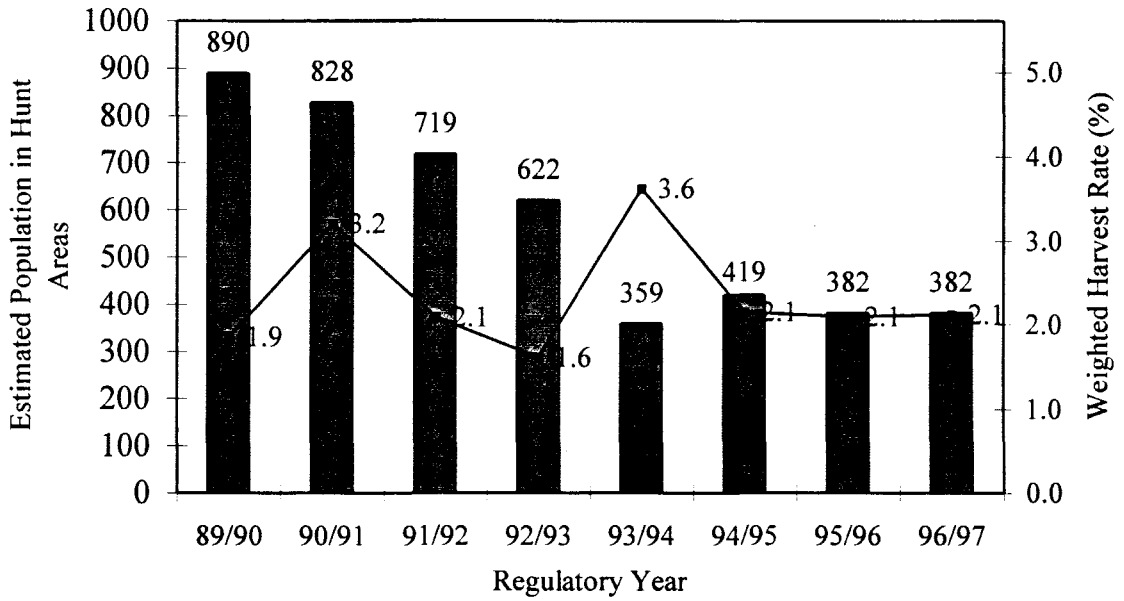

Figure 4 Unit 6 mountain goat estimated population in permit hunt areas and weighted harvest rates, 1989–96

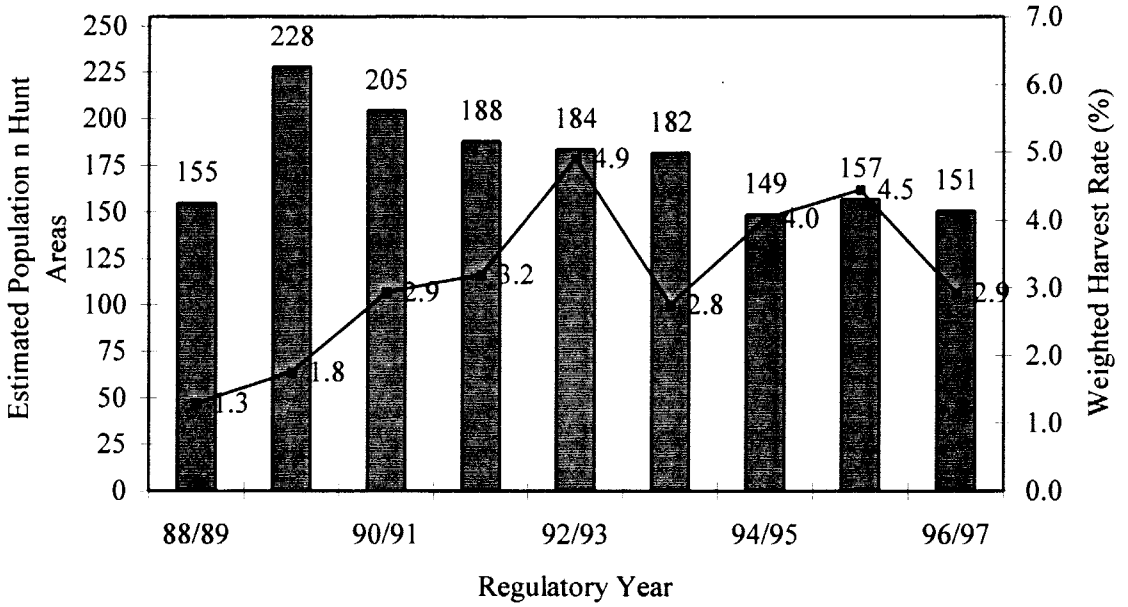

Figure 5 Unit 6B mountain goat estimated population in permit hunt areas and weighted harvest rates, 1988-96

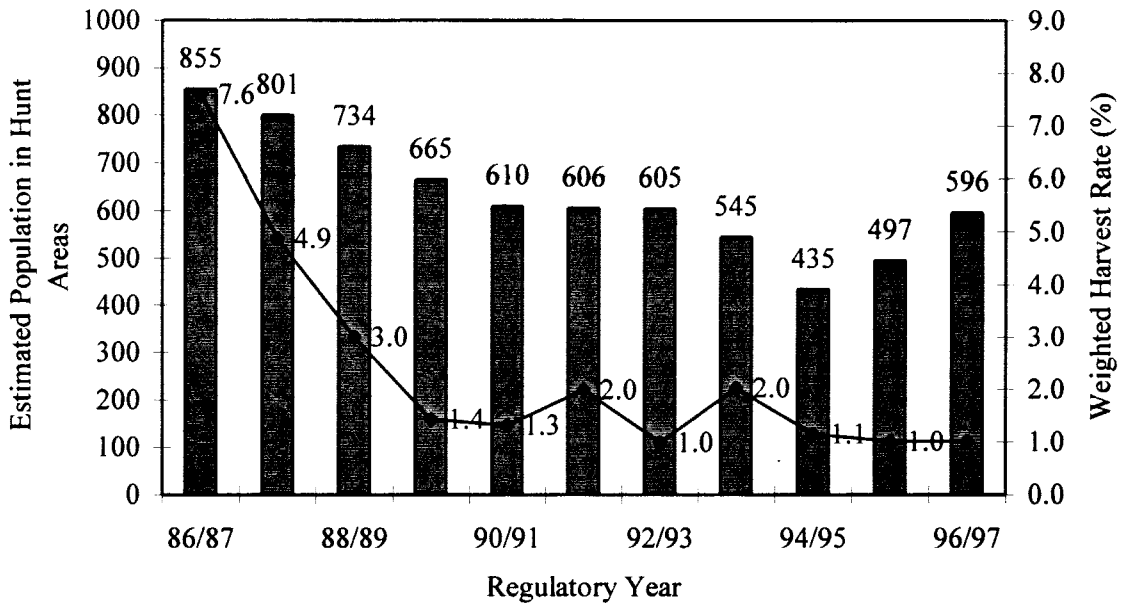

Figure 6 Unit 6D(East) mountain goat estimated population in permit hunt areas and weighted harvest rates 1986-96

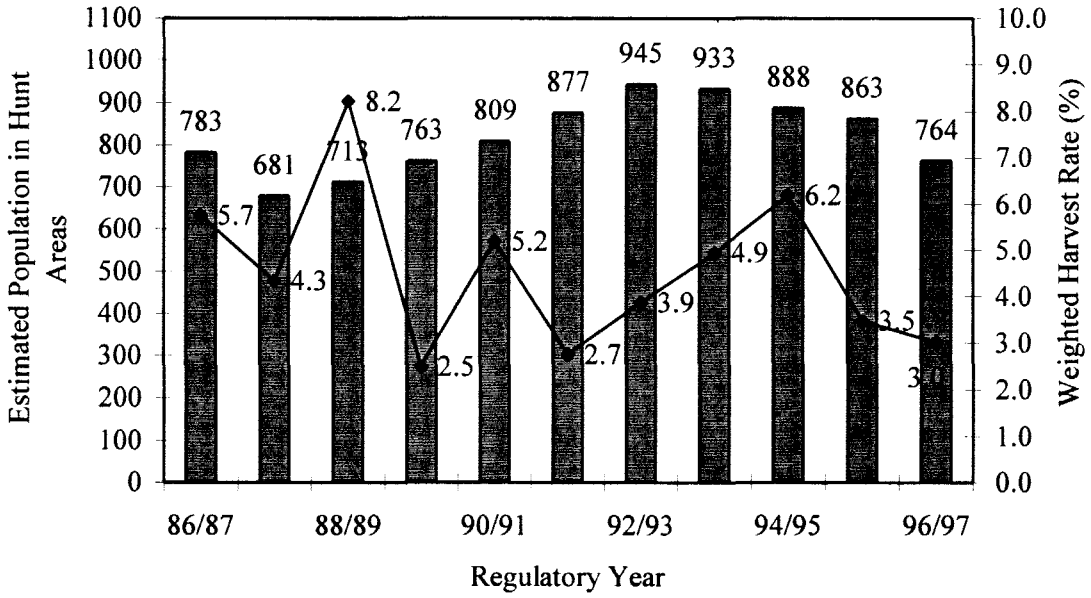

Figure 7 Unit 6D (West) mountain goat estimated population in permit hunt areas and weighted harvest rates 1986-96

Table 1 Unit 6 summer/fall mountain goat composition counts and estimated population size, 1992–96

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG820	1992/93	PARTIAL	160	(77)	47	(22)	29	207	653
	RG202 [a]	1993/94	--	--	--	--	--	--	--	102
		1994/95	--	--	--	--	--	--	--	102
		1995/96	FULL	77	(91)	8	(9)	10	85	94
		1996/97	--	--	--	--	--	--	--	94
	RG204 [a]	1993/94	FULL	167	(87)	26	(13)	16	193	217
		1994/95	--	--	--	--	--	--	--	181
		1995/96	PARTIAL	110	(88)	15	(12)	14	125	155
		1996/97	--	--	--	--	--	--	--	155
	RG206 [a]	1993/94	PARTIAL	75	(78)	21	(22)	28	96	142
		1994/95	--	--	--	--	--	--	--	137
		1995/96	PARTIAL	32	(86)	5	(14)	16	37	134
		1996/97	--	--	--	--	--	--	--	134
	RG212[a]	1993/94	--	--	--	--	--	--	--	79
		1994/95	FULL	52	(88)	7	(12)	13	59	72
		1995/96	--	--	--	--	--	--	--	72
		1996/97	--	--	--	--	--	--	--	72

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
	RG825	1992/93	FULL	46	(82)	10	(18)	22	56	67
	RG215[b]	1993/94	--	--	--	--	--	--	--	72
		1994/95	FULL	51	(78)	14	(22)	27	65	72
		1995/96	FULL	72	(86)	12	(14)	17	84	92
		1996/97	--	--	--	--	--	--	--	92
	6A	1992/93	--	--	--	--	--	--	--	34
	Remainder	1993/94	--	--	--	--	--	--	--	76
		1994/95	--	--	--	--	--	--	--	73
		1995/96	PARTIAL	31	(84)	6	(16)	19	37	69
		1996/97	--	--	--	--	--	--	--	69
6A		1992/93	--	206	(78)	57	(22)	28	263	754
TOTAL		1993/94	--	242	(84)	47	(16)	19	289	688
		1994/95	--	103	(83)	21	(17)	20	124	637
		1995/96	--	322	(88)	46	(13)	14	368	617
		1996/97	--	--	--	--	--	--	--	617

