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Division of Wildlife Conservation

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MOUNTAIN GOAT

Mary V. Hicks, Editor

Grants W-27-1 and W-27-2
Study 12.0
December 2000

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
Frank Rue, Commissioner

DIVISION OF WILDLIFE CONSERVATION
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LOCATION

GAME MANAGEMENT UNIT: 1A (5000 mi^2)

GEOGRAPHIC 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 currently stable at moderately high levels.

Steep, glacially created valleys and peaks in Unit 1A provides important escape terrain for 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 shrubs and evergreen forbs provide goats with important foods during critical winter months.

Although goats historically inhabited only the subunit's mainland, they now occur on Revillagigedo Island as a result of introductions to Swan Lake (17) in 1983 (Smith and Nichols 1984) and Upper Mahoney Lake (15) in 1991 (ADF&G Unpubl. data, Ketchikan). These areas were selected as translocation sites because they appeared to have suitable escape terrain and wintering habitat. The Swan Lake population has increased substantially since its introduction and we believe it now numbers roughly 250 goats. This increase prompted a hunting season in the vicinity of Swan Lake in 1993. We estimate that the Upper Mahoney Lake population currently consists of about 50–60 goats. At present there is no open hunting season for that small introduced population.

Hunter harvests from Unit 1A averaged roughly 45 goats each season during 1972–1988. The average annual harvest dropped to just over 25 during the past 9 seasons as a result of 1989 legislation requiring nonresident goat hunters to hunt with registered guides. Cyclic and unpredictable weather severity, healthy predator populations, and density-related over-foraging of habitat, are believed to be more influential than hunting in modifying the subunit's goat populations.

To monitor population changes caused by winter weather, over-foraging, 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 prior to and during surveys can greatly influence our ability to observe goats and hence to accurately estimate actual numbers.

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.

3. Monitor sex composition of the harvest and manage for < 6% harvest of observed number of goats using a weighted harvest point system.

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 PA-18 Supercub with a pilot and observer is flown at a height of 200–300 feet above the ground. Both the pilot and observer search for goats, and the observer records observations 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 used. Successful hunters who pursue a second goat are treated as separate hunters for the purposes of calculating and presenting hunt and harvest information.

A weighted point system is applied to all trend count areas. Points are weighted more heavily for harvested females (2 points) than for males (1 point). Using the number of observed goats from annual fall aerial surveys we apply a 6% harvest cap. Hunt areas that reach the cap are closed by emergency order during the hunting season.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During fall 1997 we completed aerial surveys in the following TCAs: K-4 Wilson Arm to Boca de Quadra, K-5 Marten Arm to Portland Canal, K-6 Southern Cleveland Peninsula, K-7 Yes Bay/Reflection Lake, K-8 Bradfield Canal to Unuk River, K-11 Walker Cove/Rudyerd Bay, K-12 Swan Lake/Mt. Reid, and K-13 Mahoney Mtn. (Table 1). We observed 551 goats in about 12 hours of flying, or 46 goats/hour. The ratio of 37 kids per 100 adults was similar to 1996 counts, and constitutes two of the highest kid ratios 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).

During fall 1998 we completed aerial surveys in the following TCAs: K-4 Wilson Arm to Boca de Quadra, K-5 Marten Arm to Portland Canal, K-7 Yes Bay/Reflection Lake, K-9 Chickamin River/Lake 2722, K-10 Chickamin River to Walker Cove, K-12A Mirror Lake to

Swan Lake, K-12B Swan Lake/Mt. Reid, and K13 Deer Mtn. to Mahony Peak (Table 1). We observed 551 goats in just over 12 hours of flying. Our observation rate of 53 goats/hour was up from the previous year, and the highest rate since 1994. However, this rate is well below the overall 20-year average of 82 goats per hour.

We observed a notable increase in the number of goats in TCA K-12A where we also counted our highest kid to adult ratio for that area. K-13. This is one of the 2 areas where goats were introduced which also had a high kid to adult ratio, indicating good recruitment (Table 2). It appears that the translocated populations are continuing to grow. TCA K-11 had the lowest count since 1993 and no kids were noted during the 1997 survey. TCA K-8 was counted for the first time ever during 1997. Kids may easily be missed during surveys and the count numbers likely represent only a portion of the total young of the year. We believe goat populations elsewhere in the subunit remained relatively stable during this report period.

Population Size

We developed population estimates for goats inhabiting Unit 1A using survey data (ADF&G Unpubl. rep., 1990, Ketchikan) and the sightability correction factor developed by Smith and Bovee (1984). To derive our estimate, we first delineated the percentage of each Wildlife Analysis Area (WAA) that we believed contained suitable goat habitat. We then applied our survey-derived estimate of 1.27 goats/mi^2 to these percentages, which resulted in a mainland estimate of 7,300–10,200 goats (ADF&G Unpubl. rep., 1990, Ketchikan). In the absence of any new information, we believe this estimate is as good now as it was when it was developed.

Population Composition

The 1997 and 1998 surveys resulted in an overall productivity estimate for Unit 1A of 37 and 40 kids per 100 adults respectively, higher than the previous 2 years (Table 1). The 1997 overall subunit productivity estimate increased to a 20-year high of 37 kids per 100 adults and during 1998 the overall ratio was even higher at 40 to 100 (Table 2). Productivity varied among TCAs from 0–44 kids per 100 adults. The higher ratio of kids may be a result of more time spent flying surveys during the past 2 years. During the 1997 survey a total of 12 hours was spent searching for and counting goats, which is the most intense survey effort since surveys were began in 1968. The 29-year aerial survey average is 6.4 hours spent counting goats in Unit 1A. The amount of time spent flying surveys any given year is dependent on pilot availability, weather, and budget constraints.

Distribution and Movements

Radio collars from the previous translocations in Unit 1A are no longer transmitting and no new goats have been captured to provide new movement or distribution data.

MORTALITY

Harvest

The highest harvest during the past 11 seasons occurred in 1997 when 17 billies and 19 nannies were reported killed by 95 hunters (Table 3). The harvest of 13 goats during August of 1997 was the highest number of goats taken during that month since 1989. Unusually mild

weather may have contributed to better access and visibility of goats during the early part of the season. During 1998, 114 hunters harvested 20 billies and 13 nannies.

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 were harvested in 1997 and in 1998, 3 billies and 2 nannies were harvested for a two-year total of 7.

Season and Bag Limit	Resident and nonresident hunters
Unit 1(A), Revillagigedo Island, except that portion west of Carroll Inlet and Creek, west of the divide between Carroll Creek and the south fork of Orchard Creek, south of Orchard Creek, Orchard Lake, Shrimp Bay, and Gedney Pass.	Aug. 1–Dec. 31
One goat by registration permit only.	Aug. 1–Dec. 31
Remainder of Unit 1(A).	
Two goats by registration permit only.	

Board of Game Actions and Emergency Orders. No Board of Game actions or emergency orders were initiated during this report period.

Hunter Harvest. Five hunters killed 2 goats each in 1997 and 4 hunters killed 2 each during the 1998 season (Table 3). One hundred seventy-seven and 205 permits were issued for Unit 1A during 1997 and 1998, respectively. Of these, 95 permittees actually hunted during 1997 and 114 hunted during 1998.

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 prior to the 1994 season this was changed so that hunters can now harvest up to 2 goats during a single hunt in most of the subunit. Hunters that kill 2 goats during the same year are treated as separate hunters. During the 1997 season 5 hunters killed 2 goats each, and during the 1998 season 4 hunters each killed 2 goats. Thus, 31 hunters killed 36 goats in 1997 and 29 hunters killed 33 goats during the 1998 season.

Hunter Residency and Success. Hunters from all residency categories harvested a record 36 goats from Unit 1A in 1997, the most goats harvested since 1986. Two nonresidents hunted

goats successfully in Unit 1A during 1997, and 4 nonresidents killed goats during 1998 (Table 4). Sixty-seven and 64% of the 1997 and 1998 harvests, respectively, were by hunters residing within the subunit. Nonlocal residents also killed 10 goats during the 1997 season, which is the highest nonlocal harvest since 1986. Overall hunter success during 1997 was 41% and in 1998 was 38% (Table 4).

Harvest Chronology. Unlike the past several years where the majority of goat harvests have occurred during September, the 1997 harvest was split between August and September with 13 goats taken during each month (Table 5). During the past 2 seasons 18 goats were harvested from the subunit during October, 4 in November, and 1 during December.

Transport Methods. Airplanes accounted for 88% and 82% of the transportation used by hunters during the past two seasons (Table 6). Airplanes accounted for 70–88% of the transportation used by hunters during the past 5 seasons. The balance of Unit 1A hunters used boats to access hunting areas. Many alpine lakes in this area make it possible for hunters to land in floatplanes and begin their hunt above timberline and near goat habitat.

Other Mortality

Cyclic and unpredictable weather severity and healthy predator populations, including black and brown bears and wolves, are believed to be more influential than hunting in modifying the subunit's goat populations. Bears likely kill young or very old goats during a portion of the year, while wolves are capable of preying on all age classes of animals during the entire year. When deep snows displace goats from the alpine and subalpine areas they are more vulnerable to predation as they seek refuge at lower elevations in old growth timber where food and escape habitat is much more limited. Deer numbers are low throughout most of Unit 1A leaving goats as the primary prey for wolves. Avalanches account for some goat mortality during years of heavy snowfall.

CONCLUSIONS AND RECOMMENDATIONS

Mountain goat populations appear to have remained stable throughout most of Unit 1A during this report period. Our objective of maintaining goat densities greater than 20 goats per hour of survey time has consistently been met. Low counts around Yes Bay/Reflection Lake on the northern Cleveland Peninsula during the past few years probably have been caused by declines associated with predation and over-browsing. High productivity observed during recent surveys suggests that the population in this area may be slowly rebounding.

As a result of State legislation that 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 unit's goat hunting. However, at least 3 registered guides have established guide use areas within the unit, and we anticipate increased nonresident hunter participation. There has also been a recent marked increase in successful nonlocal hunters. During 1998, 10 nonlocal hunters were successful, which is the highest nonlocal success in Unit 1A since 1986.

The 1991 Upper Mahoney Lake goat introduction appears to have been a success. Although 3 of the originally translocated goats are known to have died, productivity remains high and the herd is known to have increased from the original 15 to a minimum of 39 goats in fall 1996. We have established a trend count area in the vicinity of Deer Mountain/Upper Mahoney Lake (K-13), which we will periodically survey along with the other TCAs in the unit. An incomplete survey during fall 1999 revealed this population is still increasing.

More time was spent conducting aerial surveys and counting goats in Unit 1A during 1997 than in any year since aerial surveys were initiated in 1968. It is not clear whether high kid to adult ratios and higher total goat counts are simply a reflection of more intense surveys, or if there has been an increase in recruitment and/or survival. Both the 1997 and the 1998 counts had a higher goats/hour rate than the previous 2 years, although the higher goats/hour rate of 58 during 1997 remains well below the 20-year average of 82 goats per hour. We will be monitoring the population to determine the overall trend during subsequent surveys.

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Table 1 Unit 1A mountain goat survey data, 1968–1998

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. 1–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 – Sep. 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
Sep. 9 – Sep. 29, 1997	147	551	698	37	12.0	46
Sep. 13 – Sep. 21, 1998	102	450	552	40	10.4	53

[a]Most comparable data is 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 Unit 1A mountain goat trend count area surveys, 1980–1998

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-3	1999	114	13	127	1.5	85	9	0
	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	1999	29	6	35	.9	38	21	0
	1998	65	17	82	1.2	68	26	1
	1997	78	24	102	1.1	93	31	1
	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	1999	149	16	165	1.3	127	11	2
	1998	158	36	194	2.0	97	23	3
	1997	283	71	354	1.9	186	25	2
	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

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-6	1997	18	7	25	1.7	15	39	0
	1996	18	6	24	1.5	16	33	0
K-7	1999	46	12	58	1.9	31	26	0
	1998	43	6	49	2.0	25	14	0
	1997	49	12	61	2.3	26	24	0
	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
	1983	131	37	168	1.8	93	28	1
	1980	128	36	164	1.8	91	28	2
K-8	1997	46	15	61	2.2	28	33	0
	1982[b]	52	13	65	0.7	89	25	0
K-9	1999	29	3	32	1.5	21	10	0
	1998	17	4	21	1.9	11	24	0
	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

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-10	1998	20	3	23	1.1	21	15	0
	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	1997	6	0	6	0.3	20	0	0
	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
	1990	15	2	17	0.3	57	13	0
	1989	21	4	25	0.4	62	19	0
	1987	21	4	25	0.3	83	19	0
	1986	30	7	37	0.3	123	23	0
	1984	32	10	42	0.4	105	31	1
	1982	20	8	28	0.2	140	40	0
	1981	29	7	36	0.3	120	24	0
	1980	22	7	29	0.3	97	32	1
K-12A	1998	39	27	12	0.5	78	44	1
	1996	23	18	5	0.8	31	28	0
	1995	36	32	4	0.7	51	12	0
	1992	34	27	7	0.4	79	26	0
K-12B	1998[b]	74	62	12	1.3	57	19	0
	1996	109	74	35	1.6	68	47	6

Table 2 Continued

Survey area	Year	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	1995	77	64	13	1.8	43	20	1
	1992	50	35	15	1.5	33	43	3
	1991	25	18	7	--	--	39	--
	1990	29	20	9	1.1	26	45	2
	1988	43	29	14	1.2	36	33	2
K-13[e]	1998	59	46	13	0.8	79	28	1
	1997	48	35	13	1.1	44	37	1
	1996	39	26	13	1.0	39	50	0
	1994	18	14	4	0.8	23	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 Unit 1A mountain goat harvest data for permit Hunt RG001/002, 1985–1998

Year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	Male	Female	Total
1985	261	122	88	51	29	22	51
1986	244	122	71	51	16	33	51
1987	195	107	61	27	14	3	27
1988	201	87	66	33	14	19	33
1989	182	87	56	23	14	9	23
1990	208	90	81	20	14	6	20
1991	245[b]	128	80	16	10	5	16[c]
1992	246	120	76	23	17	6	23
1993	299	197	52	33	20	13	33
1994[d]	215	135	55	20[e]	11	9	20
1995	201	110	54	24[f]	14	10	24
1996	171	91	48	22	14	8	22
1997	177	82	51	36[g]	17	19	36
1998	205[h]	91	65	33[i]	20	13	33

[a] Total permits issued does not include the Unit 1B portion of the hunt and exceeds the total for Did not hunt, Unsuccessful hunters, and Successful hunters.
[b] Three permits not returned.
[c] The sex of 1 goat was not reported.
[d] Regulation changed; hunters could take 2 goats during a single hunt.
[e] Two hunters killed two goats (18 hunters killed 20 goats).
[f] One hunter killed two goats (23 hunters killed 24 goats).
[g] Five hunters killed two goats (31 hunters killed 36 goats).
[h] One permit not returned.
[i] Four hunters killed two goats (29 hunters killed 33 goats).

Table 4 Unit 1A mountain goat hunter residency and success, 1985–1998

	Successful				Unsuccessful			
Year	Local res[a]	Nonlocal res	Nonres	Total	Local res[a]	Nonlocal res	Nonres	Total
1985		30	21	51		67	21	88
1986		39	12	51		48	23	71
1987	15	0	12	27	44	3	14	1
1988	19	0	14	33	35	0	31	66
1989	18	4	1	23	45	10	61	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
1997	24	10	2	36	40	8	3	51
1998	21	8	4	33	51	10	4	65

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

Table 5 Unit 1A goat harvest chronology, 1985–1998

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
1997	13	13	7	3	0
1998	8	12	11	1	1
Totals	160	330	140	35	61

Table 6 Unit 1A successful mountain goat hunters' transportation methods, 1985–1998

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
1997	83	17
1998	73	27

LOCATION

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

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland, Cape Fanshaw to Lemesurier Point

BACKGROUND

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

Hunters have limited access to goat habitat so hunting pressure is focused near access points. Because of this ADF&G biologists monitor harvest closely. The kill has ranged from 20–36 goats in the last 6 years.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES:

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

METHODS

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

Population Composition

Table 1 shows the past 6 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 1997 survey, kids composed 13% of the goats classified, a decrease from the September 1996 survey that had 26% kids. Annual differences in survey intensity (i.e., minutes/mile search time) and methods, as well as lack of information about seasonal goat movements, make it difficult to estimate goat abundance.

Habitat

In September 1998 Fish and Game and U. S. Forest Service biologists' inspected the ridge between Dahlgren and Jamestown peaks for signs of goat use. No obvious goat sign was found on the ridge, where the US Forest Service has proposed building a logging road.

MORTALITY

Harvest

Season and Bag Limit:	Resident and nonresident hunters:
Unit 1B, that portion north of the Bradfield Canal and the north fork of the Bradfield River.	Aug. 1–Dec. 31.
One goat by registration permit only.	
Remainder of Unit 1B.	Aug. 1–Dec. 31.
Two goats by registration permit only.	

Board of Game Actions and Emergency Orders. The Federal Subsistence Board made a determination that all rural residents of Units 1B and 3 qualify as subsistence users of goats in Unit 1B. This action became effective July 1, 1997. No previous determination had been made, except that no subsistence use was allowed by residents of Petersburg, Kupreanof, and outlying areas.

Hunter Harvest. The 1997 and 1998 harvests of 33 and 20 goats, respectively, for Unit 1B was below our management harvest goal of 35 goats (Table 2). Hunter success was 42% in 1997 and 33% in 1998, which approaches the management goal of 35%. Males comprised 79% and 80% of the harvest for 1997 and 1998, respectively. This data from registration hunt reports was not verified by checking hunter kills. We distributed literature designed to help hunters identify male goats and we encouraged hunters to select males.

Two subsistence hunters received a Federal permit to harvest a second goat in 1997 in the RG004 area. One of these hunters successfully harvested a male goat. In 1998, no Federal permits were issued. 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 continue to be the dominant group of hunters and harvest the largest number of goats (Table 3). The number of unsuccessful local residents exceeds the number of unsuccessful nonlocal residents and nonresidents. This discrepancy is not due to different hunting skills between the groups, but due to the lack of effort by many locals. Many local hunters primarily 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 (Table 4). This was especially true in 1997 when 16 of the 33 goats (48%) were harvested in August.

Transport Methods. In 1997 and 1998, 67% and 55%, respectively, of successful hunters accessed their hunting area by boat; the remainder used airplanes (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

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

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Management Coordinator

Table 1 Unit 1B summer aerial mountain goat composition counts, 1991–98

Regulatory year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
1991/92	67	(83)	14	(17)	0	21	81	35
1992/93	117	(70)	50	(30)	0	43	167	72
1994/95 (Aug. 1994)	90	(74)	31	(26)	0	34	121	35
1994/95 (June 1995)	339	(94)	21	(6)	0	16	360	32
1996/97 (Sept. 1996)	59	(74)	21	(26)	0	36	80	52
1997/98 (Sept. 1997)	144	(87)	21	(13)	0	15	165	73
1998/99 (no surveys)								

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

Table 2 Unit 1B mountain goat harvest data by permit hunt, 1993–98

Hunt No.	egulatory year	Permits [a] issued	Number hunted	(%) Did not hunt	Number of successful hunters	(%) successful hunters	Nr. males	(%) males	No. Females	Total Harvest
RG001	1993/94		18		11	(61)	5	(45)	6	11
	1994/95		6		6	(100)	1	(17)	5	6
	1995/96		11		6	(54)	3	(50)	3	6
	1996/97		10		1	(10)	0	(0)	1	1
	1997/98		8		5	(63)	5	(100)	0	5
	1998/99		15		4	(27)	3	(75)	1	4
RG004	1993/94	147	66	(55)	25	(38)	19	(76)	6	25
	1994/95	144	80	(44)	28	(35)	19	(68)	9	28
	1995/96	125	59	(52)	22	(40)	20	(90)	2	22
	1996/97	147	60	(59)	21	(35)	15	(71)	6	21
	1997/98	156	70	(55)	28	(40)	21	(75)	7	28
	1998/99	119	45	(62)	16	(36)	13	(81)	3	16
Combined	1993/94		84		36	(43)	24	(67)	12	36
	1994/95		86		34	(40)	20	(59)	14	34
	1995/96		70		28	(40)	23	(82)	5	28
	1996/97		80		22	(31)	15	(68)	7	22
	1997/98		78		33	(42)	26	(79)	7	33
	1998/99		60		20	(33)	16	(80)	4	20

[a] Number of permits issued for 1B in hunt number RG001 is unknown because it includes 1A.

Table 3 Unit 1B mountain goat hunter residency and success, 1993–98

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total Hunters
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
1997/98	20	8	5	33	(42)	30	10	5	45	(58)	78
1998/99	9	5	6	20	(33)	31	7	2	40	(67)	60

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

Table 4 Unit 1B mountain goat harvest chronology, percent by time period, 1993–98

	Harvest Periods										
Regulatory	August		September		October		November		December		Total
year	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	Harvest
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
1997/98	16	(49)	5	(15)	5	(15)	4	(12)	3	(9)	33
1998/99	6	(30)	1	(5)	5	(25)	5	(25)	3	(15)	20

Table 5 Unit 1B mountain goat harvest, percent by transport methods, 1993–98

Regulatory year	Percent of Harvest						
	Airplane		Boat		Other		Total harvest
	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
1997/98	11	(33)	22	(67)	0	(0)	33
1998/99	9	(45)	11	(55)	0	(0)	20

LOCATION

GAME MANAGEMENT UNIT: 1C (7600 miles^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 utilize alpine and subalpine zones in the summer and the upper reaches of coniferous forests in the winter, the coastal mountains of British Columbia and Alaska have promoted range expansion rather than acted as a barrier. Mountain goats now inhabit most of the coastal range of Southeast Alaska where steep forested slopes broken by rock outcrops are common.

Because they are a popular species for local hunters and trophy hunters from around the world, mountain goat populations in easily accessible areas near Juneau have been reduced from historic levels. In the immediate Juneau vicinity goat populations may have been reduced significantly early in the 1900s as mining activity increased. Sport hunting of the populations likely 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. To boost local goat numbers, mountain goats from the Whiting River were reintroduced to Mount Juneau in the summer of 1989. All of these goats, individually marked prior to reintroduction, apparently left the area by 1992, but small numbers of mountain goats are routinely sighted both on Mt. Juneau and on Heintzelman Ridge above urban Juneau. Aerial surveys of nearby Mt. Hawthorne have revealed increasing goat numbers. Goat sightings are also routinely reported from Sheep Mountain, Mt. Bullard, and Mt. McGinnis.

