Mountain Goat
Management Report
of survey-inventory activities
1 July 1999–30 June 2001

Carole Healy, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation

ADF&G

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STATE OF ALASKA

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DEPARTMENT OF FISH AND GAME
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DIVISION OF WILDLIFE CONSERVATION
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P.O. Box 25526
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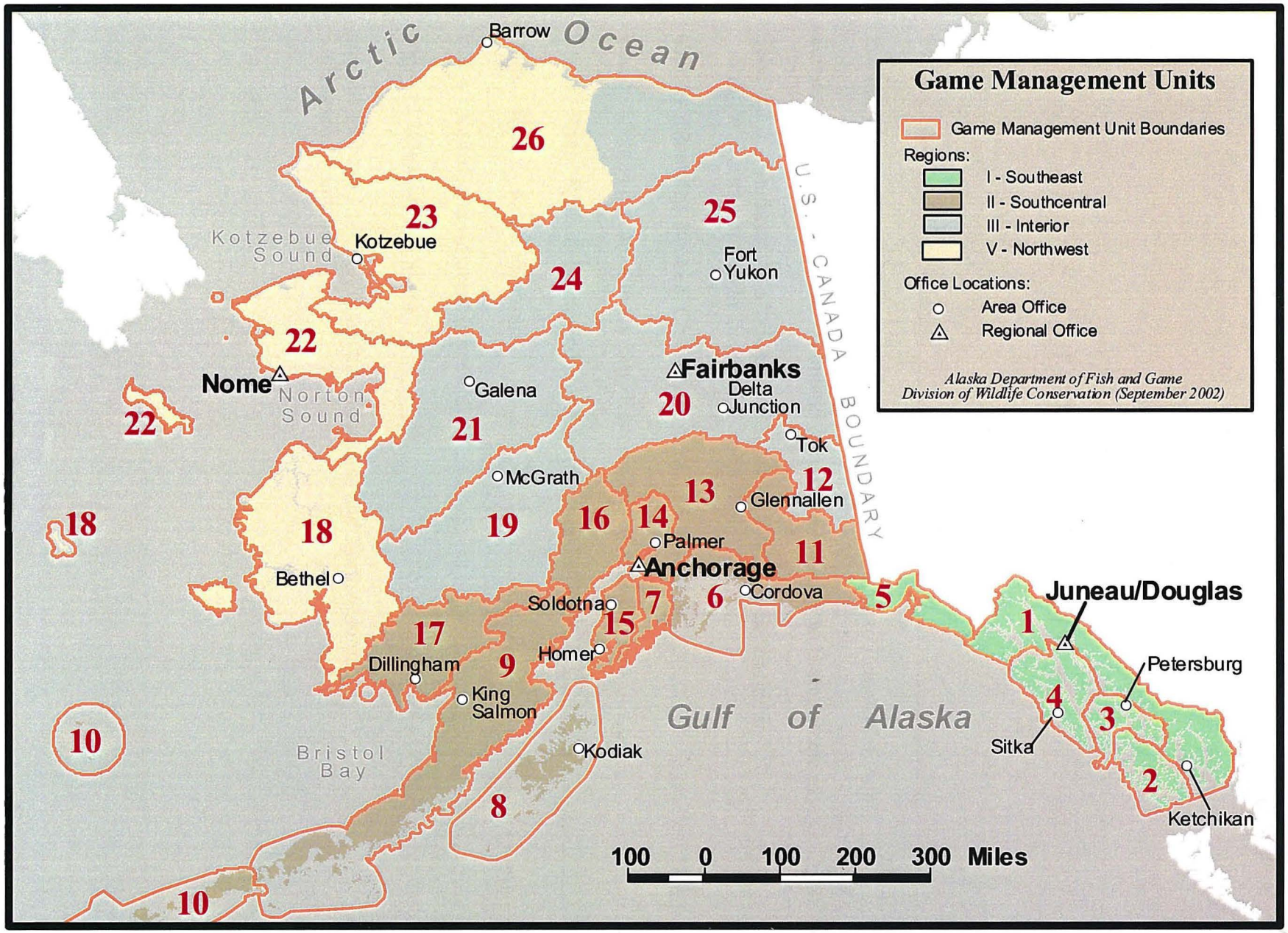
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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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SPECIES
MANAGEMENT REPORT

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 populations to recover and we believe they are currently stable at moderate to high levels throughout most of the unit.