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated Population Size
6B	RG826	1992/93	FULL	102	(76)	33	(24)	32	135	162
	RG226[b]	1993/94	FULL	118	(81)	27	(19)	23	145	174
		1994/95	FULL	103	(83)	21	(17)	20	124	149
		1995/96	--	--	--	--	--	--	--	157
		1996/97	FULL	112	(82)	25	(18)	16	137	151
	RG878	1992/93	--	--	--	--	--	--	--	22
	RG220[b]	1993/94	FULL	7	(100)	0	(0)	0	7	8
		1994/95	--	--	--	--	--	--	--	8
		1995/96	--	--	--	--	--	--	--	8
		1996/97	--	--	--	--	--	--	--	8
	Goat	1992/93	PARTIAL	61	(86)	10	(14)	16	71	85
	Mountain	1993/94	--	--	--	--	--	--	--	85
		1994/95	--	--	--	--	--	--	--	85
		1995/96	--	--	--	--	--	--	--	85
		1996/97	--	--	--	--	--	--	--	85

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6B		1992/93	--	163	(79)	43	(21)	26	206	269
TOTAL		1993/94	--	125	(82)	27	(18)	22	152	267
		1994/95	--	103	(83)	21	(17)	20	124	242
		1995/96	--	--	--	--	--	--	--	250
		1996/97	--	112	(82)	25	(18)	22	137	244
6C		1992/93	--	--	--	--	--	--	--	222
TOTAL		1993/94	--	--	--	--	--	--	--	246
		1994/95	--	--	--	--	--	--	--	270
		1995/96	FULL	206	(83)	41	(17)	20	247	290
		1996/97	PARTIAL	118	(78)	34	(22)	29	152	442
6D	RG822	1992/93	PARTIAL	176	(81)	42	(19)	24	218	304
	RG242 [b]	1993/94	PARTIAL	32	(80)	8	(20)	25	40	282
		1994/95	FULL	208	(85)	37	(15)	18	245	271
		1995/96	--	--	--	--	--	--	--	293
		1996/97	FULL	248	(78)	72	(23)	29	320	369

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
	Upper	1992/93	FULL	64	(74)	23	(26)	36	87	104
	Fort	1993/94	--	--	--	--	--	--	--	86
	Fidalgo	1994/95	FULL	48	(86)	8	(14)	17	56	62
		1995/96	--	--	--	--	--	--	--	62
		1996/97	--	--	--	--	--	--	--	62
	RG824	1992/93	FULL	94	(76)	29	(24)	31	123	140
	RG244[b]	1993/94	--	--	--	--	--	--	--	160
		1994/95	FULL	131	(83)	26	(17)	20	157	181
		1995/96	--	--	--	--	--	--	--	203
		1996/97	--	--	--	--	--	--	--	227
	RG828	1992/93	PARTIAL	22	(88)	3	(12)	14	25	56
	RG245[b]	1993/94	--	--	--	--	--	--	--	47
		1994/95	--	--	--	--	--	--	--	34
		1995/96	PARTIAL	12	(86)	2	(14)	17	14	35
		1996/97	--	--	--	--	--	--	--	40

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
	Heiden	1992/93	--	--	--	--	--	--	--	23
	Canyon	1993/94	--	--	--	--	--	--	--	23
		1994/95	--	--	--	--	--	--	--	23
		1995/96	--	--	--	--	--	--	--	26
		1996/97	--	--	--	--	--	--	--	28
6D (East)		1992/93	--	356	(79)	97	(21)	27	453	627
TOTAL		1993/94	--	32	(80)	8	(20)	25	40	598
		1994/95	--	387	(84)	71	(16)	18	458	571
		1995/96	--	12	(86)	2	(14)	17	14	620
		1996/97	--	248	(78)	72	(23)	25	320	725
	RG829	1992/93	--	--	--	--	--	--	--	389
	RG249[b]	1993/94	FULL	295	(83)	61	(17)	21	356	392
		1994/95	--	--	--	--	--	--	--	352
		1995/96	FULL	232	(82)	52	(18)	22	284	325
		1996/97	--	--	--	--	--	--	--	406

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
	RG830	1992/93	FULL	291	(83)	58	(17)	20	349	406
	RG266 [b]	1993/94	--	--	--	--	--	--	--	377
		1994/95	--	--	--	--	--	--	--	348
		1995/96	FULL	236	(85)	42	(15)	18	278	326
		1996/97	--	--	--	--	--	--	--	358
	RG879	1992/93	--	--	--	--	--	--	--	150
	RG252 [b]	1993/94	FULL	111	(81)	26	(19)	23	137	164
		1994/95	--	--	--	--	--	--	--	157
		1995/96	--	--	--	--	--	--	--	212
		1996/97	FULL	161	(81)	38	(19)	24	199	239
	6D (West)	1992/93	--	--	--	--	--	--	--	207
	Remainder	1993/94	--	--	--	--	--	--	--	211
		1994/95	--	--	--	--	--	--	--	213
		1995/96	--	--	--	--	--	--	--	225
		1996/97	PARTIAL	23	(72)	9	(28)	39	32	204

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Count area coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D (West)		1992/93	--	291	(83)	58	(17)	20	349	1152
TOTAL		1993/94	--	406	(82)	87	(18)	21	493	1144
		1994/95	--	--	--	--	--	--	--	1070
		1995/96	--	468	(83)	94	(17)	20	562	1089
		1996/97	--	184	(80)	47	(20)	26	231	1206
6D		1992/93	--	647	(81)	155	(19)	24	802	1779
TOTAL		1993/94	--	438	(82)	95	(18)	22	533	1742
		1994/95	--	387	(84)	71	(16)	18	458	1641
		1995/96	--	492	(83)	98	(17)	20	590	1709
		1996/97	--	432	(78)	119	(22)	28	551	1931
UNIT 6		1992/93	--	1016	(80)	255	(20)	25	1271	3024
TOTAL		1993/94	--	805	(83)	169	(17)	21	974	2943
		1994/95	--	593	(84)	113	(16)	19	706	2790
		1995/96	--	1020	(85)	185	(15)	18	1205	2866
		1996/97	--	662	(79)	178	(21)	27	840	3234

[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, 1992–96

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A/RG820	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
	1995/96	11	4	36	4	57	3	43	3	(100)	0	(0)	0	3	3	3
	1996/97	10	2	20	5	63	3	38	3	(100)	0	(0)	0	3	3	3
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
	1995/96	10	5	50	3	60	2	40	2	(100)	0	(0)	0	2	2	5
	1996/97	6	2	33	2	50	2	50	2	(100)	0	(0)	0	2	2	4
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
	1995/96	6	1	17	2	40	3	60	3	(100)	0	(0)	0	3	3	3
	1996/97	4	0	0	2	50	2	50	2	(100)	0	(0)	0	2	2	3
6A/RG212 [d]	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6A/RG825	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A TOTAL	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
	1995/96	27	10	37	9	53	8	47	8	(100)	0	(0)	0	8	8	11
	1996/97	20	4	20	9	56	7	44	7	(100)	0	(0)	0	7	7	10
6B/RG826	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
	1995/96	16	5	31	4	36	7	64	7	(100)	0	(0)	0	7	7	6
	1996/97	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
6B/RG878	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6B TOTAL	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
	1995/96	16	5	31	4	36	7	64	7	(100)	0	(0)	0	7	7	6
	1996/97	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
6D/RG822	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
	1995/96	13	8	62	0	0	5	100	5	(100)	0	(0)	0	5	5	4
	1996/97	23	11	48	6	50	6	50	6	(100)	0	(0)	0	6	6	5

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
RG824	1992/93	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG244[e]	1993/94	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	25	18	72	7	100	0	0	0	(0)	0	(0)	0	0	0	4
6D/RG828	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6D (EAST)	1992/93	46	25	54	16	76	5	24	4	(80)	1	(20)	0	5	6	11
TOTAL	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
	1995/96	13	8	62	0	0	5	100	5	(100)	0	(0)	0	5	5	4
	1996/97	48	29	60	13	68	6	32	6	(100)	0	(0)	0	6	6	9
6D/RG829	1992/93	37	20	54	6	35	11	65	8	(73)	3	(27)	0	11	14	11
6D/RG249 [e]	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
	1995/96	24	15	63	2	22	7	78	3	(43)	4	(57)	0	7	11	12
	1996/97	52	25	48	16	59	11	41	11	(100)	0	(0)	0	11	11	12
6D/RG830	1992/93	68	32	47	22	61	14	39	9	(69)	4	(31)	1	14	19	13
6D/RG266 [e]	1993/94	68	31	46	27	73	10	27	4	(40)	6	(60)	0	10	16	15
	1994/95	76	29	43	23	61	15	39	9	(60)	6	(40)	0	15	21	18
	1995/96	44	20	45	15	63	9	38	6	(67)	3	(33)	0	9	12	8
	1996/97	33	11	33	15	68	7	32	4	(57)	3	(43)	0	7	10	8

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D/RG879	1992/93	28	19	68	7	78	2	22	2	(100)	0	(0)	0	2	2	5
6D/RG252 [e]	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
	1995/96	24	14	58	3	30	7	70	7	(100)	0	(0)	0	7	7	5
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6D (WEST)	1992/93	133	71	53	35	56	27	44	19	(73)	7	(27)	1	27	35	29
TOTAL	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
	1995/96	92	49	53	20	47	23	53	16	(70)	7	(30)	0	23	30	25
	1996/97	85	36	42	31	63	18	37	15	(83)	3	(17)	0	18	21	20
6D TOTAL	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
	1995/96	105	57	54	20	42	28	58	21	(75)	7	(25)	0	28	35	29
	1996/97	133	65	49	44	65	24	35	21	(88)	3	(13)	0	24	27	29
UNIT 6	1992/93	267	147	55	70	58	50	42	39	(80)	10	(20)	1	50	61	69
TOTAL	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
	1995/96	148	72	49	33	43	43	57	36	(84)	7	(16)	0	43	50	46
	1996/97	162	72	44	55	61	35	39	32	(91)	3	(9)	0	35	38	44

[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, 1992–96

		Successful					Unsuccessful					
Unit	Regulatory year	Local [a] resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunter
6A	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
	1995/96	0	0	8	8	(47)	0	3	6	9	(53)	17
	1996/97	0	0	7	7	(44)	0	2	7	9	(56)	16
6B	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
	1995/96	4	0	3	7	(64)	2	2	0	4	(36)	11
	1996/97	0	0	4	4	(67)	0	1	1	2	(33)	6
6D	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
	1995/96	9	16	3	28	(58)	17	2	1	20	(42)	48
	1996/97	7	14	3	24	(35)	9	27	8	44	(65)	68
UNIT 6	1992/93	5	22	23	50	(42)	10	49	11	70	(58)	120
TOTAL	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
	1995/96	13	16	14	43	(57)	19	7	7	33	(43)	76
	1996/97	7	14	14	35	(39)	9	30	16	55	(61)	90