Guided hunts in Tracy and Endicott arms 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 steep cliffs lining fiords. This use predominates late in the season, when snow often forces goats to lower elevations. The area south of the Endicott River in the Chilkat Range was reopened to hunting by a BOG action in fall of 1996 offering hunters more opportunities to harvest a goat.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

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

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

METHODS

Harvest data were obtained from registration permit hunt reports for the 1997 and 1998 fall hunts. Population surveys were conducted in a small portion of Unit 1C during the report period using both a fixed and rotor winged aircraft.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Information on Unit 1C mountain goat populations was gathered from aerial surveys and hunters' comments. Mountain goat populations seem to be at medium densities over most of the hunted range, based on the number of goats per hour seen during aerial surveys (Table 1). Aerial population surveys were conducted from Pt. Salisbury to the Taku Glacier, as well as from Eagle Glacier to the Lace River during this report period. Sighting rates and the ratio of kids to adults were both within the range of previous surveys (Table 1). In areas that were not surveyed during this report period, we used hunter effort and success as well as previous survey information as an indicator of population status. The goat population on the mountains adjacent to Juneau appears to be increasing, and sightings are becoming routine above town.

The Board of Game adopted a proposal in fall 1998 to allow bow and arrow hunting of mountain goats between Pt. Salisbury and the Taku Glacier. Goat numbers in this area have reached huntable levels (>100 animals) for the first time since the area closed in 1985.

No sign of contagious ecthyma (orf) has been seen during the report period, although any facial lesion tends to be attributed to the disease by hunters.

MORTALITY

Harvest

Season and Bag Limits:	Resident and nonresident hunters
Unit 1C, that portion draining into Lynn Canal and Stephens Passage between the Antler River and Eagle Glacier and River, and all drainages of the Chilkat Range south of the south bank of the Endicott River.	Oct. 1–Nov. 30.

1 goat by registration

permit only.

Unit 1C, that portion draining into Stephens Passage between Eagle Glacier and River and Point Salisbury	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 1998 meeting the Board of Game heard and approved a proposal to reopen goat hunting from Pt. Salisbury to the Taku Glacier. This area had been closed since the 1985 season because of low goat numbers.

Hunter Harvest. A total of 84 goats were taken during this report period, 46 in 1997 and 38 in 1998 (Table 2). Average harvest during the reporting period increased by 8 goats over the preceding 2-year period. Males again made up a large part of the harvest (71%), which is similar to the 73% male harvest during the previous report period. The predominantly male harvest may partially result from the high number of 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. Most guided hunters prefer a male goat because of its trophy status. Because we do not require hunters to present their goats to ADF&G staff, the reported harvest of male goats may be inflated as hunters are sometimes reluctant to admit to killing a nanny.

Permit Hunts. Registration Permit Hunts RG012 and RG013 are incorporated under a single permit. The number of permits issued increased from a mean of 141 in the previous report period, to a mean of 159 in 1997/98. (Table 3). Compliance with reporting requirements has been good, but we continue to resort to reminder letters and certified reminder letters to get information from some hunters.

Hunter Residency and Success. The success rate of all hunters averaged 57% during this report period compared to 53% during 1995–96. Although local resident hunters outnumbered non-resident hunters more than 2:1, nonresidents harvested an equal number of goats (Table 4). The percentage of goats taken by nonresidents declined slightly from the previous report period, but the number of goats harvested by non-residents increased from 38 to 39. This reflects a growing popularity in goat hunting by local residents. Successful hunters expended an average of 2.2 days per goat during the reporting period, an effort level below the mean of 3.2 days per goat during 1995–96 (Table 3). Unsuccessful hunters expended an average of 3.0 days in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4 month season accounting for 37% of the take in 1997 and 55% in 1998. 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. Boats have historically been the primary means of transportation for successful hunters. This trend continued during the report period, with 79% of successful hunters using them (Table 5). Other means of transportation included airplanes, highway vehicles, and walking. Highway vehicles were used along the Juneau road system, and the person walking lived in Snettisham.

Commercial Services. The use of commercial services remained about the same as last report period with 44% of hunters using a commercial service versus 43% during 1995–96. Commercial transportation to the field was used by 27% of the hunters using a commercial service. This is not surprising since most huntable areas are only accessible by airplane or boat. The commercial service used most often by resident hunters was transportation, whereas all nonresidents used a registered guide as required by law.

Other Mortality

There is little data available concerning natural mortality. Holroyd (1967) cited several instances of goats killed in falls, rockslides, and avalanches. Several radio-collared goats from a previous study near Juneau died in circumstances that may have involved accidents, although abundant wolf sign at carcass locations made determination of the cause of death problematic. Wounding loss may be responsible for additional deaths, but we are unable to gather data related to this cause.

HABITAT

Assessment

Winter and summer goat range within Unit 1C is extensive and goat numbers are probably below carrying capacity in most parts of the subunit. Helicopter traffic in or near goat habitat is probably the biggest concern at this time. There is a steady increase in demand for both summer flightseeing tours as well as winter heliskiing opportunities. Little is known about the effects of helicopter noise on goat populations. Goats may be displaced from preferred habitat areas because of these disturbances that could ultimately play a role in population declines due to reduced fitness. Because of these concerns, the USFS and ADF&G have been discussing methods of addressing these concerns through a study funded by the USFS, but with input by ADF&G staff.

CONCLUSIONS AND RECOMMENDATIONS

Because aerial surveys were not completed in the southern part of the subunit or in the Chilkat Range during the report period, it is unknown if management objectives regarding goat densities were met. Between the Eagle Glacier and River and the Antler River goat densities were greater than twice the management objectives. Hunter effort and success throughout the unit was greater than the preceding report period. In both years hunters killed predominantly males.

As weather and funding permit, aerial surveys should be conducted to determine population trends. It is not clear if goats reintroduced to Mt. Juneau have contributed to population expansion, but goat numbers near Juneau have apparently increased. Survey results from the previous management report indicate a recovery in goat numbers in the Chilkat Range, and a proposal to reauthorize hunting in that area was approved by the Board of Game in fall 1998.

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 one 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 report 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.

The Chilkat Range south of the Endicott River, reopened in fall 1998, received little hunting pressure and no goats were harvested there during this report period. The season opening date of October 1 in this area may be restrictive to local hunters due to deteriorating weather late in the year. If this lack of effort continues we may propose to the BOG to open the season at an earlier date to increase hunter effort.

LITERATURE CITED

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

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Table 1 Unit 1C mountain goat composition counts, 1986–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	Percent kids	Goats per hour
1986	192	55	247	29	22	42
1987			No survey			
1988	81	26	107	32	24	26
1989	514	169	683	33	25	51
1990–92			No survey			
1993[1]	171	4	175	2	2	17
	62	15	77	25	19	77
1994	370	79	449	21	18	82
1995			No survey			
1996[2]	215	78	293	36	27	52
1997			No survey			
1998[3]	225	38	263	20	14	77
	71	19	90	27	21	39

1 The first survey was conducted from a boat in early May at Tracy and Endicott arms. 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. to the southern end of the Chilkat Mts.

3 The first survey was from Eagle River and Glacier to the Lace River. The second survey was from Pt. Salisbury to the Taku Glacier (RG014 bow and arrow only hunt area).

Table 2 Unit 1C annual goat harvest, 1990–98

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]
1997	30	14	2	46
1998	30	6	2	38

1 Three of these goats were taken illegally.

Table 3 Unit 1C goat hunter effort and success, 1990–98

		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
1997	164	46	118	2.7	35	70	2.0	81	188	2.3
1998	153	38	85	2.2	29	88	3.0	67	173	2.6

Table 4 Unit 1C goat hunter success by community of residence, 1990–98

		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
1997	57	22	4	20	30	4	1
1998	57	17	2	19	24	3	2

Table 5 Unit 1C transport methods used by successful goat hunters, 1990–98

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)
1997	10	(22)	34	(74)	1	(2)	1	(2)	0	(0)
1998	6	(16)	32	(84)	0	(0)	0	(0)	0	(0)

Table 6 Commercial services used by Unit 1C goat hunters, 1991–98

Year	Unit residents		Other AK residents		Nonresidents		Total use		Registered guide	Transporter	Oth
	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
1997	37	9	5	3	0	21	42	33	21	12	0
1998	28	5	5	0	0	21	33	26	21	4	1

LOCATION

GAME MANAGEMENT UNIT: 1D (2700 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 with separate hunt areas in Unit 1D (RG023, RG024, and RG026). There is also 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. The Skagway area was closed by a Board of Game action in 1984 (effective during the 1985 hunting season) because of a sharp decline in goat numbers as evidenced by fewer sightings, reduced hunter success, and a greater proportion of females in the harvest. The allowable harvest was also becoming difficult to maintain, with the season closing the same day it opened. Aerial composition counts conducted between 1983 and 1995 indicated that this population had not recovered despite the closure. In the remainder of the subunit, mountain goat populations appear to be fairly healthy based on aerial survey information.

Hundertmark et. al. (1983) examined winter habitat utilization 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 added hunting pressure and the ability to access previously unhunted areas were considered as detrimental to goat populations as the habitat loss resulting 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 1,000 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%;

4. Conduct aerial surveys in areas of concentrated harvest at least every 3 years.

METHODS

Aerial surveys were conducted within the subunit during 1997 and 1998 by both ADF&G staff and Bureau of Land Management (BLM) personnel. Results from BLM surveys, though not directly comparable to ADF&G survey results due to different survey aircraft and intensity, still provide useful data. A single registration permit was used to administer hunts RG023, RG024, and RG026. Harvest parameters, including hunter effort and success rates, were determined for

each hunt. Harvest guidelines for the 3 hunt areas were revisited in fall of 1998 and adjusted for the most recent survey data available.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

With only occasional nonstandard surveys, mountain goat population status in Unit 1D is difficult to evaluate. Survey results vary from year to year for most areas (Tables 1a, 1b, and 1c). Some of these variations are due in part to the intensity and scope of the surveys in any given 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 BLM survey data in conjunction with that collected by ADF&G to arrive at a more comprehensive evaluation of the Unit 1D goat population.

Historical data suggests that hunting pressure has the potential to reduce goat numbers rapidly in easily accessible areas, such as the area north and west of Skagway that was closed in 1985 (Table 1a). Despite this closure, recovery of goats in this area has been slow. A portion of the Takshanuk Mountains in Hunt Area RG023 is similar to the Skagway closed area in that a highway borders it also, making it readily accessible to hunters. 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 Composition

We did not attempt to conduct any unit wide population estimates during this report period, rather our surveys were meant to monitor population trends and kid to adult ratios in certain areas. Our surveys were concentrated in areas of harvest and one area where a hydro project may be initiated. Based on the overall number of goats, percent kids, and number of goats seen per hour of survey time, the goat population appears healthy (Tables 1a, 1b, and 1c).

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.	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.	Aug 1–Dec 31
1 goat by registration permit only.	
Remainder of Unit 1D	Sep 15–Nov 30.
1 goat by registration permit only	

Board of Game action and Emergency Orders. No Board of Game actions were taken in Unit 1D regarding mountain goat seasons or bag limits. An emergency order was issued in fall 1997 to close most of Unit 1D because harvest guidelines had been met or exceeded. In 1998 no emergency orders were issued.

Hunter Harvest. A total of 54 goats were harvested during the report period, 27 each in 1997 and 1998 (Table 2). The 1997 harvest consisted of 15 males and 12 females, compared to the 1998 harvest of 20 males, 6 females, and 1 goat of unknown sex. The harvest during both years of the report period was slightly higher than the mean annual harvest of 24 goats during 1990–1996 (Table 2).

Permit Hunts. Mountain goat hunting within Unit 1D occurred under 3 registration permit hunts during the report period. An average of 153 permits were issued during 1997–98, compared to a mean of 173 during 1995–96, and a mean of 168 since 1990. Hunt reports were amalgamated for the 3 hunts. The main reason for maintaining 3 hunts in the subunit is to allow different opening and closing dates while attempting 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. A mean of 29% of goat hunters were successful during the report period (Table 4). This is much higher than the 21% mean for 1995–96, but similar to the mean of 30% during 1990–94. Local residents continue to comprise the majority of goat hunters in Unit 1D. In 1997 and 1998, residents of the subunit took 56% and 89% of harvested goats, respectively. In 1997 nonlocal Alaska residents took 11 of the 27 goats harvested. In 1998 non-local Alaska residents only harvested 2 goats. Few nonresidents hunt goats in Unit 1D, and they took only 2 of the 54 goats harvested during this report period.

Harvest Chronology. Goats can be hunted in Unit 1D from August 1 through December 31, but the season varies by hunt area. Over the years most goats have been harvested in October, with September being the next most popular month. During this report period the trend continued, with 52% of the goats harvested in October, and 22% in September.

Transport Methods. Boats and highway vehicles are the transport methods used most often by successful hunters, amounting to 36% and 38%, respectively during the report period (Table 5). It is interesting to note the differences in transportation used between 1997 and 1998. In 1997 48% of successful hunters used highway vehicles while only 26% used boats, but in 1998 almost the opposite occurred with only 27% using highway vehicles and 46% using boats. The increase in hunters using boats for transportation is related to heavy snows forcing goats down to low

elevations along Lynn Canal where they were vulnerable to harvest. From 1990–1996 boat access has accounted for 50% of successful hunters while highway vehicles accounted for 32%. Some hunters walk to their hunting area along the Haines Highway, especially residents of Klukwan.

Commercial Services. Most goat hunters do not use commercial services in Unit 1D (Table 6). Most people have access to either a highway vehicle or a boat and are able to provide their own transportation. During the report period only 10 of 168 hunters used commercial services, and 7 of these were nonresidents who had to be accompanied by a guide while goat hunting.

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 with harvest guidelines developed for each area. 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. This is especially true along the Haines road system, and parts of Lynn Canal where goats typically can be found at low elevations and vulnerable to hunting during heavy snow years. Composition surveys should be conducted annually in these areas. The closed area between Taiya Inlet and the Yukon and White Pass Railroad should be surveyed again to assess the goat population and the possibility of reopening the area to goat hunting. Any hunt in this area would have to be monitored closely to prevent overharvest and would almost certainly be managed with a registration or drawing permit. Finally, consistent surveys of areas with well-defined boundaries rather than basic trend routes are needed to improve population estimates and monitor population trends within the subunit. The importance of surveys will continue to increase as management becomes more area-specific and pressure on goats increases from activities other than hunting such as helicopter flightseeing and heliskiing. Our willingness to assist the BLM with interpretation of their survey data in Unit 1D will vastly improve our understanding of the goat populations in this subunit.

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Table 1a Unit 1D mountain goat composition counts, Skagway closed area, 1981–98

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			
1997–98			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, 1990–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
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
1996–97	*No survey*					
1998	69	23	92	33	(25)	58
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
1996–97			No survey			
1998	22	6	28	27	(21)	20
North of the Klehini River and West of the Chilkat River						
1989	23	6	29	26	(21)	70
1993			No survey			
1994	58	4	62	7	(6)	69
1995	55	9	64	16	(14)	116
1996–98	No survey					
East of Ferebee Gl./River (F), Chilkoot/Taiya 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)	119/130	21/33	140/163	18/25	(15/20)	46/59
1995–98	No survey					
	Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass					
1995	64	9	73	14	12	50.5
1996–98	No survey					
	Twin Dewey Peaks, Skagway Pass, Warm Pass					
1995	20	6	26	30	(23)	20
1996–98	No survey					
	Katzehin River north to Twin Dewey Peaks					
1994	121	32	153	26	21	102
1995	No survey					
1996	103	26	129	25	20	105
1997	96	15	111	16	14	80
1998	No survey					

[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 Mt. to Chilkoot Inlet.

Table 1c Unit 1D mountain goat composition counts, hunt area RG026, 1988–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
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
1995–98	No survey					
Remainder of Area West of Chilkat Inlet						
1974	39	3	42	8	7	72
1975	20	9	29	45	31	---[3]
1993			No survey			
1994	184	32	213	17	15	49
1995–98	No survey					
East of Chilkoot Inlet-Katzehin River South						
1993			No survey			
1994	32	10	42	31	24	98
1995–96			No survey			
1997	5	2	7	40	29	N/A
1998			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.

Table 2 Unit 1D annual mountain goat harvest, 1988–98

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
1997	15	12	0	27
1998	20	6	1	27

Table 3 Unit 1D mountain goat hunter effort and success, 1990–98

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total nr days	Avg nr days	Nr hunters	Total nr days	Avg nr 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
1997	149	27	46	1.7	60	125	2.4	87	171	2.2
1998	157	27	64	2.6	69	168	2.6	96	230	2.6

Table 4 Unit 1D goat hunter success by community of residence, 1990–98

		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
1997	31	15	11	1	45	14	1
1998	28	24	2	1	58	8	3

Table 5 Unit 1D transport methods used by successful goat hunters, 1990–98

	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)
1997	0	(0)	7	(26)	5	(19)	13	(48)	2	(7)
1998	0	(0)	12	(46)	5	(19)	7	(27)	2	(8)

Table 6 Unit 1D commercial services used by goat hunters, 1991–98

Year	Unit residents		Other AK residents		Non-residents		Total use		Registered guide	Transporter	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
1997	51	0	20	3	0	3	71	6	3	1	2
1998	77	0	10	0	0	4	87	4	4	0	0

[1] Only 37% of hunters reported whether they used, or did not use, commercial services in 1991.

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5800 mi^2)

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

BACKGROUND

Mountain goat populations were established on Baranof Island in 1923 when 18 animals were transplanted from Tracy Arm in Game Management Unit 1 (Burris and McKnight 1973). Goats were not believed to have been indigenous to the island, although early written Russian history is confusing with references to "white deer." Hunting was initiated in 1949 on descendants of the 1923 translocation efforts, and seasons have continued to this time. In 1976 a registration permit system was initiated and has continued. Since that time the harvest has ranged from 28 to 75 goats per year.

In the mid-1950s goats were transplanted to Chichagof Island (Burris and McKnight 1973), but populations did not become established. The last report of a goat on that island was in 1978 (Johnson 1981). Mountain goat populations do not exist on Admiralty or any other island in the unit. Baranof Island goats appear to be dispersing spatially and increasing numerically, with recent expansions of animals to the southern part of the island.

The effects of severe winters on goat populations are poorly understood. Consistent goat surveys are needed to better understand the effects of varying snow accumulations. Throughout most goat habitat on Baranof Island, hunter access is difficult. Weather patterns during open goat seasons play an important role in regulating the harvest.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Manage Baranof Island goat populations to provide for maximum sustained annual use by hunters and wildlife viewers. Maintain for an island-wide population in excess of 1000 goats.

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 through a registration permit system (hunt RG150). Hunters obtain permits without charge, but successful hunters are required to report 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, number of days hunted, kill date, sex of goat harvested, transportation used, and any use of commercial services. Successful hunters are also encouraged to bring in the horns from their goat for age determination.

Late summer aerial surveys are conducted periodically in selected areas. During September 1998 an extensive survey designed to determine goat distribution was conducted island-wide.

Goat horns voluntarily submitted by successful hunters were examined during 1998. Incremental growth measurements, age, and width between horn bases were recorded on standardized forms (Appendix A), in an attempt to determine growth rates and characteristics of Baranof Island goats as they relate to varying winter severity. Although sample sizes were inadequate for statistical significance, this effort will continue.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

During September 1998 an extensive aerial survey of goat habitat on Baranof Island was conducted, resulting in a total of 1013 goats being tallied. This number should be viewed as a minimum number of goats inhabiting the island, as sightability data have not been established. I suspect that conditions were near optimal, resulting in at least 75% of all goats being seen. Under this assumption the goat population on the island may exceed 1250 animals. Additional survey effort should be expended in future years to determine sightability, leading to more precise population estimates.

Currently it appears that goat populations continue to expand both spatially and numerically on Baranof Island. However, because of differences in observers, pilots, area surveyed, and type of aircraft used, it is impossible to infer goat abundance from the number of goats observed per hour of survey time.

Summer range (alpine) is not currently threatened by destructive resource extraction activities (logging and mining with appurtenant roading), and winter range appears to be secure for the immediate future. The only recent population estimate for Baranof Island was in 1991 by E. L. Young at 1000 goats (cited by Faro 1994), and the population has undoubtedly increased since that time.

Population Composition

Kid percentages in the observed segment of the goat population have varied widely, from a low of 10 to a high of 41. These data should be viewed cautiously because of differences in observers, pilots, type of aircraft used, and timing of surveys. Hunters generally select males, so sex ratios in the harvest certainly do not reflect sex ratios in the population.

Distribution and Movements

Mountain goats inhabit all available summer range on Baranof Island north of Gut Bay and Whale Bay. Actual densities of goats on the various alpine areas are unknown, but I suspect that at least some of the areas are saturated. South of Whale and Gut bays there are sporadic goat observations made by the public, and I suspect that as populations increase those areas will support additional goats. Winter habitat is more difficult to define, but south-facing cliff areas are apparently preferred.

Horn Growth Rates

In an effort to better understand growth characteristics of Unit 4 goats, hunters were asked to voluntarily submit horns for aging and measuring. A total of 23 goats from the 1998 season yielded data on horn growth.

I suspect that horn growth reflects body growth patterns. Because no annuli are discernable until the goat reaches 1.5 years of age, and this "annulus" encompasses 2 growth years (0–0.5 and 0.5–1.5), the data cannot be used for analyses of single-year growth. Additionally, growth from the year of death cannot be reliably used, as growth may not be completed during that particular year. The 1998 horn measurements yielded 51 usable annuli that could be assigned to any one particular year.

Although data are preliminary, they suggest that horn growth (assumed to be a reflection of body condition) may have been better following relatively harsh winters. Intuitively this was opposite of my original hypothesis that winter severity could be assessed by poor horn growth because of diminished food intake. However, it may be that severe winter weather causes goats to move off of their traditionally used cliffs into habitat where they actually survive on a higher nutritional plane. At this point in the investigation, more data are needed to fully assess the effects of varying winter weather as it affects horn growth.

MORTALITY

Harvest

Season and Bag Limit	Resident and nonresident hunters Aug 1–Dec 31

1 goat by registration permit only.

Regulations adopted by the Federal Subsistence Board are identical to 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. During both 1997 and 1998, 326 registration permits were issued (Table 1). This resulted in 55 and 63 goats being legally harvested in 1997 and 1998, respectively. The percent of permittees who actually hunted was 42% and 49%, respectively, during the 2 years. For those hunters going afield, the success rate was 40% in both 1997 and 1998. Five-year averages for the period 1994–1998 were: permits issued, 315; hunters afield, 143; and reported goat harvest, 52. Hunters reported sex of goats in the harvest as 65% males in 1997 and 57% in 1998 (Table 1). With the current population estimate for goats in Unit 4 at 1,250 animals, documented harvest accounts for a mortality over 4.2% annually.

Permit Hunts. All goat hunting in Unit 4 is conducted under a registration permit system.

Hunter Residency and Success. Residents of Baranof Island continue to be the primary users (79% of hunters were local residents during 1998, Table 2). The proportion of nonresident-guided hunters appears to be increasing (6% in both 1997 and 1998), although numbers are still low.

Harvest Chronology. Weather appears to be the primary factor controlling hunter effort and chronology of the goat harvest in Unit 4. Typically, few goats are harvested during November and December when consecutive low-pressure systems bombard Southeast Alaska with rain and/or snow. During 1997, 24 goats (44%) were harvested during August, with lesser numbers in all other months (Table 3). During 1998, hunters took the largest monthly total during October, when 18 goats (29%) were reported harvested.

Transport Methods. Boats continue to provide the majority of transportation for Unit 4 goat hunters. During 1997 and 1998, hunters used boats for primary access, 55% and 79%, respectively (Table 4).

Other Mortality. No estimates of extent or causes of other goat mortality have been made. I suspect that bear-caused mortality occurs, but its significance is unknown. Winter starvation mortality and accidental deaths due to rockslides and avalanches undoubtedly take some toll on the goat population.

HABITAT

Assessment

No data are available regarding habitat quality. Relatively high numbers of kids observed during late summer composition surveys and good body condition of harvested goats suggests that habitat is in relatively good shape.

Enhancement

No habitat enhancement activities were conducted on goat range during this reporting period; there are no plans for future assessment or enhancement of goat habitat.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Efforts should continue to monitor timber extraction activities and additional road building associated with logging. On Baranof Island, habitat degradation activities appear to be minor.

CONCLUSIONS AND RECOMMENDATIONS

Unit 4 mountain goat populations appear to be secure at this time. Efforts should continue to determine effects of varying winter severity on goat populations through horn annuli measurements. I recommend that current state regulations remain in effect concerning season dates and bag limits. The current system of registration permit hunting appears to be working well and causes little additional effort on the part of hunters. I commend hunters for their willingness to voluntarily submit horn sets for aging and measurement. Future assessment work should be explored in an effort to determine sightability of goats. These data will allow better enumeration of goat populations on the island.

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Table 1 Unit 4 mountain goat harvest data for registration permit hunt RG150, 1994/95–1998/99

Reg. year	Permits issued	Did not report	Did not hunt	Unsuccessful hunters	Success. hunters	Males	Females	Sex unk.	Illegal	Total harvest
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
1997	326	0	188	83	55	36	18	1	0	55
1998	326	1	167	95	63	36	27	0	0	63

Table 2 Unit 4 mountain goat hunter residency and success for registration permit hunt RG150, 1994/95–1998/99

	Successful				Unsuccessful				
Reg. year	Local[a] resident	Nonlocal resident	Nonres	Total	Local[a] resident	Nonlocal resident	Nonres	Total	Total hunters
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
1997	45	5	5	55	69	11	3	83	138
1998	48	8	7	63	77	16	2	95	158

[a]Residents of Baranof Island.

Table 3 Unit 4 mountain goat harvest chronology by month for registration permit hunt RG150, 1994/95–1998/99

Regulatory year	Harvest periods					Total
	August	September	October	November	December	
1994	13	8	12	3	16	52
1995	6	21	12	7	3	49
1996	4	13	3	9	13	42
1997	24	9	6	9	7	55
1998	11	12	18	13	9	63

Table 4 Unit 4 mountain goat harvest by transport method used by successful hunters for registration permit hunt RG150, 1994/95–1998/99

Regulatory year	Airplane	Boat	Snow machine	Offroad vehicle	Vehicle	Walked	Total
1994	12	34	0	1	5	0	52
1995	15	28	0	0	2	4	49
1996	12	25	1	0	3	1	42
1997	18	30	0	0	4	3	55
1998	8	50	0	1	3	1	63

Appendix A

MOUNTAIN GOAT HORN STUDY

NAME _____

DATE OF KILL _____

LOCATION OF HARVEST _____

_____

AGE OF GOAT _____ CERTAINTY? A B C

SEX OF GOAT _____

(all measurements to nearest 1/16 inch)

LENGTH OF LEFT HORN _____ BROOMED? Y N

BASAL CIRCUMFERENCE OF LEFT HORN _____

LENGTH OF RIGHT HORN _____ BROOMED? Y N

BASAL CIRCUMFERENCE OF RIGHT HORN _____

ANNULUS LENGTHS (Use longer horn)

0-1.5 years _____

1.5-2.5 years _____

2.5-3.5 years _____

3.5-4.5 years _____

4.5-5.5 years _____

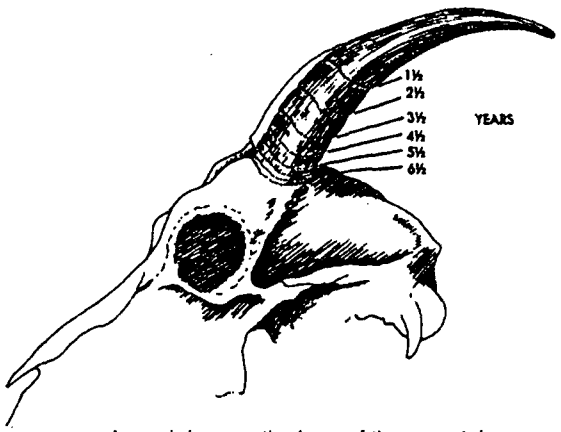
5.5-6.5 years _____

6.5-7.5 years _____

7.5-8.5 years _____

8.5-9.5 years _____

9.5-10.5 years _____



Annual rings on the horn of the mountain goat (after Brandborg 1955)

WIDTH BETWEEN HORN AND BASES _____

MEASUREMENTS RECORDED BY _____ DATE _____

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

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

BACKGROUND

Mountain goats have been present in the eastern Gulf Coast region since recorded history began. 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.

The Alaska Department of Fish and Game first conducted aerial goat surveys in this Unit in 1971. 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 Unit 5A during the 1980s and anecdotal accounts from guides, pilots, and hunters indicated that goat numbers were higher than recorded in the early 1970s. In the 1990s no aerial surveys were conducted, but anecdotal information from hunters and guides suggests that goats are relatively abundant throughout the area.

There is both a State registration permit hunt and a Federal subsistence hunt for goats in this Unit.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Management objectives identified by staff for mountain goat populations in Unit 5 are as follows:

1. Increase the estimated population from 850 to 1250 goats;

2. Maintain a hunter success rate of 25%;

3. Conduct aerial surveys in areas of concentrated harvest at least every 3 years.

METHODS

No aerial surveys were conducted within the Unit during the report period. This was the result of a combination of factors including weather, staffing changes, and loss of the assistant area biologist position for northern Southeast Alaska. Yakutat's distance from the Douglas Regional Office makes it difficult logistically to plan for and conduct aerial surveys there. Hunters were required to obtain registration permits from Fish and Game offices that allowed in-season monitoring of harvest effort and success. Information collected from registration reports included the number of days hunted, method of transportation used, hunt dates, commercial services used (for all hunters), and sex and date of kill (for successful hunters). Anecdotal information was gathered from hunters, ADF&G field personnel, and federal agency personnel stationed in Yakutat.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Surveys conducted in the late 1980s suggested that the goat population was stable to increasing based on the number of goats seen per hour during aerial surveys (Table 1). No information has been received that would indicate the goat population has declined since that time, and the Unit 5 goat population may number about 1,000 animals.

MORTALITY

Harvest

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

Hunter Harvest. Twenty-one goats were harvested during the report period, 5 in 1997 and 16 in 1998. Two of the 5 goats harvested in 1997 were taken under Federal subsistence permits. The increase in harvest in 1998 is attributed to an increase in non-local resident and nonresident hunters (Table 3). The percentage of males harvested was 60% in 1997, 50% in 1998, and 57% overall. The 2-year average is slightly lower than the 64% male harvest over the previous 7 years (Table 2).

The harvest of 16 goats in 1998 was the highest since 1983 when 23 goats were killed. Goat hunting has never attracted a lot of attention in Yakutat. During 1990–96 the average harvest of goats in Unit 5 was only 8. The reduction in kill from the early 1980s appeared to be related more to decreased effort rather than reduced success rate or a decline in goat numbers (Table 3). During the 1995–96 reporting period effort increased but harvest decreased in relation to the preceding report period. In 1997–98 the number of hunters increased by 12 over the previous report period (Table 4), and the number of goats harvested increased from 13 to 21 animals (Table 2). Most of the harvest occurred in 1998 when heavy snowfall forced goats into low elevation habitat where they were vulnerable to harvest.

Illegal harvest remains unquantified but may be higher than previously thought. A recent enforcement operation resulted in the arrest of 2 Yakutat residents on charges of illegally harvesting goats.

Permit Hunts. A total of 53 and 56 registration permits were issued during 1997 and 1998, respectively, an increase in 1 permit over the previous reporting period (Table 4). Hunting effort differed dramatically between 1997 and 1998 with 17 people hunting in 1997 and 33 hunting in 1998. The increase was largely due to the addition of 10 nonresident hunters in 1998. The mean of 25 hunters each year of the report period is noticeably higher than during 1990–1996 when an average of 18 people hunted each year. The registration permit strategy remains a viable method for effectively managing goat hunting in the unit.

Information on the Federal Subsistence hunt (other than the 2 goats harvested) is not available at this time.

Hunter Residency and Success. Goat hunter success averaged 42%, substantially lower than that of the previous 2-year period (Table 3). Four of 5 1997 successful hunters were unit residents; in 1998 this ratio dropped to 5 of 16, with nonresidents accounting for 7 of the goats. The number of Alaska residents hunting during the 1997–98 period outnumbered nonresidents 36 to 14. Of the 36 resident hunters, 23 were Unit 5 residents. Nonresidents still account for a significant portion of the effort and harvest, with non-local resident effort and harvest being the smallest. The relatively low harvest by non-local Alaskans is partly due to the availability of other huntable goat populations in the state. The requirement that a guide must accompany nonresidents is not believed to have a negative effect on goat hunting in the Yakutat area.

Harvest Chronology. The Unit 5 goat harvest is usually spread throughout the season, with the greatest number of goats typically taken during September and October. The 1998 harvest was especially concentrated in October and November. This was due to an increase in late season hunting pressure, when goats were forced to lower elevations by snow and were accessible on cliffs in Russell Fiord.

Transport Methods. In 1997 all successful hunters used boats, but in 1998 40% of successful hunters used aircraft and 60% of successful hunters used boats. Most hunters who used aircraft to access goat hunting areas were guided nonresidents.

Other Mortality

Some anecdotal reports were received from guides and hunters regarding wolf predation on goats, but there is no evidence that it has a major effect on the population. Winter weather probably plays more of a factor in goat mortality, as Yakutat often gets large amounts of snow and severe winter weather.

CONCLUSIONS AND RECOMMENDATIONS

Efforts to obtain mountain goat population information through aerial sex and age composition counts should be a priority during the next report period. Hunting pressure appears to be increasing, and better population information, especially in areas of concentrated harvest, is essential. Despite this information void, our hunt records indicate that hunting effort has been

quite low and it is likely that goat populations could support additional harvest in all but the most popular hunt areas.

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Table 1 Unit 5 mountain goat composition counts, 1986–98

Year	Number adults	Number kids	Total goats	Kids:100 adults	Percent kids	Goats/ hour
1986	36	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
1990–98			No surveys			

Table 2 Unit 5 annual goat harvest, 1990–98

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
1997	3	2	0	5
1998	9	6	1	16

Table 3 Unit 5 goat hunter success by community of residence, 1990–98

		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
1997	29	4	1	0	6	4	2
1998	48	5	4	7	8	4	5

Table 4 Unit 5 goat hunter effort and success, 1990–98

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days	Nr. hunters	Total days	Avg nr 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
1997	53	5	8	1.6	12	26	2.6	17	34	2.3
1998	56	16	55	3.4	17	59	3.5	33	114	3.5

Table 5 Unit 5 transport methods used by successful goat hunters, 1990–98

	Airplane		Boat		Snowmachine		Highway vehicle		Foot	
Year	Total	%	Total	%	Total	%	Total	%	Total	%
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
1997	0	0	5	100	0	0	0	0	0	0
1998	6	40	9	60	0	0	0	0	0	0

Table 6 Unit 5 commercial services used by goat hunters, 1990–98

	Unit residents		Other AK residents		Nonresidents		Total use		Registered
Year	No	Yes	No	Yes	No	Yes	No	Yes	guide
1990	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
1997	7	2	4	1	0	2	11	5	2
1998	12	0	4	3	0	12	16	15	2

LOCATION

GAME MANAGEMENT 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 increased significantly during the mid-to-late 1990s.

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 mountain goats 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.

Management guidelines were clarified in 1993 when a harvest tracking strategy (Caughley 1977, Smith 1984) was fully implemented. The 3 elements essential for implementation of the strategy were: 1) improved aerial survey methods for obtaining trend information, 2) registration permit hunts allowing careful monitoring of harvest distribution and magnitude, and 3) establishing a minimum population objective of 2400 goats for Unit 6. Implementation of the strategy provided the conceptual framework necessary to guide decisions about harvest. In response to declining populations in most of the unit, we reduced harvest and prohibited hunting of small groups of goats (<60) during the early and mid 1990s.

We have monitored harvest since 1972, using hunter reports. Both 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 DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a minimum population of 2400 goats
- Achieve a minimum of 70% males in the harvest.

METHODS

We conducted aerial surveys to estimate mountain goat population size, trend, and composition in permit hunt areas (Fig. 1). Individual hunt areas were usually surveyed during August and September at 2–3-year intervals. Each area was divided into 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 wheels with pilot and 1 observer onboard. The pilot 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.

The observer recorded start and stop times and calculated search effort (minutes/mi^2) for each survey. Number of kids and goats older than kids were recorded for each group. Goat observations and flight lines were plotted on sample unit maps. We also recorded environmental conditions during the survey to evaluate survey quality as excellent, good, or poor. We noted 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, with the exception of those taking goats in Unit 6C.

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 13 permit hunt areas during this reporting period. We counted 1922 goats during 1997 and 1472 goats in 1998 (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 4020 goats unit-wide in 1997–98 and 4050 goats in 1998–99.

Population size and trend varied among units over the past 5 years. Units 6D (West) and 6D (East), which had the largest numbers of goats, have been increasing since 1995–96 (Table 1). The goat population in Unit 6C increased annually since the hunt closed in 1989. Between 1994–95 and 1997–98, population size doubled in Unit 6C (Table 1). However, exceptional survey conditions may have contributed to the high count in 1997. Goat populations in Units 6A and 6B increased by 5% and 17%, respectively, between 1996–97 and 1998–99.

Data for the past 10 years indicate long-term trends of goat populations in Unit 6 (Fig. 2). Goat numbers in Unit 6A declined by 49% through 1994, but have since stabilized and slightly increased. Unit 6B population declined in the late 1980s, was stable during 1990–1994, then increased through 1998. Unit 6C goats increased steadily because hunting was closed in 1989; this population more than tripled by 1998. The Unit 6D (West) population increased by 33% between 1988 and 1992–93, decreased slightly during the next 2 years, then resumed increasing through 1998. The Unit 6D (East) goat population decreased by 31% between 1987–88 and 1994–95, then increased to an historic high by 1998.

Results of aerial goat surveys can be extremely variable (Ballard 1975, Fox 1977). We attempted to minimize variability by standardizing methods and by surveying mostly during excellent or

good conditions. Of 37 sample units completed during 1997 and 1998, 14 were rated as excellent and 23 were good.

Population Composition

The kid-to-older goat ratio and percent kids for all areas counted during 1997–98 were 25:100 and 20%, respectively (Table 1). These values for 1998–99 were 15:100 and 13%, respectively; the lowest recorded in over a decade. Kids observed during goat surveys over the past 10 years averaged 18% (SD = 3%) in Unit 6. On the Kenai Peninsula (Del Frate 1996) and Kodiak Island (Smith & VanDaele 1987), values less than 20% and 17% kids, respectively, indicated poor productivity and declining populations.

MORTALITY

Harvest

Season and Bag Limit. The mountain goat season in Units 6A and 6B was 20 August to 31 January and in Unit 6D was 15 September to 31 January. Hunts in 6C were limited to 2 periods during 9–15 October and 13–19 November. The bag limit was 1 goat by registration permit only. Permit hunts were opened in all units including 6C, which had been closed since 1989.

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 beginning in 1997/98. This resulted from a public proposal objecting to an increasingly earlier harvest 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. The department supported the proposal to increase trophy quality and to reduce harvest control problems in Units 6D (East) and 6D (West).

Seven emergency orders were issued closing registration permit hunts when MAH was reached (down from eleven emergency orders during the last reporting period). During 1997–98, hunts RG215, RG226, RG231, and RG242 were closed. During 1998–99, hunts RG226, RG242, and RG249 were closed. These were routine management actions.

Hunter Harvest. Hunter harvest declined to the lowest level in the history of goat hunting in Unit 6 in 1996/97. Goat populations responded favorably to reduced MAH's, allowing an increase in harvest during this reporting period. Unweighted and weighted harvest during 1997–98 was 67 and 76, respectively (Table 2). Harvest during 1998–99 was 75 and 88, respectively. The harvest included 58 males (87%) and 9 females (16%) during 1997–98. In 1998–99, the sex composition was 62 males (85%) and 11 females (15%) and 2 of unknown sex.

Sex composition of the harvest varied by unit. In Units 6A and 6B, most hunters were guided nonresidents who reported taking 90–100% billies (Table 2). Sex verification was not required for these units, but in general guides are motivated to take billies and report accurately. Sex verification is required for Unit 6C hunters (most of whom were locals), who harvested 70% billies. Most hunters in Unit 6D were nonlocal residents who reported 89% and 84% billies during this period. Hunters were aware that nannies counted as 2 goats toward the harvest quota, sex verification was not required, and therefore some hunters may have been reluctant to report taking a nanny. We suspect that sex composition may be biased towards billies in Unit 6D.

MAH during 1997–98 and 1998–99 was 114 and 117, respectively (Table 2). Weighted harvest exceeded MAH in only 2 of 25 hunts during this reporting period. In Unit 6A, weighted harvest rates averaged 1.7% since 1989–90 (Fig. 4). In Unit 6B, the average was 2.0% since 1989/90 (Fig. 5). The harvest in Unit 6C during the reporting period was 3.7. In Units 6D (East) and 6D (West), the averages were 1.4% and 3.6%, respectively, since 1989–90 (Figs 6 and 7). Conservative MAH's and resulting low harvest were part of our harvest tracking strategy for hunted populations that were declining, and where kid survival was poor. Under these conditions 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 progressively increased to 268 by 1998–99 (Table 2). Registration 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 but did not live in Unit 6 (Table 3). Hunter success during the reporting period averaged 56.5%, which was within the normal range during the last 5 years. There was a unitwide increase in the number of goat hunters during the reporting period, probably in response to higher MAH's and hunts remaining opened longer.

Harvest Chronology. September and October were the most productive months for goat harvest during the reporting period (Table 4). During 1995–96 and 1996–97 much of the harvest had occurred in August in response to lower MAH and emergency closures of hunt areas. Changing the season opening to 15 September resulted in a later-season harvest and eliminated complaints about hide quality.

Transport Methods. Airplanes were the most important means of hunter transport in Units 6A and 6B (Table 5). In Unit 6C highway vehicles were the primary mode of transportation. In Unit 6D boats followed by airplanes were primarily used. Ground transportation was reported for the first time in Unit 6A during 1998/99. This was probably a result of the logging road that now extends from Icy Bay to the Yakataga River valley.

Other Mortality

Predation by wolves was a source of natural mortality, particularly in Units 6A and 6B where wolf density was greatest. Pilots in Units 6A and 6B have occasionally reported Wolf predation on goats. However, Carnes (1996) found little evidence of significant wolf predation in Unit 6, during the early to mid 1990's. He reported that the wolf population probably peaked during the early to late 1980's and then declined during the following decade to a stable, relatively low density. Hence, wolf predation may have been a more important factor in the past than it is currently.

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).

Logging commenced on the western shore of Icy Bay in the mid 1960s. Clearcutting and a road system progressed westward toward Cape Yakataga through the 1970s and 1980s. Logging began in the White River watershed during spring 1995 and has since proceeded westward toward Cape Yakataga. The logging company will begin clearing in hunt area RG204 along the North Fork Yakataga River during spring 2001 in the Porcupine Creek drainage. RG204 has the largest population (200 goats) in Game Management Unit 6A.

Historical trends of mountain goat populations in the area indicate the effect of removing winter habitat. The White River to Icy Bay hunt area (RG202), numbered approximately 400 goats in 1977, and has since steadily declined to 77 in 1998–99, representing an 80% decrease. There was excessive legal harvest and poaching in RG202 during the 1970s and early 1980's because of easy access by logging roads. There was little protection given to winter goat habitat, nor mitigation for the loss of goat habitat. Despite low wolf density (Carnes 1996) and restricted hunter harvest, the goat population has dropped 30% since 1989. Goat populations in adjacent unlogged hunt areas have been increasing, despite hunter harvest and continued wolf predation.

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 4049. The population increased by 13% since the last reporting period, indicating that our harvest tracking strategy was successful. Weighted harvest rate of declining populations was restricted to <3.5%, and hunting was closed where goat numbers approached minimum acceptable levels. This facilitated some population improvement, despite 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 the last reporting period, and hunters may have been reluctant to voluntarily report harvest of females. This bias was likely limited to Unit 6D.

The harvest tracking 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.