[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, 1992–96

Unit	Regulatory year	Harvest Periods						n
		August	September	October	November	December	January	
6A	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
	1995/96	25	38	25	13	0	0	8
	1996/97	29	71	0	0	0	0	7
6B	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
	1995/96	57	29	14	0	0	0	7
	1996/97	100	0	0	0	0	0	4
6D	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
	1995/96	14	46	39	0	0	0	28
	1996/97	54	33	13	0	0	0	24
UNIT 6 TOTAL	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
	1995/96	23	42	33	2	0	0	43
	1996/97	54	37	9	0	0	0	35

Table 5 Unit 6 mountain goat harvest percent by transport method, 1992–96

Unit	Regulatory year	Airplane	Boat	n	Unit	Regulatory Year	Airplane	Boat	n
6A	1992/93	100	0	11	6D	1992/93	56	44	32
	1993/94	100	0	9		1993/94	50	50	38
	1994/95	100	0	7		1994/95	43	58	40
	1995/96	100	0	8		1995/96	43	57	28
	1996/97	100	0	7		1996/97	50	50	24
6B	1992/93	100	0	7	UNIT 6	1992/93	72	28	50
	1993/94	100	0	5	TOTAL	1993/94	63	37	52
	1994/95	100	0	6		1994/95	57	43	53
	1995/96	100	0	7		1995/96	63	37	43
	1996/97	100	0	4		1996/97	66	34	35

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. KFNP includes some private and state lands that may in the future support additional hunting opportunity. In addition to KFNP, most goat habitat on the Kenai Peninsula is 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 that 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 observed 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 three 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 those sightability variations.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We observed 3027 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 4163 (90% observability) to 5324 goats (70% observability) inhabit the Kenai Peninsula. Goat populations have remained slightly declined during this reporting period.

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 have stabilized around 393 goats.

West Slope. The formations along the west slope of the Kenai Mountains from Chickaloon Bay to Tustumena Glacier support the lowest mountain goat density on the Kenai Peninsula because of habitat and climate 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 through 1992 but have gradually declined since. Poor winter weather and competition with Dall sheep are suspected causes for the decline. (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. Counts in individual areas and adjacent areas indicate populations in this region have also declined gradually.

Population Composition

In 1995 we surveyed 7 count areas and tallied 534 goats with 24% kids (Table 2). In 1996 we counted 733 goats in 10 count areas. There were 25% kids in the population in 1996.

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 TG364 and TG365 was from 1 August to 30 September. The bag limit was 1 goat.

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. The original court decision was overturned and the boards reinstated the nonsubsistence areas and the associated regulations. Now there are only 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. The "up to " language was inadvertently left out of the codified. The proposal was resubmitted and approved during the March 1997 Board of Game meeting. During this meeting the board approved of the department's plans to allow for archery-only hunts during the late fall registration season. Archery hunts would only take place in those areas where a harvestable surplus exists and a general all-weapon season is not practical.

A separate proposal to reopen state and private inholdings within the KFNP was approved. However, the principal landowner (Port Graham Native Corporation) refused to allow the public access so only state lands were opened in Hunt area DG351.

Registration permit hunts were managed for the remainder of the harvestable quota. When the quota was reached, were issued emergency orders, closing the respective hunt areas. Three emergency orders were issued on October 24 (RG333, 346, 347 and 352), November 2 (RG358 363, and 364), and November 7 (RG336), 1995. In 1996, 3 emergency orders were issued on October 25 (RG333, 345, and 346), November 2 (RG352, and 363), and November 22 (RG361, 362, and 365)

Hunter Harvest. Hunters harvested 145 goats on the Kenai Peninsula in 1995. Drawing permittees killed 74 goats (46 males, 27 females, and 1 unspecified sex) throughout 24 hunt areas (Table 5). Permittees harvested 64 goats (39 males, 24 females, and 1 unspecified sex) from 10

hunt areas during the registration permit hunt (Table 6). Subsistence hunters harvested 4 billy and 3 nanny goats in the 2 Tier II subsistence hunts (Table 7).

Hunters harvested 133 goats on the Kenai Peninsula in 1996. Drawing permittees killed 90 goats (58 males, 32 females) throughout 24 hunt areas (Table 8). Permittees harvested 37 goats (22 males, 15 females) from 11 hunt areas during the registration permit hunt (Table 9). Subsistence hunters harvested 6 billy goats 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, and 12). Goat distribution, weather, and hunter demographics contributed to these variations. Nonresident hunters composed less than 3% of total hunters in both 1995 and 1996 (Tables 13 & 14). However, nonresidents usually had high success rates because of guiding requirements. The overall success rate of nonresidents was 67% and 69% for 1995 and 1996, respectively.

Harvest Chronology. Drawing permittees harvested a higher proportion of goats during the last part of September in both 1995 and 1996 (Table 15). 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 game management units because of accessibility. In 1995 successful hunters in Unit 7 used highway vehicles (42%), boats (31%), and aircraft (20%) (Table 16). In Unit 15 successful hunters used boats (46%), aircraft (42%), and horses (6%) (Table 17). All other transportation methods were less than 2%.

In 1994 the transportation types used were similar to the previous year. Successful hunters in Unit 7 used highway vehicles (35%), boats (34%), and aircraft (19%) (Table 16). In Unit 15 successful hunters used aircraft (54%) and boats (41%) (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 8500 acres of potential winter habitat were logged in 1996. More importantly, over 2500 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 3027 goats on the Kenai Peninsula, excluding KFNP. An estimated 800 to 1000 goats inhabited the KFNP. Including KFNP, we estimated between 4163 (assuming 90% observability) and (assuming 70% observability) 5324 goats inhabited the Kenai Peninsula. The goat population

was stable and we met our management objective of maintaining 4000 to 4500 mountain goats on the Kenai Peninsula.

Within trend areas during 1968–1997, 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 provided additional hunter opportunity with the addition of archery-only hunts in areas that would otherwise be closed during the registration season. The fall of 1997 will be the first year for these hunts, which will need to be fully evaluated before we extend them. We do not recommend any changes in goat harvest management on the Kenai Peninsula at this time.

Winter severity and access to winter habitat may limit mountain goat populations on the Kenai (Hjeljord 1973, Del Frate and Spraker 1994). Surveys following poor weather conditions (deep, persistent snow with warm periods causing the snow to crust) during 1992–93 support this hypothesis. Aerial counts revealed declines in many of the areas within the west slope trend area and south into Kachemak bay. Because hunter harvest is the primary mortality factor in prime-aged mountain goats (Smith 1986), we must be cautious to recognize declines and adjust harvest objectives to avoid larger declines.

Forestry practices on state and private land adjacent to winter mountain goat habitat could be detrimental to mountain goats. Removal of the overstory reduces the amount of thermal cover and forage availability on winter habitat. 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 1968–97

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
	1997	37.5	27.2	110	-16
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, 1988–96

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
DG331	1992/93	34	12	--	35	46	--	46
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
	1995/96	42	14		33	56		56
	1996/97[a]	--	--	--	--	--	--	--
DG332	1992/93	2	0	--	0	2	--	2
	1993/94[a]	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--
	1996/97	17	7		41	24		24
DG333	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	89	23	--	26	112	--	112
	1995/96[a]	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--
DG334	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	67	24	--	36	91	--	91
	1995/96	--	--	--	--	--	--	114[f]
	1996/97	--	--	--	--	--	--	--
DG335	1992/93[a]	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--
	1994/95	63	19	--	30	82	--	82
	1995/96[a]	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG336	1992/93 [a]	--	--	--	--	--	--	--
	1993/94	119	23	--	19	142	--	142
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	132	46	--	35	178	--	178
	1996/97 [a]	--	--	--	--	--	--	--
DG337	1992/93	20	6	0	30	26	--	26
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	12	1	--	8	13	--	13
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	16	3	--	19	19	--	19
DG338	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	14	2	--	14	16	--	16
	1996/97	7	1	--	14	8	--	8
DG339	1992/93	118	33	0	28	151	--	151
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	106	23	--	22	129	--	129
	1996/97 [a]	--	--	--	--	--	--	--
DG340	1992/93 [a]	--	--	--	--	--	--	--
	1993/94	52	16	--	31	68	--	68
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	64	21	--	33	85	--	85

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG341	1992/93	41	12	0	29	53	--	53
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	39	14	--	36	53	--	53
	1996/97	36	17	--	47	53	--	53
DG342	1992/93	71	25	0	35	96	--	96
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG343	1992/93	80	29	0	36	109	--	109
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	58	16	--	28	74	--	74
	1996/97 [a]	--	--	--	--	--	--	--
DG344	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	53	13	0	25	66	--	66
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG345	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	146	25	0	17	171	--	171
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG346	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	180	42	0	23	222	--	222
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	166	52	--	31	218	--	218
DG347	1992/93 [a]	--	--	--	--	--	--	--
	1993/94	128	41	--	--	169	--	169
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG348	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG349	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	31
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG350	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	222
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG351	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	335
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [e]	17	10	--	59	27	--	27
DG352	1992/93	110	44	0	40	154	--	154
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG353	1992/93 [a]	--	--	--	--	--	--	--
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	0	0	--	--	0	--	0
DG354	1992/93	70	28	0	40	98	--	98
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	35	8	--	23	43	--	43
DG355	1992/93	16	4	0	25	20	--	20
	1993/94 [f]	18	4	0	22	22	--	22
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG356	1992/93	50	15	0	30	65	--	65
	1993/94	38	10	0	26	48	--	48
	1994/95	34	4	0	12	38	--	38
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG357	1992/93	52	19	0	36	71	--	71
	1993/94	41	17	0	41	58	--	58
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	39	12	--	30	51	--	51
	1996/97 [a]	--	--	--	--	--	--	--
DG358	1992/93	87	28	0	32	115	--	115
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	40	16	--	40	56	--	56
DG359	1992/93	147	54	0	37	201	--	201
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	75	17	0	23	92	--	92
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG360	1992/93	180	48	0	27	228	--	228
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95	138	31	0	22	169	--	169
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [e]	35	14	--	40	49	--	49

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG361	1992/93	107	33	0	31	140	--	140
	1993/94	87	13	0	15	100	--	100
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG362	1992/93	67	21	--	31	88	--	88
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	110	45	--	41	155	--	155
	1996/97 [a]	--	--	--	--	--	--	--
DG363	1992/93 [a]	--	--	--	--	--	--	--
	1993/94	175	40	0	23	215[e]	--	215
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG364	1992/93	98	21	0	21	119	--	119
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
DG365	1992/93	129	30	0	23	159	--	159
	1993/94 [a]	--	--	--	--	--	--	--
	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--

[a]No survey.
[b]New hunt area 841- Cecil Rhodes Mountain 1991.
[c]Poor count.
[d]Partial count.
[e]Combined Ground observations with aerial counts.