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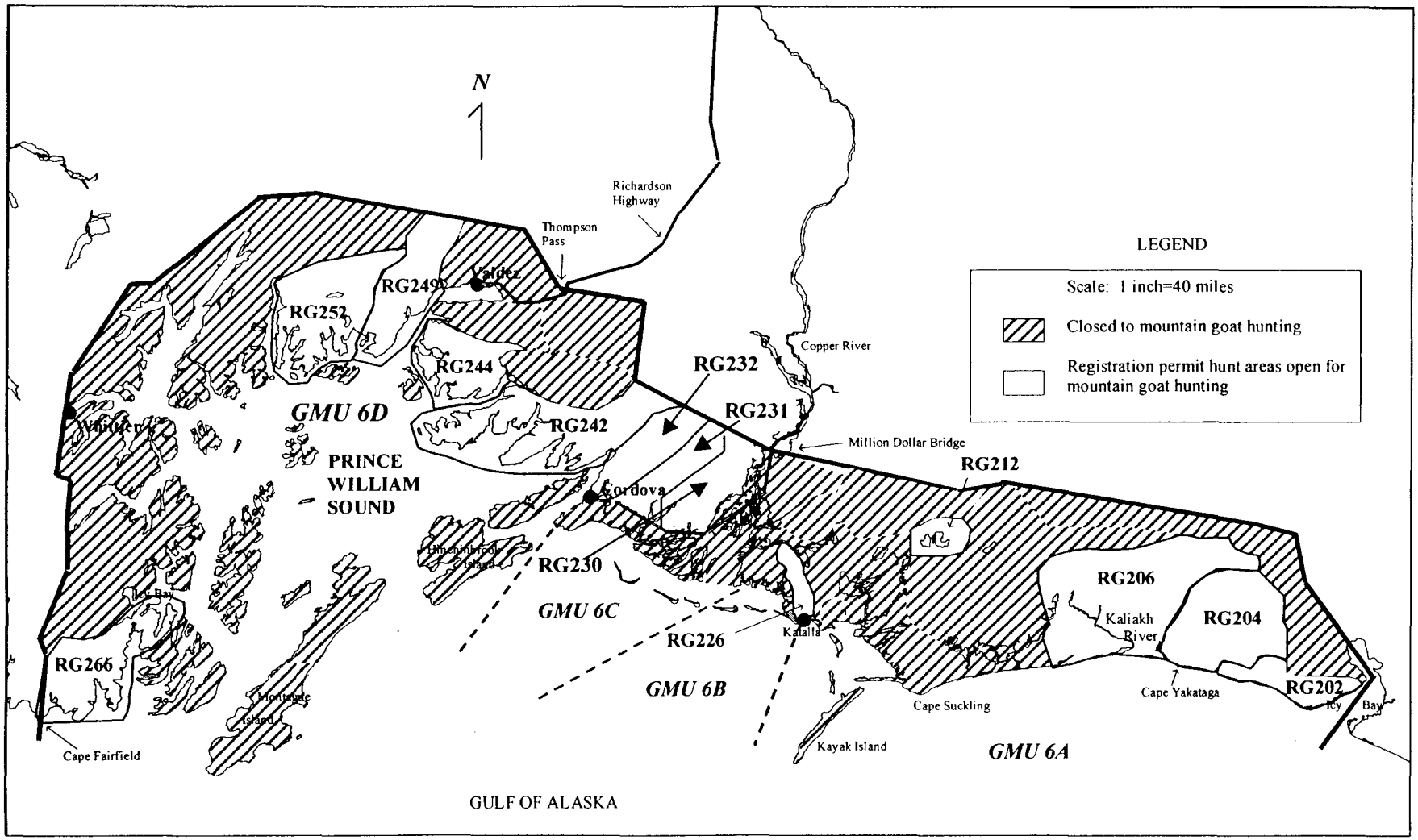

Figure 1 Unit 6 mountain goat registration permit hunts 1994 – 1998.

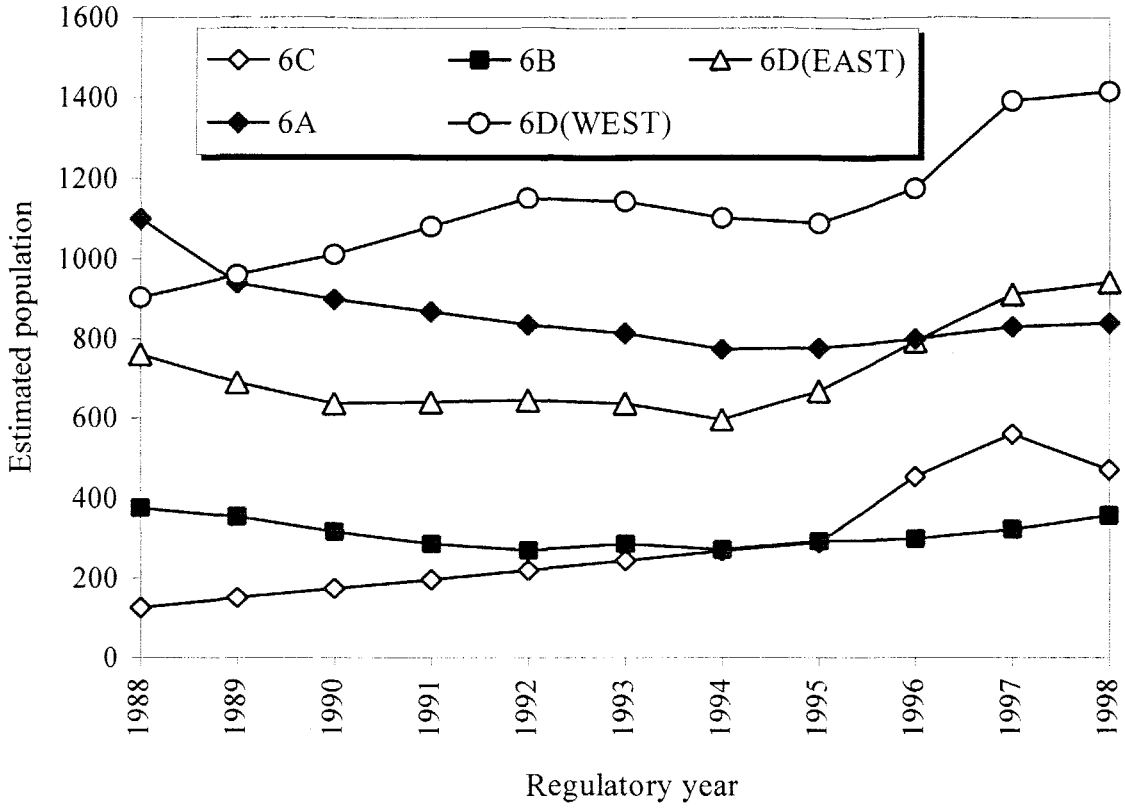

Figure 2 Unit 6 mountain goat estimated population size 1988-98.

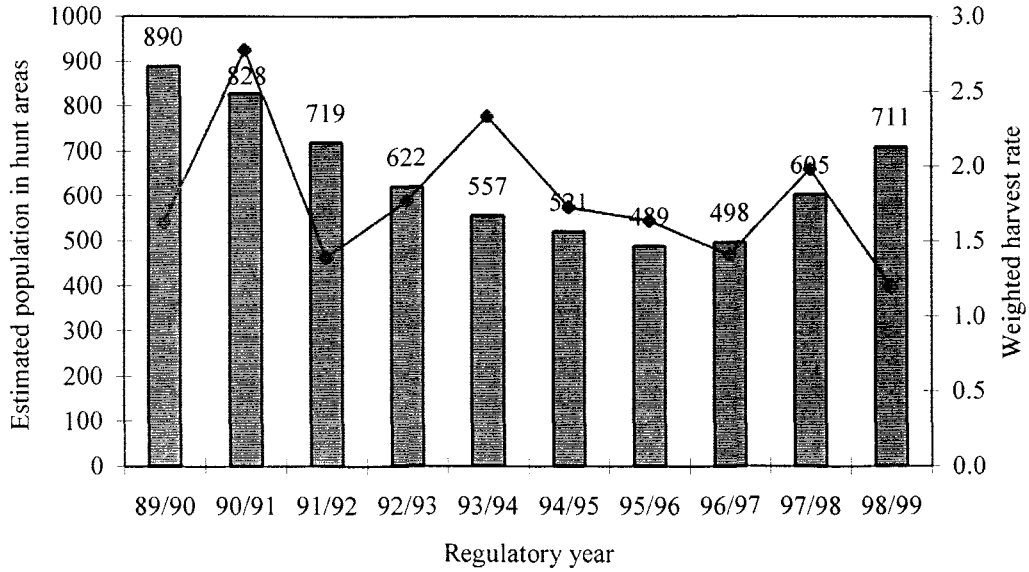

Figure 3 Estimated mountain goat populations and weighted harvest rate in permit hunt areas of Unit 6A, 1989-1998.

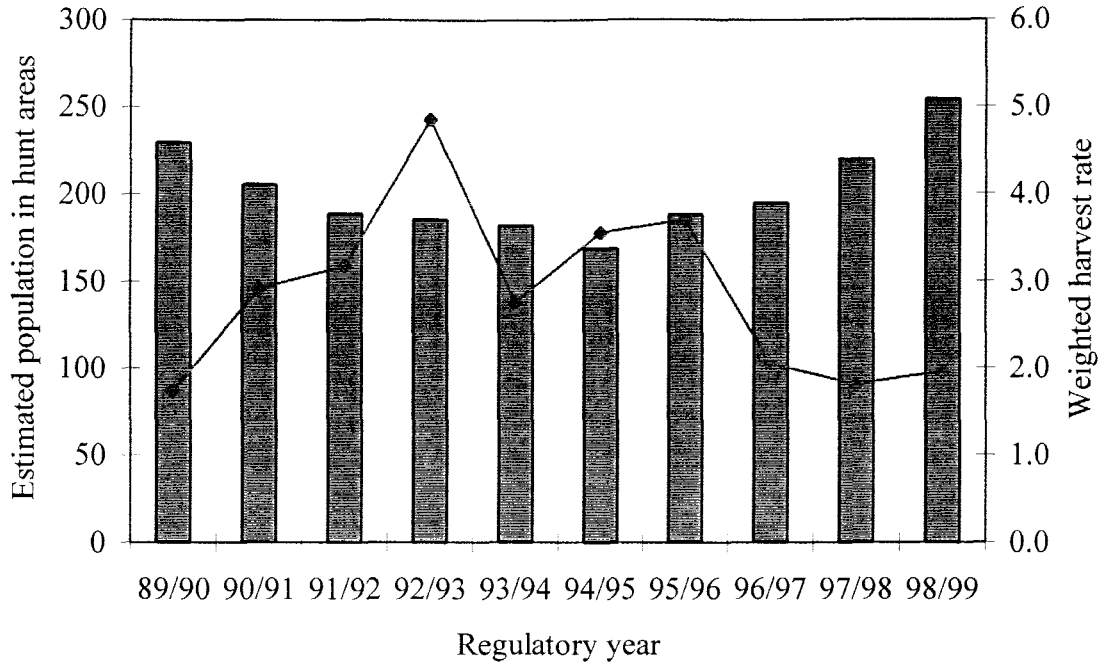

Figure 4 Estimated mountain goat populations and weighted harvest rate in permit hunt areas of Unit 6B, 1989-1998.

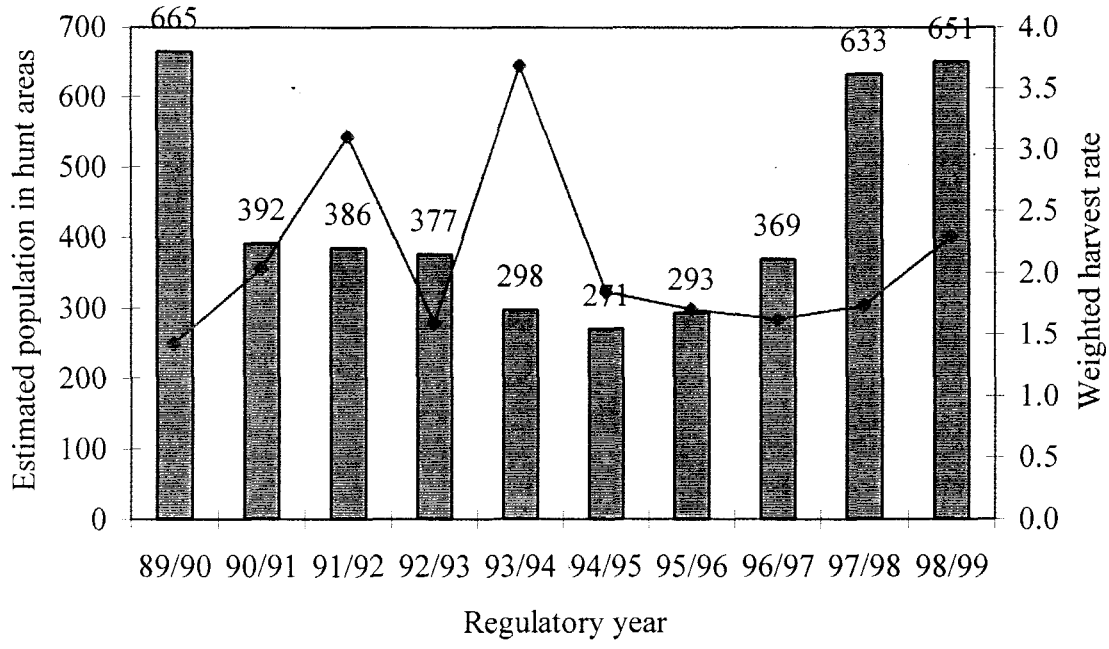

Figure 5 Unit 6D(East) mountain goat estimated population in permit hunt areas and weighted harvest rates 1989-98.

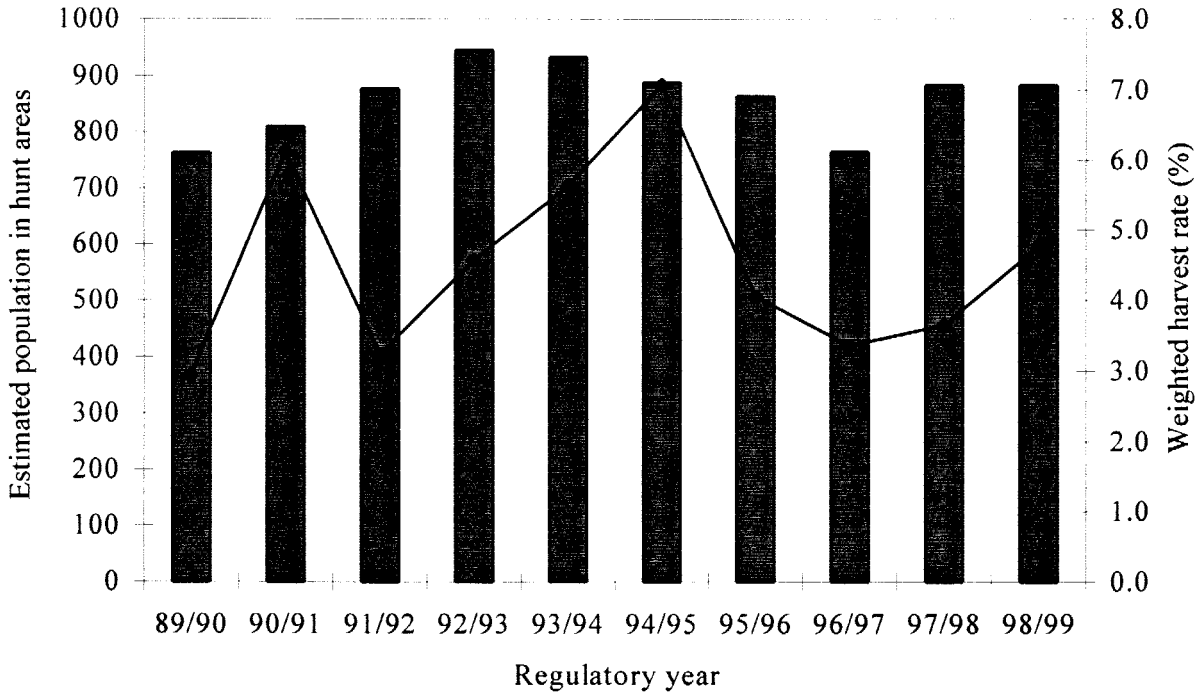

Figure 6 Unit 6D (West) mountain goat estimated population in permit hunt areas and weighted harvest rates 1986–96.

Table 1 Unit 6 summer/fall mountain goat composition counts and estimated population size, 1994–98

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG202	1994/95	--	--	--	--	--	--	--	102
		1995/96	FULL	77	(91)	8	(9)	10	85	94
		1996/97	--	--	--	--	--	--	--	93
		1997/98	--	--	--	--	--	--	--	93
		1998/99	FULL	62	(81)	15	(19)	24	77	92
	Brower	1994/95	--	--	--	--	--	--	--	46
	Ridge	1995/96	FULL	31	(84)	6	(16)	19	37	44
		1996/97	--	--	--	--	--	--	--	44
		1997/98	--	--	--	--	--	--	--	43
		1998/99	--	--	--	--	--	--	--	43
	RG204	1994/95	--	--	--	--	--	--	--	181
		1995/96	PARTIAL	110	(88)	15	(12)	14	125	155
		1996/97	--	--	--	--	--	--	--	170
		1997/98	--	--	--	--	--	--	--	185
		1998/99	PARTIAL	138	(85)	25	(15)	18	163	189
	RG206	1994/95	--	--	--	--	--	--	--	237
		1995/96	PARTIAL	32	(86)	5	(14)	16	37	240
		1996/97	--	--	--	--	--	--	--	234
		1997/98	PARTIAL	103	(90)	19	(16)	18	122	226
		1998/99	PARTIAL	55	(93)	14	(20)	25	69	225

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG212	1994/95	FULL	52	(88)	7	(12)	13	59	72
		1995/96	--	--	--	--	--	--	--	82
		1996/97	--	--	--	--	--	--	--	92
		1997/98	FULL	63	(73)	23	(27)	37	86	103
		1998/99	--	--	--	--	--	--	--	108
	RG214	1994/95	--	--	--	--	--	--	--	51
		1995/96	--	--	--	--	--	--	--	54
		1996/97	--	--	--	--	--	--	--	56
		1997/98	PARTIAL	13	(81)	3	(19)	23	19	61
		1998/99	--	--	--	--	--	--	--	64
	RG215	1994/95	FULL	51	(78)	14	(22)	27	65	72
		1995/96	FULL	72	(86)	12	(14)	17	84	92
		1996/97	--	--	--	--	--	--	--	96
		1997/98	FULL	65	(77)	19	(23)	29	84	101
		1998/99	--	--	--	--	--	--	--	105
	Suckling	1994/95	--	--	--	--	--	--	--	10
	Hills	1995/96	--	--	--	--	--	--	--	11
		1996/97	--	--	--	--	--	--	--	12
		1997/98	FULL	8	(62)	5	(38)	63	13	16
		1998/99	--	--	--	--	--	--	--	20

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A		1994/95	--	103	(83)	21	(17)	20	124	773
TOTAL		1995/96	--	322	(88)	46	(13)	14	368	776
		1996/97	--	--	--	--	--	--	--	799
		1997/98	--	252	(79)	69	(21)	27	321	829
		1998/99	--	255	(83)	54	(17)	21	309	847
6B	RG226	1994/95	FULL	103	(83)	21	(17)	20	124	149
		1995/96	--	--	--	--	--	--	--	157
		1996/97	FULL	112	(82)	25	(18)	16	137	151
		1997/98	--	--	--	--	--	--	--	158
		1998/99	FULL	135	(89)	16	(11)	12	151	181
	RG220	1994/95	--	--	--	--	--	--	--	20
		1995/96	--	--	--	--	--	--	--	32
		1996/97	--	--	--	--	--	--	--	44
		1997/98	FULL	44	(86)	7	(14)	16	51	61
		1998/99	--	--	--	--	--	--	--	73
	Goat Mt.	1994-1999	NONE	--	--	--	--	--	--	110
6B		1994/95	--	103	(83)	21	(17)	20	124	273
TOTAL		1995/96	--	--	--	--	--	--	--	294
		1996/97	--	112	(82)	25	(18)	22	137	301
		1997/98	--	44	(86)	7	(14)	16	51	327
		1998/99	--	135	(89)	16	(11)	12	151	363

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6C		1994/95	--	--	--	--	--	--	--	269
TOTAL		1995/96	FULL	206	(83)	41	(17)	20	247	290
		1996/97	PARTIAL	118	(78)	34	(22)	29	152	455
		1997/98	FULL	396	(82)	84	(18)	21	480	560
		1998/99	FULL	359	(91)	34	(9)	9	393	472
6D	RG242	1994/95	FULL	208	(85)	37	(15)	18	245	271
		1995/96	--	--	--	--	--	--	--	293
		1996/97	FULL	248	(78)	72	(23)	29	320	369
		1997/98	--	--	--	--	--	--	--	378
		1998/99	FULL	283	(85)	53	(15)	18	333	386
	RG243	1994/95	FULL	48	(86)	8	(14)	17	56	62
		1995/96	--	--	--	--	--	--	--	83
		1996/97	--	--	--	--	--	--	--	105
		1997/98	--	--	--	--	--	--	--	126
		1998/99	--	--	--	--	--	--	--	148
	RG244	1994/95	FULL	131	(83)	26	(17)	20	157	181
		1995/96	--	--	--	--	--	--	--	203
		1996/97	--	--	--	--	--	--	--	227
		1997/98	FULL	186	(83)	37	(17)	20	223	255
		1998/99	--	--	--	--	--	--	--	265

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D	RG245	1994/95	--	--	--	--	--	--	--	62
		1995/96	PARTIAL	12	(86)	2	(14)	17	14	62
		1996/97	--	--	--	--	--	--	--	65
		1997/98	PARTIAL	35	(81)	8	(19)	23	43	96
		1998/99	--	--	--	--	--	--	--	97
	Heiden Canyon	1994–1999	NONE	--	--	--	--	--	--	55
6D (East)		1994/95	--	387	(84)	71	(16)	16	458	598
TOTAL		1995/96	--	12	(86)	2	(14)	14	14	668
East of Valdez Port, Narrows and Arm		1996/97	--	248	(78)	72	(23)	23	320	793
		1997/98		221	(83)	45	(17)	17	266	912
		1998/99		283	(85)	50	(15)	15	333	952
6D	RG249	1994/95	--	--	--	--	--	--	--	352
		1995/96	FULL	232	(82)	52	(18)	22	284	325
		1996/97	--	--	--	--	--	--	--	406
		1997/98	FULL	347	(76)	109	(24)	31	456	502
		1998/99	--	--	--	--	--	--	--	500