Table 3 Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1984–96

Year	Season Dates	Nr. Permits Issued	Nr. 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
1995	10 Aug. - 30 Sept.	381	192	39	46	27	1	74
1996	10 Aug. - 30 Sept.	444	252	36	58	32		90
Total					551	270	6	827

Table 4 Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984–96

Year	Season Dates	Nr. Permits Issued	Nr. 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
1995	15 Oct. - 30 Nov.	427	231	28	39	24	1	64
1996	15 Oct. - 30 Nov.	353	139	29	24	16	1	41
Total					515	287	14	816

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

Table 5 Kenai Peninsula mountain goat drawing permit hunt summary, 1995[a]

Hunt area	Permits issued	Nr. of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	3	2	50	0	1		1
DG333	15	11	27	3	0		3
DG334	10	8	75	2	4		6
DG335	12	8	88	5	2		7
DG336[b]	25	10	10	1	0		1
DG338	2	1	100	0	1		1
DG339	15	13	54	6	1		7
DG340	20	6	0	0	0		0
DG341	4	2	100	1	1		2
DG342	14	9	56	4	1		5
DG343	10	8	50	2	2		4
DG344	16	7	14	0	1		1
DG345[b]	35	12	50	2	3	1	6
DG346	35	26	23	6	0		6
DG347	20	8	38	2	1		3
DG354	20	8	13	1	0		1
DG355	4	3	33	0	1		1
DG356	5	2	50	0	1		1
DG357	10	5	20	1	0		1
DG358[c]	20	4	0	0	0		0
DG359	20	13	23	2	1		3
DG360	30	11	55	3	3		6
DG361	20	6	50	2	1		3
DG362	16	9	56	3	2		5
Totals	381	192	39	46	27	1	74

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

Table 6 Kenai Peninsula mountain goat registration permit hunt summary, 1995[a]

Hunt area	Permits issued	Nr of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG333	101	41	7	2	1		3
RG336	74	41	15	5	1		6
RG340	9	2	50	0	1		1
RG346	86	43	28	7	5		12
RG347	40	29	28	4	3	1	8
RG352	15	11	64	4	3		7
RG354	38	21	19	2	2		4
RG358	16	8	88	5	2		7
RG363	38	30	43	9	4		13
RG364[b]	10	5	60	1	2		3
Totals	427	231	28	39	24	1	64

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

[b] Limited to residents of Alaska. Only a portion of the hunt area was opened.

Table 7 Kenai Peninsula subsistence harvest, 1986–96

Year	Season Dates	Nr. Permits Issued	Nr. 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
1995	1 Aug.-. 30 Sept.	50	23	30	4	3		7
1996	1 Aug.-. 30 Sept.	46	21	29	6	0		6
Total					71	22	3	96

[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, 1996[a]

Hunt area	Permits issued	Nr of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	3	3	67%	2	0		2
DG333	15	10	10%	0	1		1
DG334	8	7	71%	4	1		5
DG335	8	5	20%	0	1		1
DG336[b]	25	16	19%	1	2		3
DG339	18	14	50%	4	3		7
DG340[b]	25	12	0%	0	0		0
DG341	6	6	33%	1	1		2
DG342	14	11	27%	3	0		3
DG343	8	7	29%	1	1		2
DG344	16	7	43%	2	1		3
DG345	35	17	29%	4	1		5
DG346[b]	35	15	20%	2	1		3
DG347[b]	20	14	43%	2	4		6
DG352	25	15	40%	5	1		6
DG354[b]	20	10	20%	2	0		2
DG355	4	1	100%	1	0		1
DG356	6	5	60%	1	2		3
DG357[b]	10	5	40%	2	0		2
DG358[b]	25	12	50%	2	4		6
DG359	20	14	36%	4	1		5
DG360	30	17	41%	4	3		7
DG361[b]	20	11	36%	2	2		4
DG362	18	5	0%	0	0		0
Totals	444	252	36%	58	32	0	90

[a]Season Dates: 10 August - 30 September.
[b]One hunter did not return a report.

Table 9 Kenai Peninsula mountain goat registration permit hunt summary, 1996[a]

Hunt area	Permits issued	Nr of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG333[b]	58	14	14%	2	0		2
RG335	52	20	10%	1	1		2
RG336	37	11	0%	0	0		0
RG340	8	1	0%	0	0		0
RG345[b]	19	9	44%	2	1	1	4
RG346[b]	88	35	34%	8	4		12
RG352[c]	7	3	33%	1	0		1
RG361[d]	13	7	29%	2	0		2
RG362[d]	25	12	50%	2	4		6
RG363[c]	30	16	31%	2	3		5
RG365[de]	16	11	64%	4	3		7
Totals	334	130	28%	22	15	0	37

[a]General Registration Season Dates: 15 October - 30 November.
[b]Hunt areas RG333, RG345, and RG346 closed by emergency order October 25, 1996.
[c]Hunt areas RG352 and RG363 closed by emergency order November 2, 1996.
[d]Hunt areas RG361,RG362, and RG365 closed by emergency order November 22, 1996.
[e] Limited to residents of Alaska.

Table 10 Units 7 & 15 mountain goat harvest data by drawing permit hunt, 1992–96

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG331	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
	1995/96	3	33	50	50	0	1	--	--	1
	1996/97	3	0	50	50	2	0	--	--	2
DG332	1992/93	0	--	--	--	--	--	--	--	--
	1993/94	0	--	--	--	--	--	--	--	--
	1994/95	0	--	--	--	--	--	--	--	--
	1995/96	0	--	--	--	--	--	--	--	--
	1996/97	0	--	--	--	--	--	--	--	--
DG333	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
	1995/96	15	27	73	27	3	0	--	--	3
	1996/97	15	33	90	10	0	1	--	--	1
DG334	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
	1995/96	10	20	25	75	2	4	--	--	6
	1996/97	8	13	29	71	4	1	--	--	5
DG335	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
	1995/96	12	33	13	87	5	2	--	--	7
	1996/97	8	38	80	20	0	1	--	--	1

Table 10 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG336	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
	1995/96	25	56	90	10	1	0	--	--	1
	1996/97	25	36	80	20	1	2	--	--	3
DG337	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
	1995/96	--	--	--	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--	--	--	--
DG338	1992/93	--	--	--	--	--	--	--	--	--
	1993/94	2	0	50	50	1	0	--	--	1
	1994/95	2	50	100	0	0	0	--	--	0
	1995/96	2	50	0	100	0	1	--	--	1
	1996/97	--	--	--	--	--	--	--	--	--
DG339	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
	1995/96	15	13	40	60	6	1	--	--	7
	1996/97	18	22	50	50	4	3	--	--	7
DG340	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
	1995/96	20	70	100	0	0	0	--	--	0
	1996/97	25	52	100	0	0	0	--	--	0

Table 10 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG341	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
	1995/96	4	50	0	100	1	1	--	--	2
	1996/97	6	0	33	66	1	1	--	--	2
DG342	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
	1995/96	14	36	44	56	4	1	--	--	5
	1996/97	14	21	73	27	3	0	--	--	3
DG343	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
	1995/96	10	20	50	50	2	2	--	--	4
	1996/97	8	13	71	29	1	1	--	--	2
DG344	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
	1995/96	16	56	86	14	0	1	--	--	1
	1996/97	16	56	57	43	2	1	--	--	3
DG345	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
	1995/96	35	63	50	50	2	3	1	--	6
	1996/97	35	51	71	29	4	1	--	--	5

Table 10 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG346	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
	1995/96	35	26	77	23	6	0	--	--	6
	1996/97	35	57	79	21	2	1	--	--	3
DG347	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
	1995/96	20	60	63	37	2	1	--	--	3
	1996/97	20	30	54	46	2	4	--	--	6
DG352	1992/93[a]	--	--	--	--	--	--	--	--	--
	1993/94	25	44	36	64	8	1	--	--	9
	1994/95[a]	--	--	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	25	40	60	40	5	1	--	--	6
DG354	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
	1995/96	20	60	88	12	1	0	--	--	1
	1996/97	20	50	78	22	2	0	--	--	2
DG355	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
	1995/96	4	25	66	33	0	1	--	--	1
	1996/97	4	75	0	100	1	0	--	--	1

Table 10 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG356	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
	1995/96	5	60	50	50	0	1	--	--	1
	1996/97	6	17	40	60	1	2	--	--	3
DG357	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
	1995/96	10	50	80	20	1	0	--	--	1
	1996/97	10	50	50	50	2	0	--	--	2
DG358	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
	1995/96	20	70	100	0	0	0	--	--	0
	1996/97	25	52	45	55	2	4	--	--	6
DG359	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
	1995/96	20	35	77	23	2	1	--	--	3
	1996/97	20	30	64	36	4	1	--	--	5
DG360	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
	1995/96	30	63	45	55	3	3	--	--	6
	1996/97	30	43	59	41	4	3	--	--	7

Table 10 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG361	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
	1995/96	20	70	50	50	2	1	--	--	3
	1996/97	20	45	60	40	2	2	--	--	4
DG362	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
	1995/96	16	44	44	56	3	2	--	--	5
	1996/97	18	72	100	0	0	0	--	--	0
DG363	1992/93[a]	0	--	--	--	--	--	--	--	--
	1993/94	24	54	55	45	4	1	--	--	5
	1994/95[a]	0	--	--	--	--	--	--	--	--
	1995/96[a]	0	--	--	--	--	--	--	--	--
	1996/97	30	57	15	85	9	2	--	--	11

[a]Subsistence season.