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D	RG252	1994/95	--	--	--	--	--	--	--	188
		1995/96	--	--	--	--	--	--	--	212
		1996/97	FULL	161	(81)	38	(19)	24	199	239
		1997/98	--	--	--	--	--	--	--	291
		1998/99	FULL	249	(87)	37	(13)	30	286	315
	RG266	1994/95	--	--	--	--	--	--	--	348
		1995/96	FULL	236	(85)	42	(15)	18	278	326
		1996/97	--	--	--	--	--	--	--	358
		1997/98	FULL	264	(78)	76	(22)	29	340	382
		1998/99	--	--	--	--	--	--	--	390
6D (West)	Remainder	1994/95	--	--	--	--	--	--	--	213
Valdez, Sargent Icefield, Mt. Castner, Whittier, College Fiord		1995/96	--	--	--	--	--	--	--	225
		1996/97	PARTIAL	23	(72)	9	(28)	39	32	204
		1997/98	PARTIAL	8	(100)	0	(0)	0	8	220
		1998/99	--	--	--	--	--	--	--	220
6D (West)		1994/95	--	--	--	--	--	--	--	1102
TOTAL		1995/96	--	468	(83)	94	(17)	20	562	1089
West of Valdez Port, Narrows and Arm		1996/97	--	184	(80)	47	(20)	26	231	1176
		1997/98	--	619	(77)	185	(23)	30	804	1392
		1998/99	--	249	(87)	37	(13)	15	286	1415

Table 1 Continued

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6D		1994/95	--	387	(84)	71	(16)	18	458	1700
TOTAL		1995/96	--	480	(83)	96	(17)	20	576	1757
		1996/97	--	432	(78)	119	(22)	28	551	1970
		1997/98	--	840	(79)	230	(21)	27	1070	2304
		1998/99	--	532	(84)	87	(14)	16	619	2367
UNIT 6		1994/95	--	593	(84)	113	(16)	19	706	3016
TOTAL		1995/96	--	1008	(85)	183	(15)	18	1191	3117
		1996/97	--	662	(79)	178	(21)	27	840	3525
		1997/98	--	1532	(80)	390	(20)	25	1922	4021
		1998/99	--	1281	(87)	191	(13)	15	1472	4049

Table 2 Unit 6 mountain goat harvest data by permit hunt, 1994–98

Unit/ hunt	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsuccessful hunters	Percent unsuccessful hunters	Nr. successful hunters	Percent successful hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A/RG202	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
	1997/98	13	10	77	1	33	2	67	2	(100)	0	(0)	0	2	2	3
	1998/99	20	10	50	8	80	2	20	2	(100)	0	(0)	0	2	2	3
6A/RG204	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
	1997/98	7	4	57	1	33	2	67	2	(100)	0	(0)	0	2	2	4
	1998/99	8	3	38	3	60	2	40	1	(100)	0	(0)	1	2	3	4
6A/RG206	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
	1997/98	7	3	43	0	0	4	100	4	(100)	0	(0)	0	4	4	4
	1998/99	5	3	60	0	0	2	100	2	(100)	0	(0)	0	2	2	5
6A/RG212	1994/95	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	No Hunt	-		-	-	-	-	-	-	-	-	-	-	-	-
	1998/99	10	6	60	2	50	2	50	2	(100)	0	(0)	0	2	2	4
6A/RG215	1994/95	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1995/96	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1996/97	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	9	2		4		3		2	(67)	1	(33)	0	3	4	4
	1998/99	No Hunt	-		-		-		-		-		-	-	-	-

Table 2 Continued

Unit/ hunt	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	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
	1997/98	36	19	53	6	35	11	65	10	(91)	1	(9)	0	11	12	15
	1998/99	43	22	51	13	62	8	38	7	(100)	0	(0)	1	8	9	16
6B/RG220	1994-1998	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6B/RG226	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
	1997/98	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998/99	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
6B TOTAL	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
	1997/98	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998/99	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
6C/RG230	1998/99	7	0	0	2	29	5	71	3	(75)	1	(25)	1	5	7	6
6C/RG231	1997/98	12	0	0	2	17	10	83	8	(80)	2	(20)	0	10	12	14
	1998/99	8	1	13	2	29	5	71	4	(80)	1	(20)	0	5	6	8
6C/RG232	1997/98	4	0	0	0	0	4	100	2	(50)	2	(50)	0	4	6	6
	1998/99	6	1	17	4	80	1	20	0	(0)	1	(100)	0	1	2	6
6C TOTAL	1997/98	16	0	0	2	13	14	88	10	(71)	4	(29)	0	14	18	20
	1998/99	21	2	10	8	42	11	58	7	(70)	3	(30)	1	11	15	20

Table 2 Continued

Unit/ hunt	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/RG242	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
	1997/98	27	17	63	1	10	9	90	8	(89)	1	(11)	0	9	10	11
	1998/99	29	14	48	6	40	9	60	6	(67)	3	(33)	0	9	12	13
6D/RG244	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
	1997/98	13	10	77	3	100	0	0	0	-	0	-	0	0	0	12
	1998/99	15	8	53	5	71	2	29	1	(50)	1	(50)	0	2	3	12
6D/RG245	1994-1998	No Hunt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6D (EAST) TOTAL	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
	1997/98	40	27	68	4	31	9	69	8	(89)	1	(11)	0	9	10	23
	1998/99	44	22	50	11	50	11	50	7	(64)	4	(36)	0	11	15	25
6D/RG249	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
	1997/98	66	29	44	16	43	21	57	20	(95)	1	(5)	0	21	22	25
	1998/99	55	21	38	8	24	26	76	25	(96)	1	(4)	0	26	27	25
6D/RG252	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997/98	21	14	67	4	57	3	43	3	(100)	0	(0)	0	3	3	10
	1998/99	32	23	72	4	44	5	56	4	(80)	1	(20)	0	5	6	10

Table 2 Continued

Unit/ hunt	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/RG266	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
	1997/98	52	36	69	11	69	5	31	3	(60)	2	(40)	0	5	7	16
	1998/99	62	35	56	18	67	9	33	7	(78)	2	(22)	0	9	11	16
6D (WEST)	1994/95	140	56	40	49	58	35	42	21	(60)	14	(40)	0	35	49	45
TOTAL	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
	1997/98	139	79	57	31	52	29	48	26	(90)	3	(10)	0	29	32	51
	1998/99	149	79	53	30	43	40	57	36	(90)	4	(10)	0	40	44	51
6D TOTAL	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
	1997/98	179	106	59	35	48	38	52	34	(89)	4	(11)	0	38	42	74
	1998/99	193	101	52	41	45	51	55	43	(84)	8	(16)	0	51	59	76
UNIT 6	1994/95	202	85	42	64	55	53	45	37	(70)	16	(30)	0	53	69	74
TOTAL	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
	1997/98	242	130	54	45	40	67	60	58	(87)	9	(13)	0	67	76	114
	1998/99	268	129	48	64	46	75	54	62	(85)	11	(15)	2	75	88	117

[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.

Table 3 Unit 6 mountain goat hunter residency and success, 1994–98

		Successful					Unsuccessful					
Unit	Regulatory year	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
6A	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
	1997/98	0	0	11	11	(61)	0	4	3	7	(39)	18
	1998/99	1	0	7	8	(38)	8	1	4	13	(62)	21
6B	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
	1997/98	0	1	3	4	(80)	0	1	0	1	(20)	5
	1998/99	0	0	5	5	(71)	0	1	1	2	(29)	7
6C	1997/98	13	1	0	14	(88)	2	0	0	2	(13)	16
	1998/99	10	1	0	11	(58)	8	0	0	8	(42)	19
6D	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
	1997/98	13	20	5	38	(52)	15	20	0	35	(48)	73
	1998/99	8	32	9	51	(54)	10	24	7	43	(46)	94
Unit 6 Total	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
	1997/98	26	22	19	67	(60)	17	25	3	45	(40)	112
	1998/99	19	33	21	75	(53)	26	26	12	64	(45)	141

Table 4 Unit 6 mountain goat harvest chronology percent by time period, 1994–98

Unit	Regulatory year	Harvest Periods						*n*
		August	September	October	November	December	January	
6A	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
	1997/98	9	55	36	0	0	0	11
	1998/99	0	63	38	0	0	0	8
6B	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
	1997/98	50	25	25	0	0	0	4
	1998/99	80	20	0	0	0	0	5
6C	1997/98	0	0	93	7	0	0	14
	1998/99	0	0	73	27	0	0	11
6D	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
	1997/98	0	42	50	8	0	0	38
	1998/99	0	35	57	2	2	4	51
Unit 6	1994/95	8	32	57	2	2	0	53
Total	1995/96	23	42	33	2	0	0	43
	1996/97	54	37	9	0	0	0	35
	1997/98	6	43	55	6	0	0	67
	1998/99	6	38	53	5	2	3	75

Table 5 Unit 6 mountain goat harvest percent by transport method, 1994–98

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*
6A	1994/95	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1995/96	8	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	8
	1996/97	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1997/98	15	(88)	2	(12)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	17
	1998/99	13	(62)	0	(0)	2	(10)	1	(5)	4	(19)	0	(0)	1	(5)	21
6B	1994/95	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	1995/96	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1996/97	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
	1997/98	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	1998/99	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
6C	1997/98	1	(6)	1	(6)	2	(13)	0	(0)	0	(0)	11	(69)	1	(6)	16
	1998/99	0	(0)	0	(0)	1	(5)	0	(0)	0	(0)	17	(89)	1	(5)	19
6D	1994/95	17	(43)	23	(58)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	40
	1995/96	12	(43)	16	(57)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	28
	1996/97	12	(50)	12	(50)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	24
	1997/98	22	(30)	47	(64)	0	(0)	0	(0)	1	(1)	0	(0)	3	(4)	73
	1998/99	42	(46)	50	(54)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	92

Table 5 Continued

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*
UNIT 6	1994/95	30	(57)	23	(43)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	53
TOTAL	1995/96	27	(63)	16	(37)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	43
	1996/97	23	(66)	12	(34)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	35
	1997/98	44	(39)	50	(45)	2	(2)	0	(0)	1	(1)	11	(10)	4	(4)	112
	1998/99	62	(45)	50	(36)	3	(2)	1	(1)	4	(3)	17	(12)	2	(1)	139

LOCATION

GAME MANAGEMENT UNIT: 7 and 15 (8397 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. 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, which was reviewed by Del Frate and Spraker (1994).

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 and the need to reduce fire danger 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 that may affect mountain goat winter habitat.

Backcountry recreation may be one of the fastest growing winter sports activities that may affect goats in the future. Technological advances in snowmachine design have made it easier for riders to access more and steeper terrain that may be in or near adjacent mountain goat habitat. More snowmachine enthusiasts are accessing and exploring the backcountry with these bigger and better machines. Private and commercial backcountry ski tours are also on the increase. While most skiers restrict their activities to day-trips from the existing highways alternative transportation is provided by the Alaska Railroad and by helicopter tours. One helicopter business has recently established operations on the Kenai Peninsula. Temporary permits were issued for both 1997 and 1998 to transport skiers to remote areas (Chugach National Forest Environmental Assessment 1999). The operator has submitted a 5-year permit application to increase its operation to 11 zones encompassing 368,400 acres of peninsula lands near Girdwood.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

To maintain a population of 4000–4500 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. Cool temperatures, light wind and a high overcast cloud cover characterize optimum counting conditions. 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.

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.

Goat harvest on the Kenai Peninsula is managed through a system of permit hunts. Harvest quotas are set and adjusted, based on the number of goats we observed in each hunt area during the most recent survey. The number of drawing permits issued for each area is limited based on previous success rates and experience and set, attempting to meet but not exceed the quota. At the end of the drawing season, we determine if any areas have unfilled quotas and can be reopened to an unlimited registration permit hunt. The registration permits are valid for a seven-day period. Areas are only opened to registration permit hunting if the remaining portion of the harvest quota is large enough that there is little chance of overharvest. Recently the Board of Game authorized the department to issue archery only registration permits for areas where the quota had not been reached but the threat of overharvest was too great if opened to all weapon types. Emergency orders to close these registration hunts are issued when harvest goals are reached.

Subsistence harvest is allowed in only two hunt areas under the State's subsistence program. We manage these hunts similar to the above general seasons. Tier II subsistence permits were allocated to achieve the harvest goal. If the quota has not been reached then Tier I registration permits (Alaska residents only) are issued.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We observed 2772 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 3880 (90% observability) to 4960 goats (70% observability) inhabit the Kenai Peninsula. Goat populations have declined approximately 10% 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, steadily increased to at least 458 goats by 1983 (Table 1) then stabilized around 393 goats during the early 1990s. Although no recent surveys have been completed we suspect this region's population has experienced similar declines.

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 and possibly competition with Dall sheep. The goat population in this area declined in the mid-1970s but increased through 1992 but then declined and stabilized (Table 1).

Kachemak Bay. The quality of habitat and goat abundance in the upper Kachemak Bay trend area was 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 each of the 3 areas between 1996 and1998 (Table 2). These areas indicated a substantial decline in Kachemak Bay goats from the population high in 1992. Winter weather is suspected as the primary cause for the decline.

Population Composition

In 1997 we surveyed 11 count areas and tallied 860 goats with 24% kids (Table 2). In 1998 we counted 722 goats in 8 count areas with 20% kids.

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 for all areas.

Board of Game Actions and Emergency Orders. The Board of Game increased the maximum number of permits the department could issue to 500 during the fall 1992 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 also approved the

department's plans to allow archery-only hunts during the late fall registration season. Archery hunts 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 refused to allow the public access so only state lands were opened in Hunt area DG351.

Registration permit hunts are managed for the remainder of the harvestable quota. When the quotas were reached, emergency orders were issued closing the respective hunt areas. In 1997 Two emergency orders were issued: on October 23 RG333, 345, 346 and 352 were closed, on October 31 RG339, 361, and 365 were closed. In 1998 two emergency orders were issued on October 27 (RG333, 346, and 365) and November 21 (RG334 and 340).

Hunter Harvest. Hunters harvested 134 goats on the Kenai Peninsula in 1997. Drawing permittees killed 79 goats (56 males, 22 females, and 1 unspecified sex) throughout 26 hunt areas (Table 5). Permittees harvested 46 goats (30 males, and 16 females) from 16 hunt areas during the registration permit hunt (Table 6). Subsistence hunters harvested 6 billy and 3 nanny goats in the 2 Tier II subsistence hunts (Table 7).

Hunters harvested 113 goats on the Kenai Peninsula in 1998. Drawing permittees killed 73 goats (51 males, 22 females) throughout 26 hunt areas (Table 8). Permittees harvested 36 goats (23 males, 12 females and one unspecified sex) from 101 hunt areas during the registration permit hunt (Table 9). Subsistence hunters harvested 3 billy and 1 nanny 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 2% of total hunters in both 1997 and 1998 (Tables 13 & 14). However, nonresidents usually had high success rates because of guiding requirements. The overall success rate of nonresidents was 40% and 60% for 1997 and 1998, respectively. For the years 1992-1998 the average success rate for drawing permit hunters was 37.7%. For registration permit hunters the average success rate was 24.2%. The lower than normal success rate for registration permit hunters (15%) in 1998 was due to poor weather conditions throughout this season.

Harvest Chronology. Drawing permittees harvested a higher proportion of goats during the last part of September in 1997 and the first part of the season in 1998 (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 of the start of the registration period.

Transport Methods. Transportation methods varied between game management units because of accessibility. In 1997 successful hunters in Unit 7 used highway vehicles (47%), boats (36%), and aircraft (11%) (Table 16). In Unit 15 successful hunters used aircraft (59%), boats (36%), and horses (2%) (Table 17). All other transportation methods were less than 2%.

In 1998 the transportation types used were similar to the previous year. Successful hunters in Unit 7 used highway vehicles (38%), boats (38%), aircraft (18%), and 4-wheeler (3%) (Table 16). In Unit 15 successful hunters used aircraft (52%) boats (45%) and horse (3%) (Table 17).

HABITAT

Spruce bark beetles have infested much of the Kenai Peninsula. The infestation affects primarily white spruce (*Picea glauca*) and Lutz spruce (*Picea* x *lutzii*) 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 observed 2772 goats on the Kenai Peninsula, excluding KFNP. An estimated 800 to 1000 goats inhabited the KFNP. Excluding KFNP, we estimated between 3080 (assuming 90% observability) and (assuming 70% observability) 3960 goats inhabited the Kenai Peninsula. Even though the goat population has declined we met our management objective of maintaining 4000 to 4500 mountain goats on the Kenai Peninsula.

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. We do not recommend any changes in goat harvest management on the Kenai Peninsula at this time.

Winter recreation continues to gain popularity on the Kenai Peninsula. It is unclear how these backcountry users affect goat distribution or behavior. We recommend that ADF&G coordinate with federal land managers and address this issue.

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 1968–99

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	36.6	26.8	127	-01
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, 1994–98

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG331	1994/95[a]	--	--	--	--	--	--	--
	1995/96	42	14		33	56		56
	1996/97[a]	--	--	--	--	--	--	--
	1997/98[a]	--	--	--	--	--	--	--
	1998/99	41	8	--	20	49	--	49
DG332	1994/95[a]	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--
	1996/97	17	7		41	24		24
	1997/98[a]	--	--	--	--	--	--	--
	1998/99	57	16	--	28	73	--	73
DG333	1994/95	89	23	--	26	112	--	112
	1995/96[a]	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--
	1997/98	135	41	--	30	176	--	176
	1998/99[a]	--	--	--	--	--	--	--
DG334	1994/95	67	24	--	36	91	--	91
	1995/96	--	--	--	--	--	--	114[f]
	1996/97	--	--	--	--	--	--	--
	1997/98	83	24	--	29	107	--	107
	1998/99[a]	--	--	--	--	--	--	--
DG335	1994/95	63	19	--	30	82	--	82
	1995/96[a]	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--
	1997/98[b]	27	5	--	19	32	--	32
	1998/99[a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG336	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	132	46	--	35	178	--	178
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG337	1994/95	12	1	--	8	13	--	13
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	16	3	--	19	19	--	19
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG338	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	14	2	--	14	16	--	16
	1996/97	7	1	--	14	8	--	8
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG339	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	106	23	--	22	129	--	129
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG340	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	64	21	--	33	85	--	85
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG341	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	39	14	--	36	53	--	53
	1996/97	36	17	--	47	53	--	53
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG342	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [b]	57	20	--	35	77	--	77
	1998/99 [a]	--	--	--	--	--	--	--
DG343	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	58	16	--	28	74	--	74
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG344	1994/95	53	13	0	25	66	--	66
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG345	1994/95	146	25	0	17	171	--	171
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG346	1994/95	180	42	0	23	222	--	222
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	166	52	--	31	218	--	218
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG347	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG348	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG349	1994/95 [a]	--	--	--	--	--	--	31
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG350	1994/95 [a]	--	--	--	--	--	--	222
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG351	1994/95 [a]	--	--	--	--	--	--	335
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [c]	17	10	--	59	27	--	27
	1998/99 [a]	--	--	--	--	--	--	--
DG352	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99	137	32	--	23	169	--	169
DG353	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	0	0	--	--	0	--	0
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG354	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	35	8	--	23	43	--	43
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG355	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	21	6	--	29	27	--	27
	1998/99 [a]	--	--	--	--	--	--	--

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG356	1994/95	34	4	0	12	38	--	38
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	35	17	--	49	52	--	52
	1998/99	27	9	--	33	36	--	36
DG357	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	39	12	--	30	51	--	51
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	37	11	--	30	48	--	48
	1998/99 [a]	--	--	--	--	--	--	--
DG358	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97	40	16	--	40	56	--	56
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99 [a]	--	--	--	--	--	--	--
DG359	1994/95	75	17	0	23	92	--	92
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99	39	7	--	18	46	--	46
DG360	1994/95	138	31	0	22	169	--	169
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [c]	35	14	--	40	49	--	49
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99	96	26	--	27	122	--	122

Table 2 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG361	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	48	13	--	27	61	--	61
	1998/99 [a]	--	--	--	--	--	--	--
DG362	1994/95 [a]	--	--	--	--	--	--	--
	1995/96	110	45	--	41	155	--	155
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99	88	20	--	23	108	--	108
DG363	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	150	51	--	34	201	--	201
	1998/99 [a]	--	--	--	--	--	--	--
DG364	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98	45	7	--	16	52	--	52
	1998/99 [a]	--	--	--	--	--	--	--
DG365	1994/95 [a]	--	--	--	--	--	--	--
	1995/96 [a]	--	--	--	--	--	--	--
	1996/97 [a]	--	--	--	--	--	--	--
	1997/98 [a]	--	--	--	--	--	--	--
	1998/99	93	26	--	28	119	--	119

[a]No survey.
[b]Poor count.
[c]Partial count.