Table 11 Units 7 & 15 mountain goat harvest data by registration permit hunt, 1992–96

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG333	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
	1995/96	101	60	93	7	2	1	--	--	3
	1996/97	58	76	86	14	2	0	--	--	2
RG335	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97	52	62	90	10	1	1	--	--	2
RG336	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
	1995/96	74	45	85	15	5	1	--	--	6
	1996/97	37	70	100	0	0	0	--	--	0
RG339	1992/93	99	33	67	33	12	10	--	--	22
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97[a]	0	--	--	--	--	--	--	--	0
RG340	1992/93	6	50	100	0	0	0	--	--	0
	1993/94	5	60	0	100	2	0	--	--	2
	1994/95[b]	0	--	--	--	--	--	--	--	0
	1995/96	9	78	50	50	0	1	--	--	1
	1996/97	8	88	100	0	0	0	--	--	0

Table 11 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG344	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
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97[a]	0	--	--	--	--	--	--	--	0
RG345	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
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97	19	53	56	44	2	1	1	--	4
RG346	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95	68	49	66	34	9	3	--	--	12
	1995/96	86	50	70	30	7	5	--	--	12
	1996/97	88	60	66	34	8	4	--	--	12
RG347	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	49	47	69	31	4	4	--	--	8
	1994/95	30	43	76	24	1	3	--	--	4
	1995/96	40	28	72	28	4	3	1	--	8
	1996/97[a]	0	--	--	--	--	--	--	--	0
RG352	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
	1995/96	15	27	36	64	4	3	--	--	7
	1996/97	7	57	66	33	1	0	--	--	1

Table 11 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG354	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
	1995/96	38	45	81	19	2	2	--	--	4
	1996/97[a]	--	--	--	--	--	--	--	--	--
RG358	1992/93	7	29	40	60	2	1	--	--	3
	1993/94	10	40	0	100	4	2	--	--	6
	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96	16	50	13	87	5	2	--	--	7
	1996/97[a]	--	--	--	--	--	--	--	--	0
RG359	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
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--	--	--
RG360	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
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--	--	--
RG361	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
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	13	46	71	29	2	0	--	--	2

Table 11 Continued

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG362	1992/93[a]	--	--	--	--	--	--	--	--	--
	1993/94[a]	--	--	--	--	--	--	--	--	--
	1994/95[a]	--	--	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	25	52	50	50	2	4	--	--	6
RG363	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
	1995/96	38	21	57	43	9	4	--	--	13
	1996/97	30	47	69	31	2	3	--	--	5
RG364	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	16	13	79	21	1	2	--	--	3
	1994/95	22	41	85	15	2	0	--	--	2
	1995/96	20	50	80	20	2	0	--	--	2
	1996/97[a]	--	--	--	--	--	--	--	--	--
RG365	1992/93[a]	0	--	--	--	--	--	--	--	0
	1993/94	20	70	83	17	0	1	--	--	1
	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	16	31	30	70	4	3	--	--	7

[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, 1992–96

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
TG352	1992/93	20	60	50	50	3	1	--	--	4
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95	25	68	62	38	2	1	--	--	3
	1995/96[b]	--	--	--	--	--	--	--	--	--
	1996/97[ab]	--	--	--	--	--	--	--	--	--
TG363	1992/93	24	42	43	57	6	2	--	--	8
	1993/94[a]	0	--	--	--	--	--	--	--	0
	1994/95	30	27	59	41	7	2	--	--	9
	1995/96[b]	--	--	--	--	--	--	--	--	--
	1996/97[ab]	--	--	--	--	--	--	--	--	--
TG364	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
	1995/96	20	50	80	20	2	0	--	--	2
	1996/97	16	25	70	30	3	0	--	--	3
TG365	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
	1995/96	30	57	61	39	2	3	--	--	5
	1996/97	30	70	67	33	3	0	--	--	3

[a]Drawing hunt only.
[b]No subsistence hunt held. Hunt area was located in non-subsistence area created by the Board of Game.

Table 13 Units 7 & 15 mountain goat hunter drawing permit hunt residency and success, 1992–96

Regulatory year	Successful				Unsuccessful				Total hunters
	resident	Nonresident	Unspec.	Total (%)	resident	Nonresident	Unspec.	Total (%)	
1992/93	75	1	3	76(42)	102	1	1	103(58)	179
1993/94	90	2	2	95(47)	107	1	2	109(53)	204
1994/95	63	5		68(31)	147	1		148(69)	216
1995/96	71	3		74(39)	116	2		118(60)	192
1996/97	81	6	1	88(36)	152	1	1	154(64)	242

Table 14 Units 7 & 15 mountain goat hunter registration permit hunt residency and success, 1992–96

Regulatory year	Successful			Unsuccessful			Total hunters
	resident	Nonresident	Total (%)	resident	Nonresident	Total (%)	
1992/93	64	10	75(29)[a]	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)[b]	247
1995/96	59	5	64(28)	166	2	168(72)	232
1996/97	35	5	41(30)[c]	92	4	96(70)	137

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

Table 15 Units 7 & 15 mountain goat harvest chronology for 1990–1996

Regulatory year	Harvest periods								Total[a] Harvest
	10–19 August	20–31 August	1–15 September	16–30 September	15–31 October	1–15 November	16–31 November	Unknown	
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
1995/96	20	10	20	23	55	2	3	2	135
1996/97	11	15	28	33	29	7	5	1	129

[a]Including Tier II subsistence and unreported harvest.

Table 16 Unit 7 mountain goat harvest percent by transport method, 1992–96. Drawing and Registration hunts are combined.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
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
1995/96	20	0	31	6	0	0	42	1	90
1996/97	19	0	34	6	0	1	35	4	68

Table 17 Unit 15 mountain goat harvest percent by transport method, 1990–96. Drawing and Registration hunts are combined.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
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
1995/96	42	6	46	2	0	2	0	2	48
1996/97	54	2	41	0	0	0	0	3	61

LOCATION

GAME MANAGEMENT UNIT: 8 (5097 mi^2)

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

Mountain goats have moved into most of the suitable habitat since their introduction to Kodiak Island in 1952 and 1953. Annual aerial composition counts indicated the population was growing in the most recently occupied habitat. Highest densities occurred in the northcentral Kodiak Island drainages of Ugak, Terror, Uganik and Kiliuda Bays. A 1994 aerial survey indicated goat numbers were increasing steadily in the Uyak and Zachar Bay drainages of southcentral Kodiak Island. Since 1968 hunting has been allowed by permit, and since 1986 hunting has been regulated by drawing permits. The road-accessible drainages near the city of Kodiak, where goats occurred at low density, were closed to hunting to provide for viewing opportunity. Much of the southern Kodiak Island goat range that had been closed to facilitate colonization into suitable habitat was opened to hunting in 1991.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Maintain a prehunting population of at least 700 goats with a harvest of at least 50% males.

METHODS

We complete composition counts annually with fixed-wing aircraft in August and early September. Count areas approximately correspond to the 8 permit hunt areas. We collect data on harvest and hunting effort from mandatory hunter reports and by examining horns of harvested goats.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The mountain goat population was estimated at a minimum of 800 animals in 1994 (Table 1). An aerial survey of most of the goat range in 1994 resulted in a count of 719 goats. This survey indicated the goat population was continuing its expansion in area and number. Smith (1993) reported a total count of 449 goats in 70% of the habitat in 1990 and 419 in 40% of the goat habitat in 1992, noting that herds that were increasing in size were in the Zachar Bay and Uyak Bay drainages of southern Kodiak Island.

Population Composition

From 1992–93 to 1996–97, the kid:adult ratio ranged from 15–24 kids:100 adults with a mean of 20.2 (Table 1).

Distribution and Movements

Goats occur, in at least small numbers, in most suitable habitat on Kodiak Island. The public and personnel in other agencies occasionally observe goats near known goat habitat. Goats were commonly seen on mountain peaks adjacent to the Kodiak Island road system

MORTALITY

Harvest

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

Board of Game Actions and Emergency Orders. Beginning in 1995–96, the Board of Game authorized a new drawing permit area (DG478), extending the open season into the Chiniak Bay drainage. This extension followed the board's decision in 1991 to adopt a department recommendation to open hunting by drawing permit on part of southern Kodiak Island where the goat population was increasing. These new permit hunts were created, and the number of drawing permits was increased to 141.

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

Hunter Harvest. Annual harvest ranged from 39 to 59 goats (average = 47.8) during the 5-year period from 1992/93 to 1996/97 (Table 2). Annual harvests were increasing throughout most of the reporting period (Table 2). Annual harvest ranged from 3 to 12 goats for each of the 8 permit hunts. Hunters harvested 5 goats in the newly opened permit hunt; 70% of these goats were male.

The mean age of goats harvested annually since 1988–89 ranged from 3.3 to 5.9 years for males and from 3.7 to 6.7 years for females (Table 3). The harvest of males exceeded females during each of the past 5 years, with an overall mean of 59% males.

Permit Hunts. The number of permits issued by lottery ranged from 125 to 141, and the number of hunters afield ranged from 70 to 98. Hunters' compliance with the conditions of the permit hunt was good. However, often permittees who did not hunt failed to return permit reports until receiving reminder letters.

Hunter Residency and Success. During this reporting period, most of the successful hunters were residents of Unit 8 (55.7%), nonlocal Alaska residents (36.7%), and nonresidents (7.6%) (Table 4). Annual hunter success ranged between 56 and 62% with a 5-year mean of 59.2%.

Harvest Chronology. Since 1988 October harvest has exceeded September's every year except 1990 (Table 5). Weather patterns, which affect hunter success and influence when hunters go into the field, largely determined the chronology of harvest.

Transport Methods. Hunters predominantly used aircraft as their preferred method of transportation (Table 6).

Other Mortality

Documenting mortality from sources other than hunting is seldom possible because of the remote, rugged nature of goat habitat. Predation by brown bears undoubtedly occurs, but it is probably rare. Severe winter weather conditions may have caused low production of kids in some years, but we have not determined whether production suffered because of early postnatal mortality of kids or low initial productivity. We estimate that wounding loss and illegal harvest contribute additional mortality equivalent to 10% of the reported harvest.

HABITAT

Assessment

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

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

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

NONREGULATORY MANAGEMENT PROBLEMS

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

CONCLUSIONS AND RECOMMENDATIONS

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

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

Management objectives for goats in Unit 8 have been modified to reflect increases in goat numbers and distribution. The new objective is to maintain a prehunting population of 700 goats that will sustain an annual harvest comprising >50% males.

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Table 1 Unit 8 Aerial summer mountain goat composition counts and estimated population size, 1992–1997

Area	Regulatory year	Adults	(%)	Kids	(%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
	1992/93	346	(83)	73	(17)	21	419	144.5	--
All	1993/94	238	(82)	54	(18)	23	292	83.4	--
permit	1994/95	579	(81)	140	(21)	24	719	49.2	800
hunts	1995/96	432	(87)	65	(13)	15	479	105.7	--
	1996/97	405	(85)	72	(15)	18	477	94.1	--
471	1992/93	110	(81)	25	(19)	23	135	--	80-90
	1993/94	79	(88)	11	(12)	14	90	--	--
	1994/95	94	(79)	25	(21)	27	119	--	--
	1995/96	114	(89)	14	(11)	12	128	--	--
	1996/97	113	(84)	21	(16)	19	134	--	--
472	1992/93	47	(82)	10	(18)	21	57	--	50-60
	1993/94	35	(95)	2	(5)	6	37	--	--
	1994/95	40	(82)	9	(18)	23	49	--	--
	1995/96	35	(97)	1	(3)	3	36	--	--
	1996/97	37	(80)	9	(20)	24	46	--	--
473	1992/93	133	(84)	25	(16)	19	158	--	120-130
	1993/94	79	(81)	18	(19)	23	97	--	--
	1994/95	93	(74)	33	(26)	36	126	--	--
	1995/96	143	(85)	25	(15)	17	168	--	--
	1996/97	101	(89)	12	(11)	12	113	--	--
474	1992/93	56	(81)	13	(19)	23	69	--	40-60
	1993/94	--	--	--	--	--	--	--	--
	1994/95	55	(75)	18	(25)	33	73	--	--
	1995/96	54	(83)	11	(17)	20	65	--	--
	1996/97	36	(97)	1	(3)	3	37	--	--
475	1992/93	--	--	--	--	--	--	--	--
	1993/94	--	--	--	--	--	--	--	--
	1994/95	98	(88)	13	(12)	13	111	--	--
	1995/96	--	--	--	--	--	--	--	--
	1996/97	24	(71)	10	(29)	42	34[a]	--	--

Table 1 Continued

Area	Regulatory year	Adults	(%)	Kids	(%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
476	1992/93	--	--	--	--	--	--	--	50-60
	1993/94	--	--	--	--	--	--	--	--
	1994/95	33	(94)	2	(6)	6	35	--	--
	1995/96	--	--	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--	--	--
478	1992/93	--	--	--	--	--	--	--	50-60
	1993/94	--	--	--	--	--	--	--	--
	1994/95	--	--	--	--	--	--	--	--
	1995/96	68	(84)	13	(16)	19	81	--	--
	1996/97	66	(81)	15	(19)	23	81	--	--

a - partial survey

Table 2 Unit 8 mountain goat harvest data by permit hunt, 1992–97

Hunt Nr/ Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
	1992/93	111	58	38	62	22 (58)	16 (42)	1	0	39
All	1993/94	143	43	40	60	31 (64)	17 (36)	0	0	48
permit	1994/95	135	39	42	58	22 (52)	20 (48)	0	0	44
hunts	1995/96	141	44	38	62	30 (61)	19 (39)	0	0	49
	1996/97	176	44	40	60	37 (62)	20 (34)	2	0	59
471	1992/93	15	60	50	50	1 (33)	2 (67)	0	0	4
	1993/94	30	43	44	56	6 (67)	3 (33)	0	0	3
	1994/95	25	64	44	56	5 (56)	4 (44)	0	0	3
	1995/96	25	44	29	71	6 (60)	4 (40)	0	0	10
	1996/97	30	47	37	63	6 (60)	4 (40)	0	0	10
472	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
	1995/96	8	50	25	75	1 (33)	2 (67)	0	0	3
	1996/97	10	20	37	63	2 (40)	2 (40)	1	0	5
473	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
	1995/96	25	40	20	80	6 (50)	6 (50)	0	0	12
	1996/97	31	39	37	63	9 (75)	3 (25)	0	0	12
474	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
	1995/96	10	50	20	80	3 (75)	1 (25)	0	0	4
	1996/97	30	50	53	47	4 (57)	3 (43)	0	0	7
475	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
	1995/96	35	49	51	49	5 (63)	3 (47)	0	0	8
	1996/97	35	60	50	50	1 (14)	6 (86)	0	0	7

Table 2 Continued

Hunt Nr/ Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
476	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
	1995/96	20	60	50	50	2 (50)	2 (50)	0	0	4
	1996/97	20	35	38	62	8 (100)	0 (0)	0	0	8
477	1992/93	8	0	50	50	1 (25)	3 (75)	0	0	4
	1993/94	10	20	13	87	6 (86)	1 (14)	0	--	7
	1994/95	10	20	62	38	2 (67)	1 (33)	0	0	3
	1995/96	10	30	37	63	4 (80)	1 (20)	0	0	5
	1996/97	12	50	17	83	3 (60)	2 (40)	0	0	5
478	1992/93	--	--	--	--	-- --	-- --	--	--	--
	1993/94	--	--	--	--	-- --	-- --	--	--	--
	1994/95	--	--	--	--	-- --	-- --	--	--	--
	1995/96	8	0	37	63	4 (80)	1 (20)	0	0	5
	1996/97	8	13	29	71	3 (60)	2 (40)	0	0	5

Table 3 Unit 8 mountain goat harvest mean age data from horn rings, 1988–1997

Regulatory Year	Male	(*n*)	Female	(*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)
1995/96	5.9	(18)	6.7	(7)
1996/97	5.2	(17)	6.2	(9)

Table 4 Unit 8 mountain goat hunter residence and success, 1992–1997

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
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
1995/96	30	17	2	49	(62)	7	20	3	30	(53)	
1996/97	36	18	5	59	(60)	21	16	2	39	(40)	

[a] Unit 8 residents only.

Table 5 Unit 8 mountain goat harvest chronology percent by time period, 1988–1997

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
	1995/96	37	63	49
	1996/97	46	54	59

Table 6 Unit 8 mountain goat hunter transport method (percent in parentheses), 1992–1997

Regulatory year	Transportation method							Total
	Aircraft	Boat	3- or 4 Wheeler	ORV	Highway vehicle	Snow-machine	Unknown	
1992/93	52 (84)	7 (11)	0 (--)	0 (--)	0 (--)	0 (--)	3 (5)	62
1993/94	60 (75)	17 (21)	0 (--)	1 (1)	0 (--)	0 (--)	2 (3)	80
1994/95	56 (86)	9 (14)	0 (--)	0 (--)	0 (--)	0 (--)	0 (--)	65
1995/96	50 (63)	18 (23)	3 (4)	8 (10)	0 (--)	0 (--)	0 (--)	79
1996/97	56 (57)	31 (32)	7 (7)	0 (--)	3 (3)	1 (1)	0 (--)	98

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 only periodically 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. We collect additional mountain goat data 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

In the 1997 survey of MacColl Ridge, we counted 66 goats, 10% higher than the 1996 count of 60 (Table 1). Until this year, the highest count on MacColl Ridge was 65 goats obtained in 1981 during a helicopter survey. Fixed-wing counts since 1990 have averaged 54 (range = 45–66) goats a year. The mountain goat population on MacColl Ridge may have increased slightly in the last few years. It is often 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 1997 was 32:100; kids composed 24% of goats observed (Table 1). Kid production has been high the last 4 years, up from an average 8 kids per year between 1991 and 1993. The number of adults observed in 1995 and 1996 increased from the previous 3 years because of the high kid production and survival.

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 Cheshnina 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 Board of Game 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. Starting in 1989 guides were required for all nonresident mountain goat hunters.

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 13 mountain goats during the 1995 season and 23 in 1996. The 1996 harvest is the highest reported since 1991 when 25 goats were taken. The average yearly take since 1980 was 16 goats (range = 6–30). The 1996 harvest comprised 16 (70%) males and 7 (30%) females. With the exception of 1992, males composed the majority of animals taken

(Table 2) during this reporting period. High male harvest is attributable to the selection of larger trophy animals, especially by nonresidents on guided hunts.

Hunter Residency and Success. We issued 68 registration permits in 1996, an increase from the 60 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 1995 and 34% in 1996. The hunter success rate is considered high for goat hunters in Unit 11 (Table 2). Successful hunters reported spending 2.9 days in the field compared with 4.2 days for unsuccessful hunters in 1996. The hunting effort reported by Unit 11 goat hunters changes little each year. Nonresident hunters took 18 goats in 1996, accounting for 78% of the harvest compared with 22% of the harvest taken by Alaskan residents (Table 3). Since 1986, nonresidents have taken 65% of goats harvested and have had a higher success rate (74%) than residents (33%).

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 1996, 65% of the harvest occurred during the initial 3 weeks of the season (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 used to harvest 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 methods used by goat hunters in Unit 11 have 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, we have not determined predation rates.

HABITAT

Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. However, goat habitat in these areas is limited. Goats are 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

For the past 2 years, the count of mountain goats in the MacColl Ridge trend area has increased slightly. The biggest change was the observed increase in adults, while kid production has also been very high since 1994. Between 1991 and 1993 survey results indicated lower kid production and/or survival. A decline in adults observed in 1995 was possibly the result of poor kid recruitment in the previous 3 years.

Interpretation of annual survey data is difficult because we do not know if small 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 vegetation and rugged terrain 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 or increasing slightly; 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 23% (19 goats) of the unit harvest from MacColl Ridge. The average annual harvest has been almost 4 goats, or approximately 6% of the current observed population.

Barnard and Hawkins Glaciers are popular sheep hunting areas for trophy rams, and because combination hunts are popular, goats also receive heavy pressure. Guides are active in these areas, and harvest records over the past 5 years indicate 13 (16%) goats have been taken from Barnard Glacier and 9 (11%) from Hawkins Glacier. The average annual harvest rate in recent years on these glaciers is thought to 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, heavy harvests from MacColl Ridge and Bernard and Hawkins Glaciers during periods with low kid recruitment or increased predation could result in a decline in the goat population in those areas. In addition to the yearly trend count on MacColl Ridge, we should survey goats 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 10% of the observed goat population. Timely emergency closures will be difficult because most of the harvest is 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, 1992–97

Area	Regulatory year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
MacColl Ridge	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
	1996/97	47 (78)	13 (22)	0	28	60	60
	1997-98	50 (76)	16 (24)	0	32	66	66

[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, 1992–96

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent Successful Hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
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
RG580	1995/96	60	50	28	22	12 (92)	1 (8)	0	0	13
RG580	1996/97	68	35	31	34	16 (70)	7 (30)	0	0	23

Table 3 Unit 11 mountain goat hunter residency and success, 1992–96

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Non-resident	Total (%)	
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
1995/96	0	3	10	13 (43)	4	10	3	17 (57)	30
1996/97	2	3	18	23 (52)	2	14	5	21 (48)	44

[a] "local resident" means 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, 1992–96

Regulatory year	September				October					
	1–7	8–15	16–23	24–30	1–7	8–15	16–23	24–31	1–30	*n*
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
1995/96	38	31	--	15	8	8	--	--	--	13
1996/97	22	30	13	9	17	9	--	--	--	23

Table 5 Unit 11 mountain goat harvest percent by transport method, 1992–96

Regulatory year	Percent of harvest							
	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	65	6	--	--	--	23	--	17
1993/94	94	--	--	--	--	6	--	16
1994/95	86	7	--	--	--	7	--	14
1995/96	92	0	--	--	8	--	--	13
1996/97	92	4	4	--	--	--	--	23

LOCATION

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

GEOGRAPHIC DESCRIPTION: Talkeetna Mountains and western Chugach Mountains

BACKGROUND

The first goat 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 units.

During the last decade, the goat population in the western Chugach Mountains (Units 13D, 14A, and 14C) has increased slightly. The number of goats observed during aerial surveys in Unit 14C ranged from 326 to 530 between 1982 and 1989. Between 1992 and 1996, complete counts ranged from 593 to 619. The goat population in the Talkeetna Mountains (Unit 14B) has remained low.

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 hunters in Unit 13D could harvest 2 goats until 1975. In the 1970s the hunting season in Unit 14 began in early August or September and ran until 15 November. In the early 1980s goat hunting in the western 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. 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. 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 (by emergency order in 1990 and 1991).

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. However, from 1969 to 1972 no areas in Unit 14C were 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, these closed areas have not included a substantial segment of the goat population in Unit 14C; however, more goats have been observed in the park in recent years.

Numbers of hunters were stable in Units 13D and 14, and few goats were harvested in Units 13D and 14A. Annual goat harvests in Unit 14C ranged from 25 to 38, with no discernible trend.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Unit 13

- Maintain a prehunting season population of at least 100 goats.

Units 14A and 14B (Talkeetna Mountains)

- 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 comprise at least 60% males.

Unit 14 (Chugach Mountains)

- Maintain a minimum observable population of 60 goats that will sustain an annual harvest of 7% of observable goats and at least 70% males.