Table 3 Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1984–98

Year	Season Dates	Nr. Permits Issued	Nr. Hunters	Percent Success	Harvest			Total
					M	F	U	
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
1997	10 Aug. - 30 Sept.	385	208	38	56	22	1	79
1998	10 Aug. - 30 Sept.	444	236	31	51	22		73
Total					658	314	7	979

Table 4 Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984–98

Year	Season Dates	Permits Issued	Nr. Hunters	Percent Success	Harvest			Total
					M	F	U	
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
1997	15 Oct. - 30 Nov.	321	192	24	30	16	0	46
1998	15 Oct. - 30 Nov.	433	244	15	23	12	1	36
Total					568	315	15	898

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

Table 5 Kenai Peninsula mountain goat drawing permit hunt summary, 1997[a]

Hunt area	Permits issued	Nr. of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	3	3	67	1	1		2
DG333	20	11	9	1	0		1
DG334	8	6	100	4	2		6
DG335	10	8	50	2	2		4
DG336[b]	25	16	19	2	1		3
DG339	15	15	33	4	1		5
DG340[c]	25	11	9	1	0		1
DG341	6	6	83	1	4		5
DG342	14	11	36	2	2		4
DG343	8	7	71	4	1		5
DG344	16	7	29	2	0		2
DG345[b]	42	20	25	4	1		5
DG346[c]	42	22	27	6	0		6
DG347	20	12	58	3	4		7
DG351	8	0	0	0	0		0
DG352[b]	25	11	36	1	3		4
DG354[b]	10	4	50	2	0		2
DG355	4	1	0	0	0		0
DG356	5	1	100	1	0		1
DG357	10	5	0	0	0		0
DG358[c]	12	5	100	4	1		5
DG359	20	9	67	4	2		6
DG360	30	11	27	3	0		3
DG361	20	7	14	1	0		1
DG362	20	10	40	4	0		4
DG363	30	11	45	2	2	1	5
Totals	385	208	38	56	22	1	79

[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, 1997[a]

Hunt area	Permits issued	Nr. of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG333[b]	67	48	13%	4	2		6
RG336	40	14	7%	1	0		1
RG339[c]	23	14	14%	0	2		2
RG340	11	5	60%	3	0		3
RG344[d]	1	1	100%	0	1		1
RG345[b]	7	6	67%	3	1		4
RG346[b]	58	35	31%	8	3		11
RG352[b]	8	5	60%	1	2		3
RG355	2	2	0%	0	0		0
RG356	1	1	0%	0	0		0
RG357[c]	1	0	0%	0	0		0
RG360[c]	22	10	10%	1	0		1
RG361[c]	7	4	50%	1	1		2
RG362	35	20	5%	0	1		1
RG363	24	16	19%	3	0		3
RG365[ce]	14	11	73%	5	3		8
Totals	321	192	24%	30	16	0	46

[a]Season Dates: 15 October - 30 November.
[b]Hunt areas RG333, RG345, RG346 and RG352 closed by emergency order October 23, 1997.
[c]Hunt areas RG339, RG361 and RG365 closed by emergency order October 31, 1997.
[d]Permit for hunt RG344 issued by mistake in Anchorage. Hunt was not open.
[e]Limited to residents of Alaska.

Table 7 Kenai Peninsula subsistence harvest, 1986–98

Year	Season Dates	Nr. Permits Issued	Nr. Hunters	Percent Success	Harvest			
					M	F	U	Total
1986	6 Sep–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 Sep–18 Dec				1	4		5
1991[c]	1 Aug–30 Sep	94	42	31	13	0		13
1992[c]	1 Aug–30 Sep	94	53	45	19	5		24
1993	1 Aug–30 Sep	50	27	22	5	1		6
1994	1 Aug–30 Sep	105	66	41	21	6		27
1995	1 Aug– 30 Sep	50	23	30	4	3		7
1996	1 Aug–30 Sep	46	21	29	6	0		6
1997	1 Aug–30 Sep	46	31	29	6	3		9
1998	1 Aug–30 Sep	46	20	20	3	1		4
Total					80	26	3	113

[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, 1998[a]

Hunt area	Permits issued	No. of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
DG331	3	3	100%	2	1		3
DG333	25	19	32%	4	2		6
DG334	6	4	25%	1	0		1
DG335	10	7	29%	1	1		2
DG336[b]	30	16	31%	4	1		5
DG339	15	13	15%	2	0		2
DG340[b]	30	13	15%	1	1		2
DG341[b]	4	2	50%	0	1		1
DG342	12	9	11%	0	1		1
DG343	6	5	40%	2	0		2
DG344	16	13	38%	3	2		5
DG345[b]	40	12	33%	3	1		4
DG346[c]	40	17	24%	3	1		4
DG347	20	15	33%	5	0		5
DG351	4	3	33%	1	0		1
DG352	25	13	54%	2	5		7
DG354	10	3	0%	0	0		0
DG355	4	4	25%	0	1		1
DG356	6	5	0%	0	0		0
DG357	10	6	33%	2	0		2
DG358	10	2	50%	1	0		1
DG359	16	9	0%	0	0		0
DG360[b]	30	12	33%	2	2		4
DG361	20	6	17%	1	0		1
DG362[b]	22	9	44%	4	0		4
DG363[b]	30	16	56%	7	2		9
Totals	444	236	31%	51	22	0	73

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

Table 9 Kenai Peninsula mountain goat registration permit hunt summary, 1998[a]

Hunt area	Permits issued	Nr. of hunters	Percent success	Harvest			Total
				Male	Female	Unknown	
RG333[b]	81	51	6	3	0		3
RG334[c]	80	54	9	3	2		5
RG336	79	35	6	2	0		2
RG339	30	18	0	0	0		0
RG340[c]	3	2	100	2	0		2
RG345	25	7	29	1	1		2
RG346[b]	89	54	24	7	5	1	13
RG354	6	3	33	1	0		1
RG361	22	11	9	1	0		1
RG365[b d]	18	9	78	3	4		7
Totals	433	244	15	23	12	1	36

[a] Season Dates: 15 October - 30 November.
[b]Hunt areas RG333, RG346 and RG365 closed by emergency order October 27, 1998.
[c]Hunt areas RG334 and RG340 closed by emergency order November 21, 1998.
[d]Limited to residents of Alaska. Only a portion of the hunt area was opened.

Table 10 Units 7 & 15 mountain goat harvest data by drawing permit hunt, 1994–98

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG331	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
	1997/98	3	0	33	67	1	1	--	--	2
	1998/99	3	0	0	100	2	1	--	--	3
DG332	1994/95	0	--	--	--	--	--	--	--	--
	1995/96	0	--	--	--	--	--	--	--	--
	1996/97	0	--	--	--	--	--	--	--	--
	1997/98	0	--	--	--	--	--	--	--	--
	1998/99	0	--	--	--	--	--	--	--	--
DG333	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
	1997/98	20	45	91	9	1	0	--	--	1
	1998/99	25	24	68	32	4	2	--	--	6
DG334	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
	1997/98	8	25	0	100	4	2	--	--	6
	1998/99	6	33	75	25	1	0	--	--	1
DG335	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
	1997/98	10	20	50	50	2	2	--	--	4
	1998/99	10	30	71	29	1	1	--	--	2

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	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
	1997/98	25	36	81	19	2	1	--	--	3
	1998/99	30	47	69	31	4	1	--	--	5
DG337	1994/95	2	50	100	0	0	0	--	--	0
	1995/96	--	--	--	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--	--	--	--
	1997/98	--	--	--	--	--	--	--	--	--
	1998/99	--	--	--	--	--	--	--	--	--
DG338	1994/95	2	50	100	0	0	0	--	--	0
	1995/96	2	50	0	100	0	1	--	--	1
	1996/97	--	--	--	--	--	--	--	--	--
	1997/98	--	--	--	--	--	--	--	--	--
	1998/99	--	--	--	--	--	--	--	--	--
DG339	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
	1997/98	15	0	67	33	4	1	--	--	5
	1998/99	15	13	85	15	2	0	--	--	2
DG340	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
	1997/98	25	56	91	9	1	0	--	--	1
	1998/99	30	57	85	15	1	1	--	--	2

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	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
	1997/98	6	0	17	83	1	4	--	--	5
	1998/99	4	50	50	50	0	1	--	--	1
DG342	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
	1997/98	14	21	64	36	2	2	--	--	4
	1998/99	12	25	89	11	0	1	--	--	1
DG343	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
	1997/98	8	12	29	71	4	1	--	--	5
	1998/99	6	17	60	40	2	0	--	--	2
DG344	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
	1997/98	16	56	71	29	2	0	--	--	2
	1998/99	16	19	62	38	3	2	--	--	5
DG345	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
	1997/98	42	52	75	25	4	1	--	--	5
	1998/99	40	70	67	33	3	1	--	--	4

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	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
	1997/98	42	48	73	27	6	0	--	--	6
	1998/99	40	58	76	24	3	1	--	--	4
DG347	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
	1997/98	20	40	42	58	3	4	--	--	7
	1998/99	20	25	67	33	5	0	--	--	5
DG351	1994/95	--	--	--	--	--	--	--	--	--
	1995/96	--	--	--	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--	--	--	--
	1997/98	8	100	0	0	0	0	--	--	0
	1998/99	4	25	67	33	1	0	--	--	1
DG352	1994/95[a]	--	--	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	25	40	60	40	5	1	--	--	6
	1997/98	25	56	64	36	1	3	--	--	4
	1998/99	25	48	46	54	2	5	--	--	7
DG354	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
	1997/98	10	60	50	50	2	0	--	--	2
	1998/99	10	70	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
DG355	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
	1997/98	4	75	100	0	0	0	--	--	0
	1998/99	4	0	75	25	0	1	--	--	1
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
	1997/98	5	80	0	100	1	0	--	--	1
	1998/99	6	17	100	0	0	0	--	--	0
DG357	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
	1997/98	10	50	100	0	0	0	--	--	0
	1998/99	10	40	67	33	2	0	--	--	2
DG358	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
	1997/98	12	58	0	100	4	1	--	--	5
	1998/99	10	80	50	50	1	0	--	--	1
DG359	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
	1997/98	20	55	33	67	4	2	--	--	6
	1998/99	16	44	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
DG360	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
	1997/98	30	63	73	27	3	0	--	--	3
	1998/99	30	60	67	33	2	2	--	--	4
DG361	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
	1997/98	20	65	86	14	1	0	--	--	1
	1998/99	20	70	83	17	1	0	--	--	1
DG362	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
	1997/98	20	50	60	40	4	0	--	--	4
	1998/99	22	50	66	44	4	0	--	--	4
DG363	1994/95[a]	0	--	--	--	--	--	--	--	--
	1995/96[a]	0	--	--	--	--	--	--	--	--
	1996/97	30	57	15	85	9	2	--	--	11
	1997/98	30	63	55	45	2	2	1	--	5
	1998/99	30	47	44	56	7	2	--	--	9

[a] Subsistence season.

Table 11 Units 7 & 15 mountain goat harvest data by registration permit hunt, 1994–98

Hunt Nr. /Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG333	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
	1997/98	67	28	87	13	4	2	--	--	6
	1998/99	81	37	94	6	3	0	--	--	3
RG334	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97[a]	0	--	--	--	--	--	--	--	0
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[b]	80	33	91	9	3	2	--	--	5
RG335	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97	52	62	90	10	1	1	--	--	2
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	0	--	--	--	--	--	--	--	0
RG336	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
	1997/98	40	65	93	7	1	0	--	--	1
	1998/99	79	56	94	6	2	0	--	--	2
RG339	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97[a]	0	--	--	--	--	--	--	--	0
	1997/98[b]	23	39	86	14	0	2	--	--	2
	1998/99[b]	30	40	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
RG340	1994/95[c]	0	--	--	--	--	--	--	--	0
	1995/96	9	78	50	50	0	1	--	--	1
	1996/97	8	88	100	0	0	0	--	--	0
	1997/98	11	55	40	60	3	0	--	--	3
	1998/99	3	33	0	100	2	0	--	--	2
RG344	1994/95	50	42	90	10	3	0	--	--	3
	1995/96[a]	0	--	--	--	--	--	--	--	0
	1996/97[a]	0	--	--	--	--	--	--	--	0
	1997/98[d]	1	0	0	100	0	1	--	--	1
	1998/99[a]	0	--	--	--	--	--	--	--	0
RG345	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
	1997/98	7	14	33	67	3	1	--	--	4
	1998/99	25	72	71	29	1	1	--	--	2
RG346	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
	1997/98	58	40	69	31	8	3	--	--	11
	1998/99	89	39	76	24	7	5	1	--	13
RG347	1994/95	30	43	76	24	1	3	--	--	4
	1995/96	40	28	72	28	4	3	1	--	8
	1996/97[a]	0	--	--	--	--	--	--	--	0
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	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
RG352	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
	1997/98	8	38	40	60	1	2	--	--	3
	1998/99 [a]	0	--	--	--	--	--	--	--	0
RG354	1994/95	25	40	93	7	1	0	--	--	1
	1995/96	38	45	81	19	2	2	--	--	4
	1996/97 [a]	--	--	--	--	--	--	--	--	--
	1997/98 [a]	0	--	--	--	--	--	--	--	0
	1998/99	6	50	67	33	1	0	--	--	1
RG355	1994/95 [a]	0	--	--	--	--	--	--	--	0
	1995/96 [a]	0	--	--	--	--	--	--	--	0
	1996/97 [a]	0	--	--	--	--	--	--	--	0
	1997/98 [c]	2	0	100	0	0	0	--	--	0
	1998/99 [a]	0	--	--	--	--	--	--	--	0
RG356	1994/95 [a]	0	--	--	--	--	--	--	--	0
	1995/96 [a]	0	--	--	--	--	--	--	--	0
	1996/97 [a]	0	--	--	--	--	--	--	--	0
	1997/98 [c]	1	0	100	0	0	0	--	--	0
	1998/99 [a]	0	--	--	--	--	--	--	--	0
RG357	1994/95 [a]	0	--	--	--	--	--	--	--	0
	1995/96 [a]	0	--	--	--	--	--	--	--	0
	1996/97 [a]	0	--	--	--	--	--	--	--	0
	1997/98 [c]	1	100	0	0	0	0	--	--	0
	1998/99 [a]	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
RG358	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96	16	50	13	87	5	2	--	--	7
	1996/97[a]	0	--	--	--	--	--	--	--	0
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	0	--	--	--	--	--	--	--	0
RG359	1994/95	16	25	75	25	3	0	--	--	3
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--	--	--
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	0	--	--	--	--	--	--	--	0
RG360	1994/95	22	45	50	50	2	4	--	--	6
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97[a]	--	--	--	--	--	--	--	--	--
	1997/98	22	55	90	10	1	0	--	--	1
	1998/99[a]	0	--	--	--	--	--	--	--	0
RG361	1994/95	8	50	50	50	2	0	--	--	2
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	13	46	71	29	2	0	--	--	2
	1997/98	7	43	50	50	1	1	--	--	2
	1998/99	22	50	91	9	1	0	--	--	1
RG362	1994/95[a]	--	--	--	--	--	--	--	--	--
	1995/96[a]	--	--	--	--	--	--	--	--	--
	1996/97	25	52	50	50	2	4	--	--	6
	1997/98	35	43	95	5	0	1	--	--	1
	1998/99[a]	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
RG363	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
	1997/98	24	33	81	19	3	0	--	--	3
	1998/99 [a]	0	--	--	--	--	--	--	--	0
RG364	1994/95	22	41	85	15	2	0	--	--	2
	1995/96	20	50	80	20	2	0	--	--	2
	1996/97[a]	0	--	--	--	--	--	--	--	--
	1997/98 [a]	0	--	--	--	--	--	--	--	0
	1998/99 [a]	0	--	--	--	--	--	--	--	0
RG365	1994/95[a]	0	--	--	--	--	--	--	--	0
	1995/96[a]	0	--	--	--	--	--	--	--	--
	1996/97	16	31	30	70	4	3	--	--	7
	1997/98	14	21	27	73	5	3	--	--	8
	1998/99	18	50	22	78	3	4	--	--	7

[a] No hunt held
[b] Hunt held but no permits issued
[c] Archery only registration hunt
[d] Permit issued by mistake for this hunt.

Table 12 Units 7 & 15 mountain goat harvest data by Tier II subsistence permit hunt, 1994–98

Hunt Nr. /Area	Regulatory year	Permit issued	Did not hunt(%)	Unsuccessful hunters (%)	Successful hunters (%)	Males	Females	Unk.	Illegal	Total harvest
TG352	1994/95	25	68	62	38	2	1	--	--	3
	1995/96[b]	0	--	--	--	--	--	--	--	0
	1996/97[ab]	0	--	--	--	--	--	--	--	0
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	0	--	--	--	--	--	--	--	0
TG363	1994/95	30	27	59	41	7	2	--	--	9
	1995/96[b]	0	--	--	--	--	--	--	--	0
	1996/97[ab]	0	--	--	--	--	--	--	--	0
	1997/98[a]	0	--	--	--	--	--	--	--	0
	1998/99[a]	0	--	--	--	--	--	--	--	0
TG364	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
	1997/98	16	25	75	25	2	1	--	--	3
	1998/99	16	56	71	29	1	1	--	--	2
TG365	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
	1997/98	30	37	68	32	4	2	--	--	6
	1998/99	30	57	85	15	2	0	--	--	2

[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, 1992–98

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
1997/98	86	1		87(39)	132	2		134(61)	221
1998/99	69	4		73(31)	163	0		163(69)	236

Table 14 Units 7 & 15 mountain goat hunter registration permit hunt residency and success, 1992–98

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
1997/98	43	3	46(24)	140	4	144(76)	190
1998/99	34	2	36(15)	204	4	208(85)	244

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

Table 15 Units 7 & 15 mountain goat harvest chronology for 1990–1998

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
1997/98	19	14	24	29	39	4	2	2	133
1998/99	26	7	25	15	30	5	1	0	109

[a]Not including Tier II subsistence and unreported harvest.

Table 16 Unit 7 mountain goat harvest percent by transport method, 1992–98. 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
1997/98	11	1	36	0	0	0	47	4	91
1998/99	18	0	38	3	0	0	38	1	78

Table 17 Unit 15 mountain goat harvest percent by transport method, 1990–98. 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
1997/98	59	2	36	0	0	0	0	2	42
1998/99	52	3	45	0	0	0	0	0	31

LOCATION

GAME MANAGEMENT UNIT: 8 (5097 mi^2)

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

The mountain goat population in Unit 8 originated from 11 females and 7 males translocated from the Kenai Peninsula to the Hidden Basin area during 1952 and 1953. Success was not realized until 1964 when 26 goats were observed in the Crown Mountain area. The first hunting season was authorized in 1968, and permits have been issued each year since then. Prior to 1986, permit allocation varied between drawing, registration, and tier II (subsistence) permits. Since then, all hunting has been regulated by drawing, with the number of permits available and open areas changing to reflect population trends and goat movements.

From the late 1960s through 1970s, goat populations were lightly harvested and most areas were closed to hunting to encourage colonization. Permits were allocated through the registration or drawing system with a harvest quota of up to 15 goats. During the 1980s, the population continued to increase from an estimated 150 to over 400 animals, and new pockets of goats were observed on the southern end of the island. The permit allocation process switched from a drawing system to a registration system in 1984 and 1985, and a tier II area was also established in 1985. A number of emergency orders were issued during the fall of 1985 when harvest goals were reached. The change from a drawing permit to a registration permit hunt in 1985 resulted in numerous inexperienced goat hunters going afield. Smith (1986) reported high hunter densities, less selectivity, herd shooting, and wanton waste during the 1985 hunting season. In 1986 the drawing system was restored.

Throughout the 1990s, goat populations continued to grow and the management scheme was conservative. Populations were closely monitored and permits were adjusted accordingly. Much of the southern portion of the island, which had been closed to facilitate colonization, was open to limited hunting in 1991. A new hunt area (DG 478) close to the Kodiak road system was opened to hunting in 1995. There are currently 8 permit hunting areas with a total of 168 drawing permits available. Based on data from comprehensive aerial surveys, we estimated that the goat population of Unit 8 in 1999 was 1000 goats. The goat population occupied all available habitat on the island, and we received unconfirmed reports of a goat on Uganik Island.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

METHODS

We complete composition counts annually with fixed-wing aircraft in August and early September. During the surveys, priority is given to the 8 permit hunt areas, but if weather and funding permit,

we attempt to survey all goat habitat on Kodiak. We collect data on harvest and hunting effort from mandatory hunter reports and by examining goat horns voluntarily brought in by successful hunters.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Our survey of approximately 90% of the goat range in August and September 1999 yielded a minimum population size of 895 goats. The population continued to increase in the Uyak and Deadman Bay areas, whereas the population is decreasing in the Kizhuyak and Terror Bay drainages. The estimated islandwide population in 1999 was 1000 goats.

Population Composition

Within the permit hunt areas, the kid:adult ratio ranged from 15–24 kids:100 adults from 1994/95 to 1998/99 (Table 1). Kid production declined in 1999 to a ratio of 18.7:100, from an average of 20.6 during the previous 5 years. This decline was precipitated by severe winter weather and delayed vegetative development in the spring of 1999. We did not collect any data on the sex composition of the population during this reporting period.

Distribution and Movements

During the first 3 decades after their introduction to Kodiak, goats gradually occupied pristine habitats near their release area, primarily in the Kizhuyak, Terror, and Hidden Basin drainages. As population density increased, goats began to pioneer new areas. No radio telemetry or other movement studies have been conducted on Kodiak goats. Research in other areas suggests dispersal of males may be driven by competition for females, but dispersal of females may be triggered by diminished food availability (Stevens 1983). During the past decade goats expanded beyond the newly discovered pockets of suitable habitat, and moved into areas not normally considered prime goat range. Goats now occur, in at least small numbers, in most of the suitable habitat on Kodiak Island.

MORTALITY

Harvest

Season and Bag. Goat hunting season for resident and nonresident hunters was open from 1 September to 31 October. The bag limit was 1 goat by drawing permit. Eight permit areas were established with 168 permits issued. Regulations authorize the department to issue up to 250 drawing permits per season (5 AAC 85.040[4]).

Board of Game Actions and Emergency Orders. There were no Board of Game actions or emergency orders during this reporting period. During the 1999–2000 season, the department administratively increased the number of permits available in hunt area DG 478 from 8 to 15 to take advantage of the increased harvestable surplus in that area.

Hunter Harvest. Annual harvest ranged from 44 to 70 goats from 1994/95–1998/99, with a 5-year average of 57.4 (Table 2). Annual harvests increased during each of these years, reflecting an increase in both goat density and permit numbers. Annual harvest ranged from 3 to 19 goats for each of the 8 permit hunts. Males continued to comprise the majority of the goats harvested during each year from 1994/95–1998/99, with a 5-year average of 64.4%.

Hunters have provided goat age (horn ring) data on their report cards since 1994–95 when regulations mandating horn inspection were rescinded. The mean age of goats harvested between 1989–90 and 1993–94 was 3.8 yrs for males and 5.0 yrs for females. During the next 5-year period, 1994/95–1998/99, mean ages were 5.3 years for males and 5.8 years for females (Table 3). These data indicate that hunter derived age data are inconsistent, and little, if any, objective analyses can be derived from them.

Permit Hunts. All goat hunting in the unit is by drawing permit. During this reporting period there were 8 hunt areas (DG 471–478) and the number of permits issued ranged from 135 to 176. Hunters afield ranged from 72–109, with a 5-year average of 60.4% of the permitees participating in the hunt (Table 2). Compliance with the permit hunt conditions by hunters was good; however, permitees who did not hunt frequently failed to return permit reports until receiving reminder letters.