Unit 14C (Chugach Mountains)

- Maintain a population of at least 500 goats that will sustain an annual harvest of 25 goats, comprising 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

Because of limited funding, we conducted few goat surveys in Units 14 and 13D (Tables 1–4). Partial surveys were conducted in Units 14A and 14B during 1992 and 1995. Goat surveys in southern Unit 14A and Unit 14B are conducted on 3-year and 3- to 5-year cycles. Complete surveys were conducted in Unit 14C in 1992 and 1995; partial surveys were flown in 1994 and 1996.

Goat populations are increasing slowly in the western Chugach Mountains. Aerial survey data collected over the past several years indicate that at least 1000 goats inhabited the Talkeetna and western Chugach Mountains in August 1995 (Tables 1–4).

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.

Population Composition

Kids comprised 21–25% of observed goats in Unit 13D, 24% in Unit 14A, and 16–21% in Unit 14C.

Distribution and Movements

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

Winter range often occupies 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 in marginal 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 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 1992 to 1996 the bag limit was 1 goat by drawing permit; the taking of kids with horn lengths of 3 inches or less and 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. There are 2 small drawing hunts in the East Fork Eklutna and Glacier/Winner creek drainages. Both hunts were open from the day after Labor Day to October 15. The bag limit was 1 goat.

Game Board Actions and Emergency Orders. The Board of Game closed the goat hunting season in Unit 14B in 1992. The goat season in Unit 14A south of the Matanuska River was extended 2 weeks (16–31 October) by the board in 1993. 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.

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

caused a substantial increase in the Unit 14C harvest. Most of this increase was in the Lake George drainage because it supports a high density of goats and is easily accessible by aircraft. The last 2 weeks of October (16–31 October) were restricted to archery hunting; however, few archers participate in this late archery-only season (Table 6).

Permit Hunts. The number of goat registration permits for Unit 14 ranged from 224 to 274 (Table 6). Thirty-five drawing permits are issued for the eastern portion of Unit 13D (Table 7). The number of permits issued for the 2 Unit 14C drawing hunts are based on the number of goats observed during aerial surveys in these drainages. To keep harvests less than 5–7% of the observed number, allowing continued growth of the population, only 3 and 5 drawing permits were issued for Glacier and East Fork drainages, respectively.

Hunter Residency and Success. Most goat hunters in Units 13 are nonlocal residents and nonresidents (Table 8). Local residents composed 87% and nonresidents only 6% of goat hunters in Unit 14 in 1996 (Table 9).

Success rates from 1992 to 1996 in Unit 14 have ranged from 20% to 29% (Table 9). Nonresident guided hunters in the Knik River drainage (hunt areas 866 and 869) were more successful than resident unguided hunters.

Harvest Chronology. In most years, approximately equal numbers of goat are harvested in Unit 14C in September and October (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 because conditions often deteriorate rapidly during the last weeks of October. Season dates and suitable conditions for hunting other big game species also affect timing of goat hunts.

Transport Methods. Most successful hunters use airplanes and highway vehicles in Unit 13D (Table 11). In Unit 14A and the Lake George portion of Unit 14C, aircraft remain the primary mode of transport for successful hunters (Table 12). In the Twentymile River drainage of Unit 14C, boats and highway vehicles are used about equally, except in years with low water levels (e.g., 1996).

HABITAT

Assessment

Habitat condition has not been assessed in Units 13D and 14. Healthy kid crops in the western Chugach goat population and increasing numbers of goats in Unit 14C indicate that goats are still below carrying capacity. Winter weather, particularly deep snow and heavy icing, are limiting factors in the western Chugach Mountains. Winter conditions in goat habitat have not been severe in recent years.

CONCLUSIONS AND RECOMMENDATIONS

All management objectives were met. We conducted aerial surveys 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 63% males. Less than 7% of observed goats were harvested annually in Unit 14A, and harvests averaged 71% 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 should be conducted biennially, unless there is severe winter weather.

Management objectives need to reflect management philosophy. Units 14A and 14B are marginal habitat, and before hunting is allowed in these areas, there should be a minimum observable population of 50 goats. 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.

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, 1992–97

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
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
1995/96[c]	50 (77)	15 (23)	30	65	22	175
1996/97	--	--	--	--	--	--

[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, 1992–97

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1992/93	75 (76)	24 (24)	32	99	8.2	120
1993/94	--	--	--	--	--	--
1994/95	--	--	--	--	--	--
1995/96[b]	94 (76)	29 (24)	31	123	27	--
1996/97	--	--	--	--	--	--

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

Table 3 Unit 14B aerial mountain goat composition counts and estimated population size, 1992–97

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[a]
1992/93	--	--	--	--	--	--
1993/94	--	--	--	--	--	--
1994/95	--	--	--	--	--	--
1995/96[b]	22 (92)	2 (8)	9	24	--	--
1996/97	--	--	--	--	--	--

[a] Based on 80-85% sightability (snow conditions).
[b] Partial survey (north side of Sheep River, part of Iron Creek, upper Kashwitna, North Fork Kashwitna).

Table 4 Unit 14C aerial mountain goat composition counts and estimated population size, 1992–97[a]

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
1992/93	498 (84)	95 (16)	19	593	119	700
1993/94	--	--	--	--	--	--
1994/95	495 (83)	124 (17)	25	619	72[c]	750
1995/96[d]	457 (84)	88 (16)	19	545	61	800
1996/97[e]	149 (79)	39 (21)	26	188	--	--

[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] Number does not include goats counted incidental to sheep surveys or Penguin Creek.
[d] Partial survey (Twentymile River, Lake George drainage, Hunter Creek-east fork, East Fork Eklutna, Glacier Creek, Penguin Creek).
[e] Partial survey (Bird Creek, Penguin Creek, and goats counted incidental to sheep surveys).

Table 5 Annual mountain goat harvest by unit, 1992–97

Regulatory year	Unit 13D[a]	14A[b]	14B[c]	14C[d]	Total
1992/93	5	1	--	38	44
1993/94	6	4	--	25	35
1994/95	2	6	--	26	34
1995/96	7	4	--	28	39
1996/97	7	5	--	29	41

[a] Drawing permit only (either sex).
[b] Registration permit only.
[c] Closed to mountain goat hunting.
[d] Registration permit only (1992/93 to 1994/95); both registration and drawing permits (1995/96 and 1996/97).

Table 6 Unit 14 mountain goat harvest data by permit hunt, 1992–97

Area[a]	Regulatory year	Permits issued	Percent did not hunt[b]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Unknown sex	Total harvest
RG866	1992/93	22	55	90	10	0 (0)	1 (100)	--	1
Unit 14A	1993/94	42	52	80	20	3 (75)	1 (25)	--	4
	1994/95	32	31	73	27	4 (67)	2 (33)	--	6
	1995/96	51	61	75	25	3 (60)	2 (40)	--	5
	1996/97	47	60	74	26	5 (100)	0 (0)	--	5
DG852	1995/96	3	0	67	33	1 (100)	0 (0)	--	1
Unit 14C East Eklutna	1996/97	3	33	0	100	0 (0)	2 (100)	--	2
DG856	1995/96	5	0	60	40	2 (100)	0 (0)	--	2
Unit 14C Glacier Ck.	1996/97	5	20	50	50	2 (100)	0 (0)	--	2
RG868	1992/93	95	45	77	23	5 (42)	7 (58)	--	12
Unit 14C	1993/94	117	49	83	17	7 (70)	3 (30)	--	10
Twentymile	1994/95	93	50	79	21	8 (80)	2 (20)	--	10
River	1995/96	90	41	87	13	6 (86)	1 (14)	--	7
	1996/97	95	54	86	14	5 (83)	1 (17)	--	6
RG869	1992/93	120	41	63	37	14 (56)	11 (44)	1	26
Unit 14C	1993/94	96	43	76	34	9 (69)	4 (31)	--	13
Lake	1994/95	116	42	76	24	7 (44)	9 (56)	--	16
George	1995/96	99	40	71	29	10 (59)	7 (41)	--	17
	1996/97	77	29	60	40	14 (70)	6 (30)	--	20

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
RG878	1992/93	5	100	--	--	0 (0)	0 (0)	--	0
Unit 14C	1993/94	13	54	100	0	0 (0)	0 (0)	--	0
Twentymile	1994/95	1	100	--	--	0 (0)	0 (0)	--	0
River	1995/96	3	33	100	0	0 (0)	0 (0)	--	0
(archery)	1996/97	2	50	100	0	0 (0)	0 (0)	--	0
RG879	1992/93	5	100	--	--	0 (0)	0 (0)	--	0
Unit 14C	1993/94	6	17	60	40	2 (100)	0 (0)	--	2
Lake	1994/95	4	100	--	--	0 (0)	0 (0)	--	0
George	1995/96	0	--	--	--	--	--	--	--
(archery)	1996/97	3	67	100	0	0 (0)	0 (0)	--	0
Totals	1992/93	225	45	69	31	19 (51)	18 (49)	1	38
for all	1993/94	232	46	80	20	18 (72)	7 (28)	--	25
Unit 14C	1994/95	214	47	77	23	15 (58)	11 (42)	--	26
	1995/96	200	39	78	22	19 (70)	8 (30)	--	27
	1996/97	185	42	72	28	21 (70)	9 (30)	--	30
Totals	1992/93	247	46	71	29	19 (50)	19 (50)	1	39
for all	1993/94	274	47	80	20	21 (72)	8 (20)	--	29
Unit 14	1994/95	246	45	77	23	19 (59)	13 (41)	--	32
permit	1995/96	251	43	77	23	22 (69)	10 (31)	--	32
hunts	1996/97	232	46	72	28	26 (74)	9 (26)	--	35

[a] Previous hunt number in parentheses.
[b] Includes permittees who did not report.