Hunter Residency and Success. Local Unit 8 residents received most of the permits issued between 1994/95–1998/99 (54%), followed by nonlocal Alaska residents (39%), and nonresidents (7%) (Table 4). Annual hunter success ranged 58–65% with a 5-year mean of 61%. Nonresidents were the most successful hunters (77%), followed by local residents (65%) and nonlocal (53%).

Harvest Chronology. Weather patterns largely determine the chronology of harvest and affect hunter success and timing of the hunt. During most years, goat hunters prefer October to hunt goats in Unit 8 (Table 5).

Transport Methods. From 1994/95 to 1998/99 hunters predominantly used aircraft (65%) to access the field (Table 6). Boats (21%) were another important transport method, and off-road vehicles (9%) have become more popular as trails increase and machines become more powerful and reliable.

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 and golden eagles undoubtedly occurs, but it is probably rare. The low production of kids in some years is probably caused by severe winter weather conditions, but it is unknown whether early postnatal mortality of kids or low initial productivity occurred. The severe winter of 1998–99 yielded reports of a few winter-killed goats in the Hidden Basin and Old Harbor areas. It has been estimated that wounding loss and illegal harvest contribute additional mortality equivalent to 10% of the reported harvest (Van Daele and Smith 1998).

HABITAT

Assessment

Goat habitat on Kodiak Island is relatively secure because it is remote and has little immediate commercial value. Construction and operation of the Terror Lake hydroelectric project, in goat habitat in northern Kodiak Island, has not been detrimental (Smith and Van Daele 1987).

There have been no detailed analyses of goat range or carrying capacity on Kodiak, but survey data suggest that the population is probably near the carrying capacity of the habitat in the north central part of the island where goats first became established. In recently colonized areas of southern Kodiak Island, the population still seemed to be below carrying capacity during this reporting period.

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 that goats were at higher elevations in March during a winter with snow cover at sea level but 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. The lack of a coniferous overstory at lower elevations may adversely affect goats on Kodiak during winters with high snowfall.

NONREGULATORY MANAGEMENT PROBLEMS

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

CONCLUSIONS AND RECOMMENDATIONS

The goat population was stable in northeastern Kodiak, decreasing in northcentral, and increasing in recently colonized drainages of southern Kodiak. Based on the 1999 comprehensive aerial survey of goat range in Unit 8, we estimated a total of 1000 goats. Severe weather during the winter of 1998–99 exacerbated population declines in some areas and resulted in lower kid:adult ratios in all permit areas. During this reporting period goat harvests increased each year, and percent males in the harvest and hunter success remained above 60%.

The policy of allowing goats to populate vacant habitat by keeping areas with low populations closed to hunting has been effective as we have routinely surpassed our management objectives. Population trends are closely monitored by annual surveys and permits are adjusted accordingly within hunt areas. Recent alterations in goat populations and ranges have prompted us to investigate changing some of the hunt area boundaries. Before acting on any of these changes, however, we will discuss them with the local Advisory Committee, staff from Kodiak National Wildlife Refuge, and other interested parties.

We have reached a pivotal point in goat management on Kodiak as the population now occupies most, if not all, suitable habitat and populations in most areas continue to increase. We should consider shifting our emphasis from encouraging range expansion and increased densities to

limiting the population to a level that will provide sustained hunting opportunities while maintaining habitat quality. We must also consider the relationship between habitat, hunting, and goat viewing opportunities on the Kodiak road system and develop socially and biologically acceptable ways of balancing these potentially conflicting factors.

To achieve these goals, we recommend the following management actions:

- Revise the management objective to include a population goal of 700–1000 goats islandwide, distributed in a manner which has minimal long-term impact on their habitat;
- Work closely with staff from Kodiak National Wildlife Refuge to initiate research into goat habitat, and the impacts of goats on that habitat;
- Evaluate current hunt area boundaries and permit allocations to assure that they adequately reflect the recent changes in goat density and distribution;
- Reestablish the requirement that hunters bring their horns into an ADF&G office for inspection;
- Initiate an investigation into the possible relationships between horn growth and habitat quality;
- Revise hunter handouts with emphasis on sex identification, goat anatomy, and ways to avoid wounding and/or losing goats while hunting; and,
- Work with hunters and nonconsumptive users to explore methods of establishing areas where goats can regularly be seen from the Kodiak road system.

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Table 1 Unit 8 Aerial summer mountain goat composition counts and estimated population size within permit hunt areas, 1994/95–1999/2000.

Hunt Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
All permit hunt areas	1994/95	579 (81)	140 (21)	24	719	49.2	800
	1995/96	432 (87)	65 (13)	15	479	105.7	--
	1996/97	405 (85)	72 (15)	18	477	94.1	--
	1997/98	495 (83)	101 (17)	20	596	129.0	--
	1998/99	482 (81)	115 (19)	24	597	81.6	--
	1999/2000	684 (84)	128 (16)	19	812	96.2	900
DG 471 Wild Creek - Center Mtn.	1994/95	94 (79)	25 (21)	27	119	--	--
	1995/96	114 (89)	14 (11)	12	128	--	--
	1996/97	113 (84)	21 (16)	19	134	--	--
	1997/98	154 (79)	40 (21)	26	194	--	--
	1998/99	167 (78)	48 (22)	29	215	--	--
	1999/2000	137 (86)	23 (14)	17	160	--	160–180
DG 472 Crown Mtn	1994/95	40 (82)	9 (18)	23	49	--	--
	1995/96	35 (97)	1 (3)	3	36	--	--
	1996/97	37 (80)	9 (20)	24	46	--	--
	1997/98	46 (87)	7 (13)	15	53	--	--
	1998/99	18 (95)	1 (5)	6	19	--	--
	1999/2000	21 (88)	3 (12)	14	24	--	20–50

Table 1 Continued.

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
DG 473	1994/95	93 (74)	33 (26)	36	126	--	--
Hidden Basin -	1995/96	143 (85)	25 (15)	17	168	--	--
Terror Lake	1996/97	101 (89)	12 (11)	12	113	--	--
	1997/98	97 (85)	17 (15)	18	114	--	--
	1998/99	63 (81)	15 (19)	24	78	--	--
	1999/2000	28 (90)	3 (10)	11	31	--	40–80
DG 474	1994/95	55 (75)	18 (25)	33	73	--	--
W. Terror Lake-	1995/96	54 (83)	11 (17)	20	65	--	--
Uganik	1996/97	36 (97)	1 (3)	3	37	--	--
	1997/98	65 (83)	13 (17)	20	78	--	--
	1998/99	33 (85)	6 (15)	18	39	--	--
	1999/2000	44 (92)	4 (8)	9	48	--	40–60
DG 475	1994/95	98 (88)	13 (12)	13	111	--	--
Uyak Bay	1995/96	--	--	--	--	--	--
	1996/97[a]	24 (71)	10 (29)	42	34	--	--
	1997/98[a]	23 (100)	0	0	23	--	--
	1998/99	--	--	--	--	--	--
	1999/2000	257 (90)	30 (10)	12	287	--	200

Table 1 Continued.

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
DG 476	1994/95	33 (94)	2 (6)	6	35	--	--
Kiliuda Bay	1995/96	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--
	1997/98	--	--	--	--	--	--
	1998/99	42 (84)	8 (16)	19	50	--	--
	1999/2000[a]	11 (85)	2 (15)	18	13	--	50–60
DG 477	1994/95	80 (86)	13 (14)	16	93	--	--
Deadman Bay	1995/96	--	--	--	--	--	--
	1996/97	--	--	--	--	--	--
	1997/98	--	--	--	--	--	--
	1998/99[a]	50 (83)	10 (17)	20	60	--	--
	1999/2000[a]	92 (83)	19 (17)	21	111	--	130–160
DG 478	1994/95	--	--	--	--	--	--
Chiniak Bay	1995/96	68 (84)	13 (16)	19	81	--	--
	1996/97	66 (81)	15 (19)	23	81	--	--
	1997/98	110 (79)	24 (21)	22	134	--	--
	1998/99	109 (81)	26 (19)	23	135	--	--
	1999/2000	94 (80)	24 (20)	26	118	--	100–120

[a] partial survey

Table 2 Unit 8 mountain goat harvest data by permit hunt, 1994/95–1998/99.

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
All	1994/95	135	39	42	58	22 (52)	20 (48)	0	0	44
permit	1995/96	141	44	38	62	30 (61)	19 (39)	0	0	49
hunts	1996/97	176	44	40	60	37 (62)	20 (34)	2	0	59
	1997/98	168	35	40	60	47 (72)	17 (28)	1	0	65
	1998/99	168	36	35	65	49 (70)	21 (30)	0	0	70
DG 471	1993/94	30	43	44	56	6 (67)	3 (33)	0	0	3
Wild	1994/95	25	64	44	56	5 (56)	4 (44)	0	0	3
Creek	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
	1997/98	30	34	63	37	6 (86)	1 (14)	0	0	7
	1998/99	30	50	27	73	8 (73)	2 (27)	0	0	11
DG 472	1993/94	8	37	0	100	3 (60)	2 (40)	0	0	5
Crown	1994/95	10	40	33	67	1 (25)	3 (75)	0	0	4
Mtn	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
	1997/98	10	30	57	43	0 (--)	2 (67)	1	0	3
	1998/99	10	50	40	60	1 (33)	2 (67)	0	0	3
DG 473	1994/95	25	45	33	67	3 (37)	5 (63)	0	0	8
Hidden	1995/96	25	40	20	80	6 (50)	6 (50)	0	0	12
Basin	1996/97	31	39	37	63	9 (75)	3 (25)	0	0	12
	1997/98	30	13	27	73	14 (74)	5 (26)	0	0	19
	1998/99	30	17	36	64	13 (81)	3 (19)	0	0	16

Table 2 Continued.

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
DG 474	1994/95	15	33	40	60	6 (60)	4 (40)	0	0	10
W. Terror	1995/96	10	50	20	80	3 (75)	1 (25)	0	0	4
Lake	1996/97	30	50	53	47	4 (57)	3 (43)	0	0	7
	1997/98	15	53	14	86	6 (100)	0 (--)	0	0	6
	1998/99	15	53	14	86	2 (33)	4 (67)	0	0	6
DG 475	1994/95	30	57	62	38	3 (60)	2 (40)	0	0	5
Uyak	1995/96	35	49	51	49	5 (63)	3 (47)	0	0	8
Bay	1996/97	35	60	50	50	1 (14)	6 (86)	0	0	7
	1997/98	35	51	53	47	5 (63)	3 (37)	0	0	8
	1998/99	35	46	68	32	4 (67)	2 (33)	0	0	6
DG 476	1994/95	20	65	57	43	2 (67)	1 (33)	0	0	3
Kiliuda	1995/96	20	60	50	50	2 (50)	2 (50)	0	0	4
Bay	1996/97	20	35	38	62	8 (100)	0 (0)	0	0	8
	1997/98	20	25	27	73	9 (82)	2 (18)	0	0	11
	1998/99	20	45	27	73	6 (75)	2 (25)	0	0	8
DG 477	1994/95	10	20	62	38	2 (67)	1 (33)	0	0	3
Deadman	1995/96	10	30	37	63	4 (80)	1 (20)	0	0	5
Bay	1996/97	12	50	17	83	3 (60)	2 (40)	0	0	5
	1997/98	20	40	33	67	6 (75)	2 (25)	0	0	8
	1998/99	20	20	17	83	11 (73)	4 (27)	0	0	15
DG 478	1994/95	--	--	--	--	--	--	--	--	--
Chiniak	1995/96	8	0	37	63	4 (80)	1 (20)	0	0	5
Bay	1996/97	8	13	29	71	3 (60)	2 (40)	0	0	5
	1997/98	8	33	50	50	1 (33)	2 (67)	0	0	3
	1998/99	8	13	29	71	4 (80)	1 (20)	0	0	5

Table 3 Unit 8 mountain goat harvest mean age data from horn rings, 1989/90–1998/99.

Regulatory Year	Males	*n*	Females	*n*
1989/90 [a]	3.3	(14)	3.8	(11)
1990/91 [a]	4.0	(17)	5.4	(9)
1991/92 [a]	3.8	(17)	4.0	(15)
1992/93 [a]	3.8	(21)	4.7	(14)
1993/94 [a]	3.8	(31)	3.7	(16)
1994/95 [b]	4.7	(21)	5.7	(19)
1995/96 [b]	5.9	(18)	6.7	(7)
1996/97 [b]	5.2	(17)	6.2	(9)
1997/98 [b]	5.5	(42)	5.6	(12)
1998/99 [b]	5.3	(40)	5.5	(14)

[a] mandatory horn inspections required.
[b] hunters report goat age with report card.

Table 4 Unit 8 mountain goat hunter residence and success, 1994/95–1998/99.

	Successful					Unsuccessful					
Regulatory year	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
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)	79
1996/97	36	18	5	59	(60)	21	16	2	39	(40)	98
1997/98	41	21	3	65	(60)	24	20	0	44	(40)	109
1998/99	35	26	9	70	(65)	23	12	2	37	(35)	107

Table 5 Unit 8 mountain goat harvest chronology percent by month, 1994/95–1998/99.

Area	Regulatory year	Harvest periods		
		September	October	*n*
All permit hunts	1994/95	43 %	57 %	42
	1995/96	37 %	63 %	49
	1996/97	46 %	54 %	59
	1997/98	52 %	48 %	65
	1998/99	37 %	63 %	70

Table 6 Unit 8 mountain goat hunter transport method (percent in parentheses), 1994/95–1998/99.

Regulatory year	Transportation method							Total
	Aircraft	Boat	3- or 4 Wheeler	ORV	Highway vehicle	Snow-machine	Unknown	
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
1997/98	70 (64)	18 (17)	13 (12)	0 (--)	7 (6)	0 (--)	1 (1)	109
1998/99	66 (62)	22 (21)	9 (8)	1 (1)	5 (5)	0 (--)	4 (3)	107

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 were 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. Mountain goat harvests have been controlled by a registration hunt since 1980.

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. Additional mountain goat data are collected periodically during aerial surveys of sheep trend count areas. Harvest and hunting pressure are controlled by registration permit.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

In both the 1998 and 1999 surveys of MacColl Ridge, we counted 74 goats, 12% higher than the 1997 count of 66 (Table 1). Until this year, the highest count on MacColl Ridge was 65 goats obtained in 1981 during a helicopter survey. The current count on MacColl Ridge is 42% above the long-term count average of 52 animals.

Biologists estimate 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 1999 was 16:100; kids composed 14% of goats observed (Table 1). Kid production declined 33% in 1999 and was the lowest observed in seven years. Recruitment was especially high between 1995 and 1998, averaging 14 kids observed per year compared to an average of 8 kids per year between 1991 and 1993. The number of adults observed in 1998 and 1999 increased from the previous 3 years because of the earlier 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 for 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.

Federal Subsistence Seasons and Bag Limits. In 1990 the federal government assumed management of subsistence hunting on federal lands. At that time, 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. In 1999 The National Park Service determined there was a subsistence use of mountain goats by local rural residents in the Park. A season was established with open dates of 25 August to 31 December. Hunting was controlled by registration permit issued by the National Park Service to residents of designated subsistence communities. The bag limit was one goat, and a harvest quota of 45 mountain goats for both the State and Federal hunts was established.

Hunter Harvest. Hunters killed 18 mountain goats during the 1997 season and 17 in 1998 for the state registration hunt (RG 580). The average yearly take since 1980 was 16 goats (range = 6–

30). The 1998 harvest comprised 12 (71%) males and 5 (29%) females. 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. There were no mountain goats reported killed in the federal subsistence hunt during the 1999 season.

Hunter Residency and Success. We issued 48 state registration hunt permits in 1998. The number of permits issued for this hunt fluctuates between 50 and 70, with no trend evident in the hunting pressure. The highest number of permits ever issued for this hunt was 97 in 1986. The hunter success rate was 67% in 1997 and 59% in 1998. The hunter success rate is considered high for goat hunters in Unit 11 (Table 2). Successful hunters reported spending 2.4 days in the field compared with 4.2 days for unsuccessful hunters in 1998. The hunting effort reported by Unit 11 goat hunters changes little each year. Nonresident hunters took 8 goats in 1998, accounting for 47% of the harvest compared with 29% of the harvest taken by non-local Alaskan residents and 24% by local rural residents (Table 3). Since 1986, nonresidents have taken 63% of goats harvested and have had a higher success rate (74%) than residents (36%). The National Park Service issued 15 permits to rural residents of communities with a subsistence designation for mountain goats. There were no reported successful permittees in the federal hunt. Unsuccessful federal hunters reported spending 4.4 days hunting.

Harvest Chronology. In 1998, 75% 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 is 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.

Transport Methods. Most successful goat hunters use aircraft. Highway vehicles are also a popular method of transportation. Transportation methods used by goat hunters in Unit 11 have changed little over the years (Table 5). Since the use of aircraft is prohibited for subsistence hunting in the Park, the most important method of transportation for federal subsistence hunters is riverboat and 4-wheelers.

Other Mortality

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

HABITAT

Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. 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

The count of mountain goats in the MacColl Ridge trend area during the last 2 years was the highest ever observed. The biggest change was the observed increase in adults, while kid production, which had been high for four years, declined slightly. Between 1994 and 1998 survey results indicated the highest kid production and/or survival ever observed on MacColl ridge.

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 has increased to the highest level observed in recent years; 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; such as 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 nonsubsistence 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. However, during this report period harvests were not concentrated enough in any area to result in localized overharvests.

The federal subsistence hunt in the Park designated lands should not present a management problem for the state hunt because hunters participating in the state hunt are limited to Preserve lands. The new federal subsistence hunt allows hunting of mountain goats in portions of Unit 11 that have been protected for over ten years. Harvests are expected to remain low under the federal hunt because the number of individuals eligible for subsistence permits is limited. Hunt areas are, for the most part, very remote and federal regulations prohibiting the use of aircraft for subsistence hunting limit access.

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 cause a decline in the goat population in those areas. In addition to the yearly trend count on MacColl Ridge, goats should be surveyed periodically in heavily hunted areas such as Hawkins and Barnard Glaciers. Harvest rates are currently not a concern in other areas in the unit.

I recommend closing the hunting season by emergency order as soon as the harvest from MacColl Ridge and Hawkins and Barnard Glaciers exceeds 10% of the observed goat

population. Timely emergency closures will be difficult because most of the harvest takes place 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 regulations to reduce the harvest.

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Table 1 Unit 11 MacColl Ridge trend count area mountain goat composition counts and estimated population size, 1994–99

Area	Regulatory year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
MacColl Ridge	1994–95	39 (78)	11 (22)	0	28	50	50
	1995–96	31 (69)	14 (31)	0	45	45	45
	1996–97	47 (78)	13 (22)	0	28	60	60
	1997–98	50 (76)	16 (24)	0	32	66	66
	1998–99	59 (80)	15 (20)	0	25	74	74
	1999–2000	64 (86)	10 (14)	0	16	74	74

[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, 1994–98

Hunt Nr. /Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent Successful Hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
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
RG580	1997–98	53	48	17	35	14 (78)	4 (22)	0	0	18
RG580	1998–99	48	37	26	37	12 (71)	5 (29)	0	0	17

Table 3 Unit 11 mountain goat hunter residency and success, 1994–98

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Non-resident	Total (%)	
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
1997–98	2	8	8	18 (67)	2	5	2	9 (33)	27
1998–99	4	5	8	17 (59)	2	7	3	12 (41)	29

[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 month, 1994–98

Regulatory year	September				October					
	1–7	8–15	16–23	24–30	1–7	8–15	16–23	24–31	1–30	*n*
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
1997–98	61	17	11	5	5	--	--	--	--	18
1998–99	44	12	19	12	12	--	--	--	--	16

Table 5 Unit 11 mountain goat harvest percent by transport method, 1994–98

Regulatory year	Percent of harvest							
	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1994–95	86	7	--	--	--	7	--	14
1995–96	92	0	--	--	8	--	--	13
1996–97	92	4	4	--	--	--	--	23
1997–98	100	--	--	--	--	--	--	17
1998–99	100	--	--	--	--	--	--	12

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 completed 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. During a complete count of Unit 14C in 1994, 619 goats were observed. The goat population in the Talkeetna Mountains (Unit 14A and 14B) has been chronically low and probably has decreased in recent years.

Seasons and bag limits for goats in these areas 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 changed 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 most 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 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 hunting season for goats in Unit 14B has been closed since 1990 (by emergency order in 1990 and 1991).

With the exception of 1969–1972, when none of Unit 14C was closed to hunting, most of Unit 14C has been closed to goat hunting since the early 1960s. First, the drainages from Potter to Girdwood (Rainbow Closed Area) were closed. In 1973, the then 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.

During this reporting period, numbers of hunters were stable in Units 13D and 14, and few goats were harvested in Units 13D and 14A (Tables 6 and 7). Annual goat harvests in Unit 14C ranged from 26 to 38, with no discernible trend (Table 5).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Unit 13D (Chugach Mountains)

- 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 14A (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 report harvests within 5 or 10 days of kill depending on hunt location. In addition, 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 1995 and 1998. Partial surveys were also conducted in 1994 and 1995 in Unit 13D. A complete survey was conducted in Unit 14C in 1994; partial surveys were flown in 1995 to 1998.

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 western Chugach and Talkeetna Mountains (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 surveys in the evening instead of early morning to midday.

Population Composition

Kids comprised 23–25% of observed goats in Unit 13D, 22–24% in Unit 14A, 8–18% in Unit 14B, and 17–23% 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. During midday goats 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. Recently, limited winter surveys in Unit 14C have been initiated to gather information about goat wintering areas. This winter survey data is not available at the time of this report.

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. Only goats in Unit 13D are hunted. We believe the number of mountain goats in Unit 13 is influenced largely by winter weather and secondarily by predation. Greatly reduced goat numbers in Unit 13 have been attributed to deep snowfall during the early 1970s.

Most mountain goats in Unit 14 occupy the Chugach Mountains; however, small numbers occur 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 may be marginal habitat, unable to support a large goat population. A decline in goat numbers in the Talkeetna Mountains during this reporting period was attributed to severe winters and an increasing predator population.

MORTALITY

Harvest

Seasons and Bag Limits. In Unit 13D the goat hunting season for residents and nonresidents was 10 August–20 September. From 1994 to 1998 the bag limit was 1 goat by drawing permit; the taking of kids 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. In addition, there were 2 drawing hunts in Unit 14C, one in the East Fork of the Eklutna River drainage and the other in the Glacier and Winner creek drainages. Both hunts were open from the day after Labor Day to October 15. The bag limit was 1 goat.