Table 7 Unit 13D mountain goat harvest data by permit hunt, 1992–97

Area[a]	Regulatory year	Permits issued	Percent did not hunt[b]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
RG718	1992/93	10	70	33	67	1 (50)	1 (50)	2
Unit 13D	1993/94	10	50	40	60	1 (33)	2 (67)	3
West	1994/95	10	30	100	0	0 (0)	0 (0)	0
(818,827)	1995/96	10	50	40	60	1 (33)	2 (67)	3
	1996/97	10	50	60	40	2 (100)	0 (0)	2
RG719	1992/93	25	56	73	27	1 (33)	2 (67)	3
Unit 13D	1993/94	25	67	80	20	3 (100)	0 (0)	3
East	1994/95	25	52	83	17	1 (50)	1 (50)	2
(819,828)	1995/96	25	72	43	57	3 (75)	1 (25)	4
	1996/97	25	36	69	31	3 (60)	2 (40)	5
Totals	1992/93	35	60	64	36	2 (40)	3 (60)	5
for all	1993/94	35	43	70	30	4 (67)	2 (33)	6
Unit 13D	1994/95	35	46	90	10	1 (50)	1 (50)	2
	1995/96	35	66	42	58	4 (57)	3 (43)	7
	1996/97	35	40	67	33	5 (71)	2 (29)	7

[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, 1992–97

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
RG718	1992/93	0	2	0	2 (67)	0	1	0	1 (33)	3
Unit 13D	1993/94	0	2	1	3 (60)	0	1	0	2 (40)[b]	5
West	1994/95	0	0	0	0 (0)	1	5	0	7 (100)[b]	7
(818,827)	1995/96	0	1	2	3 (60)	0	2	0	2 (40)	5
	1996/97	0	1	1	2 (40)	0	0	3	3 (60)	5
RG719	1992/93	1	2	0	3 (27)	0	8	0	8 (73)	11
Unit 13D	1993/94	0	3	0	3 (20)	0	12	0	12 (80)	15
East	1994/95	0	1	1	2 (17)	0	10	0	10 (83)	12
(819,828)	1995/96	2	1	1	4 (57)	0	3	0	3 (43)	7
	1996/97	0	2	3	5 (31)	1	9	1	11 (69)	16
Totals	1992/93	1	4	0	5 (36)	0	9	0	9 (64)	14
for all	1993/94	0	5	1	6 (30)	0	13	0	14 (70)[b]	20
Unit 13D	1994/95	0	1	1	2 (10)	1	15	0	17 (90)[b]	19
	1995/96	2	2	3	7 (58)	0	5	0	5 (42)	12
	1996/97	0	3	4	7 (33)	1	9	4	14 (67)	21

[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, 1992–97

Area[a]	Regulatory year	Successful				Unsuccessful				Total hunters
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
RG866	1992/93	0	0	1	1 (10)	8	0	0	9 (90)[b]	10
Unit 14A	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
	1995/96	2	0	2	4 (21)	15	0	0	15 (79)	19
	1996/97	2	2	1	5 (28)	13	0	0	13 (72)	18
DG852	1995/96	1	0	0	1 (33)	2	0	0	2 (67)	3
Unit 14C East Eklutna	1996/97	1	0	0	1 (100)	0	0	0	0 (0)	1
DG856	1995/96	2	0	0	2 (40)	3	0	0	3 (60)	5
Unit 14C Glacier Ck.	1996/97	3	0	0	3 (60)	2	0	0	2 (40)	5
868	1992/93	12	0	0	12 (23)	39	1	0	40 (77)	52
Unit 14C	1993/94	10	0	0	10 (18)	46	0	0	47 (82)[b]	57
Twentymile	1994/95	10	0	0	10 (21)	37	0	0	37 (79)	47
River	1995/96	7	0	0	7 (14)	44	1	0	45 (86)	52
	1996/97	5	1	0	6 (13)	39	1	0	40 (87)	46
869	1992/93	17	1	8	26 (37)	40	3	2	45 (63)	71
Unit 14C	1993/94	9	2	2	13 (25)	37	2	0	41 (75)[b]	54
Lake	1994/95	12	3	1	16 (24)	45	4	2	51 (76)	67
George	1995/96	13	2	3	18 (30)	40	2	1	43 (70)	61
	1996/97	14	1	4	19 (40)	26	1	2	29 (60)	48

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
RG878	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0
Twentymile	1993/94	0	0	0	0 (0)	5	1	0	6 (100)	6
River	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	1995/96	0	0	0	0 (0)	2	0	0	2 (100)	2
(881)	1996/97	0	0	0	0 (0)	0	1	0	1 (100)	1
RG879	1992/93	0	0	0	0 (0)	0	0	0	0 (0)	0
Lake	1993/94	1	1	0	2 (40)	2	1	0	3 (60)	5
George	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	1995/96	0	0	0	0 (0)	0	0	0	0 (0)	0
(882)	1996/97	0	0	0	0 (0)	1	0	0	1 (100)	1
Totals	1992/93	29	1	8	38 (31)	79	4	2	85 (69)	123
for all	1993/94	20	3	2	25 (21)	90	4	0	97 (79)	122
Unit 14C	1994/95	22	3	1	26 (23)	82	4	2	88 (77)	114
	1995/96	23	2	3	28 (23)	91	3	1	95 (77)	123
	1996/97	23	2	4	29 (28)	68	3	2	73 (72)	102
Totals	1992/93	29	1	9	39 (29)	87	4	2	94 (71)[b]	133
for all	1993/94	20	3	6	29 (21)	103	5	2	113 (79)[b]	142
Unit 14	1994/95	26	3	3	32 (24)	96	6	2	104 (76)	136
	1995/96	25	2	5	32 (23)	106	3	1	110 (77)	142
	1996/97	25	4	5	34 (28)	81	3	2	88 (72)	122

[a] Previous hunt number in parentheses.

[b] Includes hunters with unspecified residency.

Table 10 Unit 14 mountain goat harvest chronology percent by time period, 1992–97

Area	Regulatory year	Harvest period						
		August	September	October	November	December	Unknown (*n*)	*n*
Unit 14A	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
	1995/96	0	80	20	0	0	0	5
	1996/97	0	100	0	0	0	1	5
Unit 14C	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
	1995/96	0	56	44	0	0	0	27
	1996/97	0	70	30	0	0	2	29
Totals for all Unit 14	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
	1995/96	0	59	41	0	0	0	32
	1996/97	0	74	26	0	0	3	34

Table 11 Unit 13D successful mountain goat hunter transport methods, 1992–97

Regulatory year	Percent of harvest							
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	*n*
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
1995/96	71	0	0	14	0	0	14	7
1996/97	71	0	0	0	0	0	29	7

Table 12 Unit 14 successful mountain goat hunter transport methods (registration hunts only), 1992–97

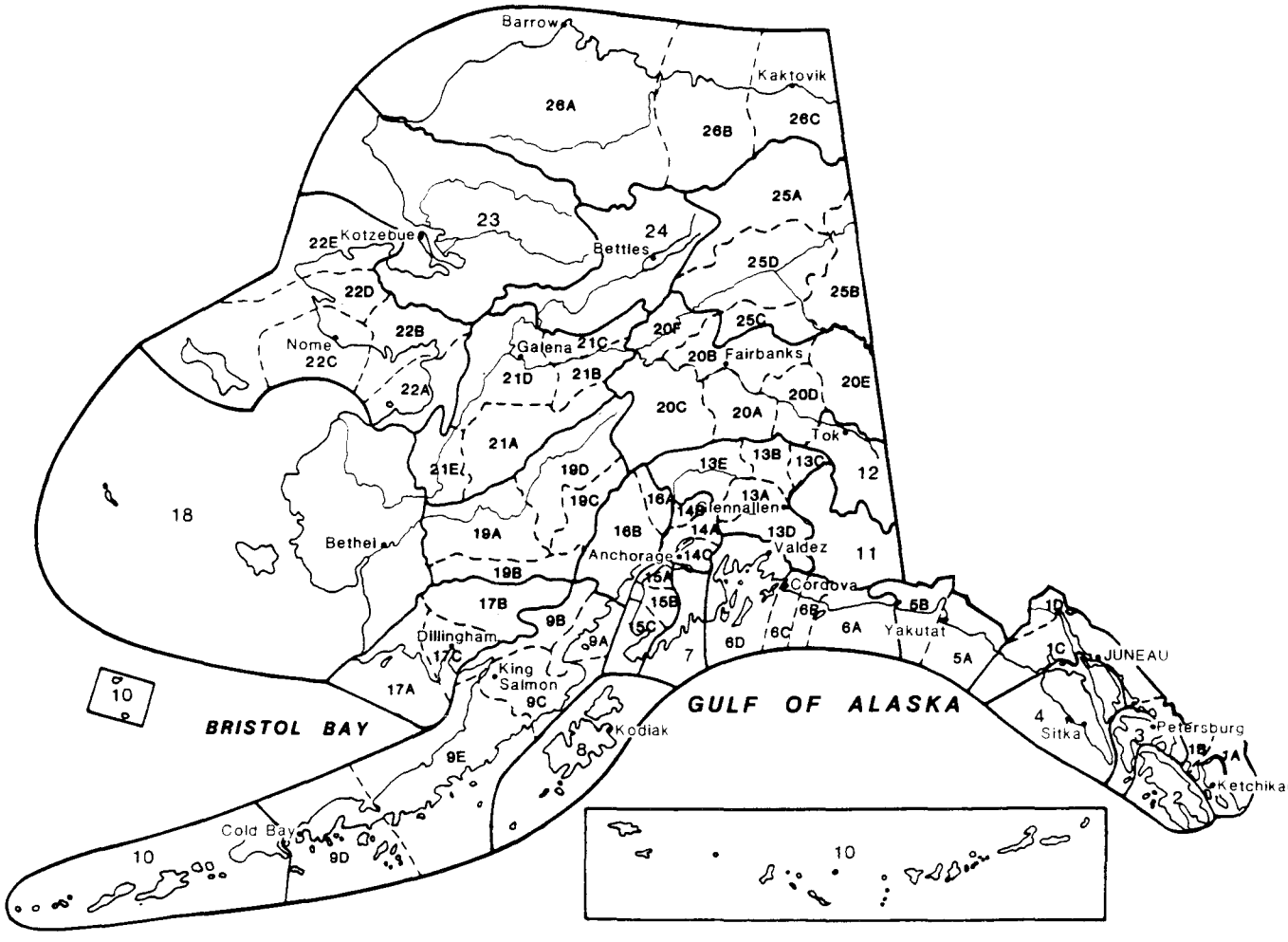
Area[a]	Regulatory year	Percent of harvest: Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
RG866	1992/93	100	0	0	0	0	0	0	0	1
Unit 14A	1993/94	100	0	0	0	0	0	0	0	4
	1994/95	100	0	0	0	0	0	0	0	6
	1995/96	100	0	0	0	0	0	0	0	4
	1996/97	80	0	0	0	0	0	0	20	5
RG868	1992/93	17	0	42	0	0	0	33	8	12
Unit 14C	1993/94	10	0	40	0	0	0	40	10	10
Twentymile	1994/95	20	0	50	0	0	0	20	10	10
River	1995/96	29	0	29	0	0	0	42	0	7
	1996/97	33	0	0	0	0	0	67	0	6
RG869	1992/93	93	0	0	0	0	0	4	4	27
Unit 14C	1993/94	100	0	0	0	0	0	0	0	13
Lake	1994/95	88	0	0	0	0	0	6	6	16
George	1995/96	94	0	0	0	0	0	0	6	18
	1996/97	95	0	0	0	0	0	5	0	19
RG879	1992/93	0	0	0	0	0	0	0	0	0
Unit 14C	1993/94	50	0	50	0	0	0	0	0	2
Lake	1994/95	0	0	0	0	0	0	0	0	0
George	1995/96	0	0	0	0	0	0	0	0	0
(archery)	1996/97	0	0	0	0	0	0	0	0	0

Table 12 Continued

Area	Regulatory year	Percent of harvest								*n*
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
Totals for all Unit 14C	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
	1995/96	80	0	7	0	0	0	10	3	29
	1996/97	80	0	0	0	0	0	17	3	30
Totals for all Unit 14	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
	1995/96	77	0	6	3	0	0	11	3	36
	1996/97	78	0	0	0	0	0	19	3	37

[a] Archery-only registration hunt 878 (Twentymile River, formerly 881) 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.

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