Board of Game Actions and Emergency Orders. In 1995 the board authorized 2 drawing permit hunts for goats in Unit 14C, one in the East Fork of the Eklutna River in Chugach State Park and the other in the Glacier and Winner creek drainages near Girdwood.

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). Likewise, the Twentymile River goat registration hunt is also archery only October 16–31 (Table 6).

Permit Hunts. The number of goat registration and drawing permits issued for Unit 14 ranged from 199 to 251 during this reporting period (Table 6). The number of Unit 14C drawing permits issued is based on the number of goats observed during surveys. During this reporting period the number of Unit 14C drawing permits issued was increased from 8 to 13 (Table 6). Thirty-five drawing permits were issued for the eastern portion of Unit 13D during each year (Table 7).

Hunter Residency and Success. Most goat hunters in Units 13 are nonlocal residents (Table 8). Most goat hunters in Unit 14 are local residents (Table 9).

Success rates from 1994 to 1998 in Unit 13D have ranged from 10% to 58% (Table 8). Likewise, success rates during this reporting period in Unit 14 have ranged from 23% to 38% (Table 9). In both units, nonresidents typically experienced higher rates of success than did resident hunters (Tables 8 and 9). Nonresidents are required to be accompanied by a registered guide to hunt goats in Alaska, guided hunters typically have a higher success rate than unguided hunters.

Harvest Chronology. Season dates for Unit 14 registration hunts occur from 1 September-31 October. In most years, harvest is distributed approximately equal between September and October in the unit (Table 10). Harvests in Unit 13D were too small to evaluate chronologically; season dates were earlier than Unit 14, occurring from 10 August–20 September.

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, airplanes, highway vehicles, and boats are used approximately equally, except in years with low water levels (e.g., 1996) when boat access is difficult.

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 may still be below carrying capacity in these areas. Winter weather, particularly deep snow and heavy icing, are believed to be the limiting factors in the western Chugach Mountains.

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 67% males. With the exception of 1997, less than 7% of observed goats were harvested annually in Unit 14A, and harvests averaged 82% males. Goat season remains closed in the Talkeetna Mountains portion of Unit 14.

We should continue to monitor mountain goat populations; however, because of the low harvest in Unit 13D and 14A, goats need to be surveyed only every 3 years. In Unit 14C, because of a relatively large harvest, budget limitations, and an apparent expanding goat population, surveys should continue to be conducted at least biennially, unless there is severe winter weather.

Management objectives need to reflect management philosophy. The Talkeetna Mountains portions of Units 14A and 14B appear to be marginal habitat, and before hunting is allowed in these areas, there should be a minimum observable population of 50 goats and harvest should not exceed 5% of observed goats. Maximum allowable harvest should not exceed 7% of the number of goats observed during surveys in the Chugach 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, 1994–98

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Goats Observed	Goats /hour
1994/95[a]	36 (75)	12 (25)	33	48	16
1995/96[b]	50 (77)	15 (23)	30	65	22
1996/97[c]					
1997/98[c]					
1998/99[c]					

[a] Partial survey (count areas 5, 7, 16).
[b] Partial survey (count areas 11, 12).
[c] No surveys conducted.

Table 2 Unit 14A, Chugach Mountains, aerial mountain goat composition counts and estimated population size, 1994–98

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour
1994/95[b]					
1995/96[a]	94 (76)	29 (24)	31	123	27
1996/97[b]					
1997/98[b]					
1998/99	90 (78)	25 (22)	28	115	25.5

[a] Partial survey (east of Metal Creek).
[b] No surveys conducted.

Table 3 Unit 14A and 14B, Talkeetna Mountains, aerial mountain goat composition counts and estimated population size, 1994–98

Regulatory Year	Adults (%)	Kids (%)	Kids: 100 adults	Total Goats Observed	Goats /hour
1994/95[a]					
1995/96[b]	22 (92)	2 (8)	9	24	
1996/97[a]					
1997/98[a]					
1998/99	14 (82)	3 (18)	21	17	

[a] No surveys conducted.
[b] Partial survey (north side of Sheep River, part of Iron Creek, upper Kashwitna, and North Fork Kashwitna).

Table 4 Unit 14C aerial mountain goat composition counts and estimated population size, 1994–98[a]

Regulatory Year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour[b]	Estimated population size[c]
1994/95	495 (83)	124 (17)	25	619	72	750
1995/96[d]	457 (84)	88 (16)	19	545	61	800
1996/97[e]	149 (79)	39 (21)	26	188		
1997/98[f]	112 (77)	34 (23)	30	146		
1998/99[f]	95 (77)	29 (23)	31	124		

[a] Data include all goats observed in Unit 14C; S&I reports prior to 1984 included only goats in registration hunt areas.
[b] Number does not include goats counted incidental to sheep surveys or Penguin Creek.
[c] Based on 80–85% sightability (snow conditions).
[d] Partial survey (Twentymile River, Lake George drainage, East Fork of Hunter Creek, East Fork Eklutna, Glacier and Penguin Creeks).
[e] Partial survey (Bird and Penguin Creeks, and those goats counted incidental to Unit 14C sheep surveys).
[f] Partial survey (goats counted incidental to sheep surveys; Lake George and Twentymile River not counted).

Table 5 Annual mountain goat harvest by unit, 1994–98

Regulatory Year	Unit 13D[a]	14A[b]	14B[c]	14C[d]	Total
1994/95	2	6		26	34
1995/96	7	4		28	39
1996/97	7	5		29	41
1997/98	6	10		38	54
1998/99	5	7		26	38

[a] Drawing permit only.
[b] Registration permit only.
[c] Closed to mountain goat hunting.
[d] Registration permit only (1994/95); both registration and drawing permits (1995/96 to 1998/99).

Table 6 Unit 14 mountain goat harvest data by permit hunt, 1994–98

Area[a]	Regulatory Year	Permits issued	Percent did not hunt[b]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)	Females (%)	Total harvest
RG866	1994/95	32	31	73	27	4 (67)	2 (33)	6
Unit 14A	1995/96	51	61	75	25	3 (60)	2 (40)	5
	1996/97	47	60	74	26	5 (100)	0 (0)	5
	1997/98	38	26	64	36	9 (90)	1 (10)	10
	1998/99	72	50	81	19	6 (86)	1 (14)	7
DG852	1995/96	3	0	67	33	1 (100)	0 (0)	1
Unit 14C	1996/97	3	33	0	100	0 (0)	2 (100)	2
East Eklutna	1997/98	3	0	100	0	0 (0)	0 (0)	0
	1998/99	5	33	50	50	2 (100)	0 (0)	2
DG856	1995/96	5	0	60	40	2 (100)	0 (0)	2
Unit 14C	1996/97	5	20	50	50	2 (100)	0 (0)	2
Glacier Ck.	1997/98	5	0	0	100	1 (20)	4 (80)	5
	1998/99	8	38	80	20	0 (0)	1 (100)	1
RG868	1994/95	93	50	79	21	8 (80)	2 (20)	10
Unit 14C	1995/96	90	41	87	13	6 (86)	1 (14)	7
Twentymile	1996/97	95	54	86	14	5 (83)	1 (17)	6
River	1997/98	82	43	81	19	6 (67)	3 (33)	9
	1998/99	73	52	80	20	4 (57)	3 (43)	7
RG869	1994/95	116	42	76	24	7 (44)	9 (56)	16
Unit 14C	1995/96	99	40	71	29	10 (59)	7 (41)	17
Lake	1996/97	77	29	60	40	14 (70)	6 (30)	20
George	1997/98	71	41	43	57	19 (79)	5 (21)	24
	1998/99	75	52	56	44	11 (69)	5 (31)	16

Table 6 Continued

Table 6 Continued

Area[a]	Regulatory Year	Permits issued	Percent did not hunt[b]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total harvest
RG878	1994/95	1	100			0	(0)	0	(0)	0
Unit 14C	1995/96	3	33	100	0	0	(0)	0	(0)	0
Twentymile	1996/97	2	50	100	0	0	(0)	0	(0)	0
River	1997/98	0								
(archery)	1998/99	1	100			0	(0)	0	(0)	0
RG879	1994/95	4	100			0	(0)	0	(0)	0
Unit 14C	1995/96	0								
Lake	1996/97	3	67	100	0	0	(0)	0	(0)	0
George	1997/98	0								
(archery)	1998/99	1	100			0	(0)	0	(0)	0
Totals	1994/95	214	47	77	23	15	(58)	11	(42)	26
for all	1995/96	200	39	78	22	19	(70)	8	(30)	27
Unit 14C	1996/97	185	42	72	28	21	(70)	9	(30)	30
	1997/98	161	40	61	39	26	(68)	12	(32)	38
	1998/99	163	51	67	33	17	(65)	9	(35)	26
Totals	1994/95	246	45	77	23	19	(59)	13	(41)	32
for all	1995/96	251	43	77	23	22	(69)	10	(31)	32
Unit 14	1996/97	232	46	72	28	26	(74)	9	(26)	35
	1997/98	199	37	62	38	35	(73)	13	(27)	48
	1998/99	235	51	72	28	23	(70)	10	(30)	33

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

Table 7 Unit 13D mountain goat harvest data by permit hunt, 1994–98

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
DG718	1994/95	10	30	100	0	0 (0)	0 (0)	0
Unit 13D	1995/96	10	50	40	60	1 (33)	2 (67)	3
West	1996/97	10	50	60	40	2 (100)	0 (0)	2
	1997/98	10	20	75	25	1 (50)	1 (50)	2
	1998/99	10	70	67	33	1 (100)	0 (0)	1
DG719	1994/95	25	52	83	17	1 (50)	1 (50)	2
Unit 13D	1995/96	25	72	43	57	3 (75)	1 (25)	4
East	1996/97	25	36	69	31	3 (60)	2 (40)	5
	1997/98	25	60	60	40	4 (100)	0 (0)	4
	1998/99	25	48	69	31	3 (75)	1 (25)	4
Totals	1994/95	35	46	90	10	1 (50)	1 (50)	2
For all	1995/96	35	66	42	58	4 (57)	3 (43)	7
Unit 13D	1996/97	35	40	67	33	5 (71)	2 (29)	7
	1997/98	35	49	67	33	5 (83)	1 (17)	6
	1998/99	35	54	69	31	4 (80)	1 (20)	5

[a] Includes permittees who did not report.

Table 8 Unit 13D mountain goat hunter residency and success, 1994–98

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local Resident	Nonlocal resident	Nonresident	Total (%)[a]	Local resident	Nonlocal resident	Nonresident	Total (%)[a]	
DG718	1994/95	0	0	0	0 (0)	1	5	0	7 (100)	7
Unit 13D	1995/96	0	1	2	3 (60)	0	2	0	2 (40)	5
West	1996/97	0	1	1	2 (40)	0	0	3	3 (60)	5
	1997/98	0	2	0	2 (25)	2	4	0	6 (75)	8
	1998/99	0	1	0	1 (33)	0	2	0	2 (60)	3
DG719	1994/95	0	1	1	2 (17)	0	10	0	10 (83)	12
Unit 13D	1995/96	2	1	1	4 (57)	0	3	0	3 (43)	7
East	1996/97	0	2	3	5 (31)	1	9	1	11 (69)	16
	1997/98	3	0	1	4 (36)	0	5	1	6 (55)	11
	1998/99	1	2	1	4 (31)	0	9	0	9 (69)	13
Totals	1994/95	0	1	1	2 (10)	1	15	0	17 (90)[b]	19
For all	1995/96	2	2	3	7 (58)	0	5	0	5 (42)	12
Unit 13D	1996/97	0	3	4	7 (33)	1	9	4	14 (67)	21
	1997/98	3	2	1	6 (33)	2	9	1	12 (67)	18
	1998/99	1	3	1	5 (31)	0	11	0	11 (69)	16

[a] Includes hunters with unspecified residency.

Table 9 Unit 14 mountain goat hunter residency and success, 1994–98

Area	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)[a]	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)[a]	Total Hunters[a]
RG866	1994/95	4	0	2	6 (27)	14	2	0	16 (73)	22
Unit 14A	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
	1997/98	1	0	3	10 (36)	10	0	1	18 (64)	28
	1998/99	3	0	4	7 (19)	24	1	4	29 (81)	36
DG852	1995/96	1	0	0	1 (33)	2	0	0	2 (67)	3
Unit 14C	1996/97	1	0	0	1 (100)	0	0	0	0 (0)	1
East Eklutna	1997/98	0	0	0	0 (0)	2	1	0	3 (100)	3
	1998/99	2	0	0	2 (50)	2	0	0	2 (50)	4
DG856	1995/96	2	0	0	2 (40)	3	0	0	3 (60)	5
Unit 14C	1996/97	3	0	0	3 (60)	2	0	0	2 (40)	5
Glacier Ck.	1997/98	5	0	0	5 (100)	0	0	0	0 (0)	5
	1998/99	1	0	0	1 (20)	4	0	0	4 (80)	5
RG868	1994/95	10	0	0	10 (21)	37	0	0	37 (79)	47
Unit 14C	1995/96	7	0	0	7 (14)	44	1	0	45 (86)	52
Twentymile	1996/97	5	1	0	6 (13)	39	1	0	40 (87)	46
River	1997/98	9	0	0	9 (19)	36	1	1	38 (81)	47
	1998/99	6	1	0	7 (20)	25	1	0	28 (80)	35
RG869	1994/95	12	3	1	16 (24)	45	4	2	51 (76)	67
Unit 14C	1995/96	13	2	3	18 (30)	40	2	1	43 (70)	61
Lake	1996/97	14	1	4	19 (40)	26	1	2	29 (60)	48
George	1997/98	18	1	5	24 (57)	12	2	4	18 (43)	42
	1998/99	7	1	7	16 (44)	15	1	2	20 (56)	36

Table 9 Continued

Area	Regulatory year	Successful: Local resident	Successful: Nonlocal resident	Successful: Nonresident	Successful: Total (%)[a]	Unsuccessful: Local resident	Unsuccessful: Nonlocal resident	Unsuccessful: Nonresident	Unsuccessful: Total (%)[a]	Total Hunters[a]
RG878	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
Twentymile	1995/96	0	0	0	0 (0)	2	0	0	2 (100)	2
River	1996/97	0	0	0	0 (0)	0	1	0	1 (100)	1
(archery)	1997/98	0	0	0	0 (0)	0	0	0	0 (0)	0
	1998/99	0	0	0	0 (0)	0	0	0	0 (0)	0
RG879	1994/95	0	0	0	0 (0)	0	0	0	0 (0)	0
Lake	1995/96	0	0	0	0 (0)	0	0	0	0 (0)	0
George	1996/97	0	0	0	0 (0)	1	0	0	1 (100)	1
(archery)	1997/98	0	0	0	0 (0)	0	0	0	0 (0)	0
	1998/99	0	0	0	0 (0)	0	0	0	0 (0)	0
Totals	1994/95	22	3	1	26 (23)	82	4	2	88 (77)	114
for all	1995/96	23	2	3	28 (23)	91	3	1	95 (77)	123
Unit 14C	1996/97	23	2	4	29 (28)	68	3	2	73 (72)	102
	1997/98	32	1	5	38 (39)	50	4	5	59 (61)	97
	1998/99	16	2	7	26 (32)	46	2	2	54 (68)	80
Totals	1994/95	26	3	3	32 (24)	96	6	2	104 (76)	136
for all	1995/96	25	2	5	32 (23)	106	3	1	110 (77)	142
Unit 14	1996/97	25	4	5	34 (28)	81	3	2	88 (72)	122
	1997/98	33	1	8	48 (38)	60	4	6	77 (62)	125
	1998/99	19	2	11	33 (28)	70	3	6	83 (72)	116

[a] Includes hunters with unspecified residency.

Table 10 Unit 14 mountain goat harvest chronology percent by month, 1994–98

Area	Regulatory year	Harvest period: August	September	October	November	December	Unknown (*n*)	*n*
Unit 14A	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
	1997/98	0	56	44	0	0	1	10
	1998/99	0	57	43	0	0	0	7
Unit 14C	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
	1997/98	0	44	57	0	0	1	38
	1998/99	0	6	40	0	0	1	26
Totals for all Unit 14	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
	1997/98	0	46	54	0	0	2	48
	1998/99	0	59	41	0	0	1	33

Table 11 Unit 13D successful mountain goat hunter transport methods, 1994–98

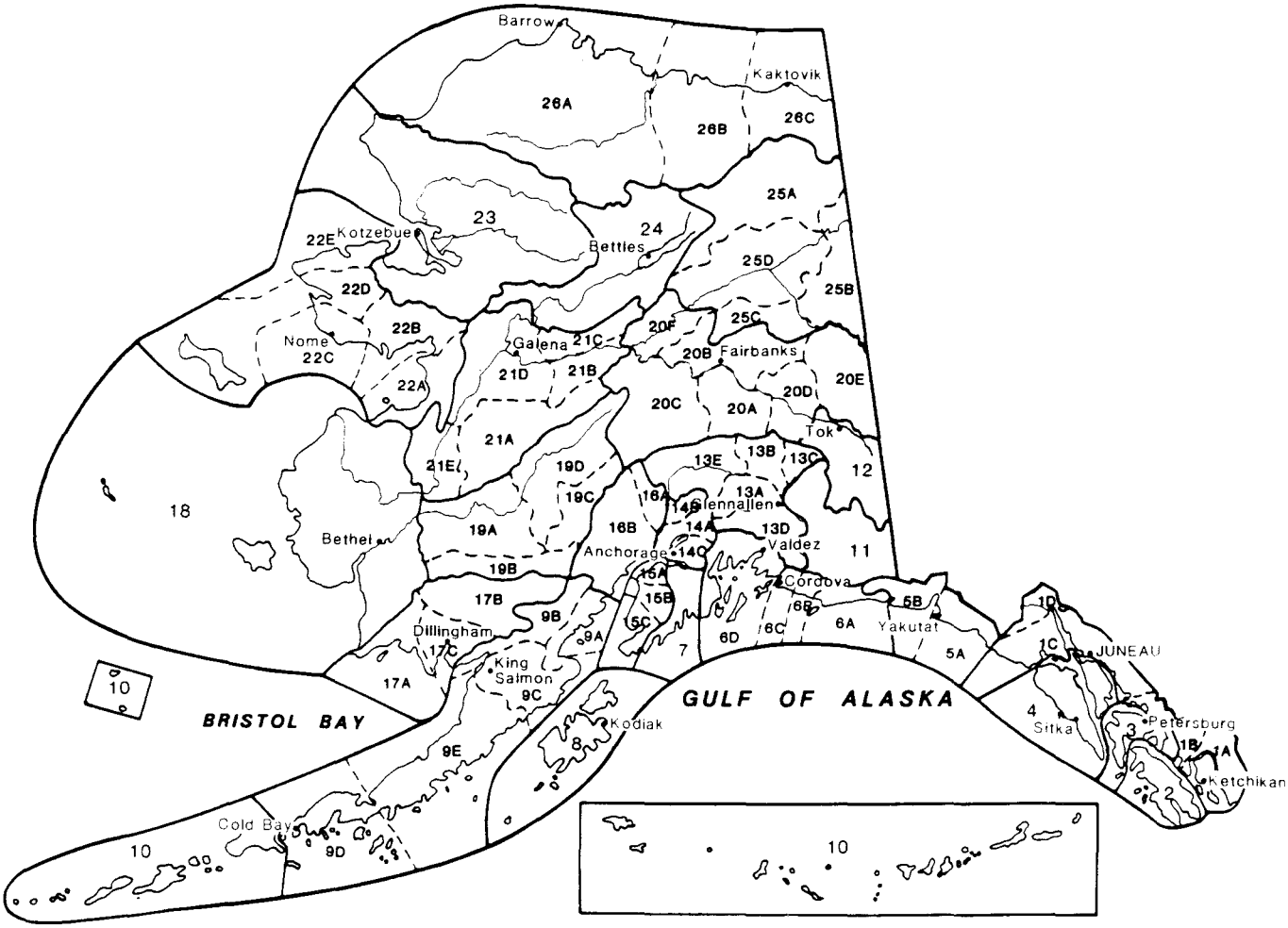
Regulatory year	Percent of harvest: Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	*n*
1994/95	50	0	0	0	0	0	50	2
1995/96	71	0	0	14	0	0	14	7
1996/97	71	0	0	0	0	0	29	7
1997/98	17	17	33	0	0	0	33	6
1998/99	40	0	0	0	0	0	60	5

Table 12 Unit 14 successful mountain goat hunter transport methods (registration hunts only), 1994–98

Area[a]	Regulatory Year	Percent of harvest								
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
RG866	1994/95	100	0	0	0	0	0	0	0	6
Unit 14A	1995/96	100	0	0	0	0	0	0	0	4
	1996/97	80	0	0	0	0	0	0	20	5
	1997/98	90	0	0	10	0	0	0	0	10
	1998/99	71	0	14	14	0	0	0	0	7
RG868	1994/95	20	0	50	0	0	0	20	10	10
Unit 14C	1995/96	29	0	29	0	0	0	42	0	7
Twentymile	1996/97	33	0	0	0	0	0	67	0	6
River	1997/98	44	0	44	0	0	0	0	11	9
	1998/99	14	0	43	0	0	0	29	14	7
RG869	1994/95	88	0	0	0	0	0	6	6	16
Unit 14C	1995/96	94	0	0	0	0	0	0	6	18
Lake	1996/97	95	0	0	0	0	0	5	0	19
George	1997/98	96	0	0	0	0	0	0	4	24
	1998/99	100	0	0	0	0	0	0	0	16
Totals	1994/95	62	0	19	0	0	0	12	8	26
for all	1995/96	80	0	7	0	0	0	10	3	29
Unit 14C	1996/97	80	0	0	0	0	0	17	3	30
	1997/98	82	12	0	0	0	0	0	6	33
	1998/99	74	13	0	0	0	0	9	4	23
Totals	1994/95	69	0	16	0	0	0	9	6	32
for all	1995/96	77	0	6	3	0	0	11	3	36
Unit 14	1996/97	78	0	0	0	0	0	19	3	37
	1997/98	84	0	9	2	0	0	0	5	43
	1998/99	73	0	13	3	0	0	7	3	30

[a] Archery-only registration hunts 878 and 879 (Twentymile River and Lake George, formerly 881 and 882) 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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