Steep glacial valleys and peaks in Unit 1A provide 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 (Revilla) Island as a result of introductions to Swan Lake (17 goats) in 1983 (Smith and Nichols 1984) and Upper Mahoney Lake (15 goats) in 1991 (ADF&G Unpubl. data, Ketchikan). These areas were selected as introduction sites because they appeared to have suitable escape terrain and adequate winter habitat. The Swan Lake population has increased substantially and we believe it now numbers roughly 160–200 goats. This increase resulted in a hunting season in the eastern part of Revilla Island in 1993. The Revilla Island harvest has remained low since its inception. Rugged terrain and poor access are believed to be responsible for the low harvest.

We estimate that the Upper Mahoney Lake population currently numbers about 100–140 goats. These goats have expanded their range and are utilizing most of the suitable goat habitat in this area. This herd is somewhat isolated, because access to other suitable habitat would require a substantial move across more than 10 miles of open, low elevation habitat. At present there is no hunting season for the Mahoney herd, however ADF&G plans to submit proposals to the state

Board of Game (BOG) in November 2002 for a limited drawing hunt. ADF&G has concerns about the increasing fixed-wing aircraft and helicopters traffic near this introduced herd. We will continue to educate the Ketchikan public, particularly air carriers, about disturbance-related stress and its potential effect on goats. Frid (1997) found that although some habituation to disturbance likely occurs in most situations, there is no evidence suggesting that it occurs enough to eliminate potential impacts of intense, chronic disturbance on reproductive success.

Hunter harvests from Unit 1A averaged roughly 45 goats each season during 1972–1988. The average annual harvest dropped to about 25 during the past 9 seasons as a result of 1989 legislation requiring nonresident goat hunters to hunt with a registered guide. 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 unit's goat populations.

To monitor population changes caused by winter weather, over-foraging, and predation, the department completes aerial surveys of most of the established trend count areas (TCAs) annually or biannually during late summer and fall. Typically in Unit 1A that means about half of the 13 TCAs are counted during any given year. 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 accurately estimate herd size. Nichols (1980) found when properly done, counts made under good conditions (i.e., overcast skies, soft light, no turbulence) in early to midsummer, included about 90 percent of the goats found from ground or helicopter surveys. Results were lower and more inconsistent when made on clear, sunny days because of glare and because some goats were hidden from observers. Some observers believe that helicopter and ground counts provide the optimal estimate of actual numbers. However, the cost and logistics of such measures make them impractical in most areas of Alaska.

Goat sightability is an important factor in estimating the actual number present, or in determining trends based on goats observed during aerial surveys. For example, in Southeastern Alaska and British Columbia, where goats spend considerable time in forested habitats (Schoen and Kirchhoff 1982, Fox 1983, Smith 1983, Herbert and Turnbull 1977, Foster 1982), goat sightability is generally low. Foster (1982) reported an average sightability of only 42% for ground surveys in west central British Columbia. From fixed-wing aircraft even when aided by telemetry, Smith (1983) averaged only 30% sightability in coastal Southeast Alaska. Smith (1983) also compared fixed-wing aircraft surveys with helicopter counts of the same area with similar results. This same study estimated the density of goats in Unit 1A at between 1.0–2.3 goats/km^2.

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 often in established trend count areas throughout Unit 1A.

3. Monitor sex composition of the harvest and manage for < 6 points per hundred goats using a weighted harvest point system (males = 1 point, females = 2 points).

METHODS

We attempt to survey at least 6 of the unit's 13 established TCAs each fall as weather and work schedules allow. TCAs vary in size from 23–200 mi^2. We generally initiate surveys during late August or September, and begin daily efforts between 0500–0800 or 1700–1900 hours. We use a PA-18 Supercub with a pilot and one observer flown at an altitude 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 collected 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 the annual harvest to determine a guideline harvest level. Points are weighted more heavily for females (2 points) than for males (1 point). Using the number of goats observed during annual fall surveys, we apply a harvest cap (6 harvest points allowed per 100 adult goats observed) using a 3-year running average. Hunt areas that reach the harvest cap are closed by emergency order. Smith (1983) stressed the need to monitor both short and long-term environmental fluctuations and subsequent variations in population parameters to assist in making management decisions.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During fall 1999 we completed aerial surveys in the following TCAs: K-3 Rudyerd Bay to Smeaton Arm, K-5 Marten Arm to Portland Canal, K-7 Yes Bay/Reflection Lake, K-8 Bradfield Canal to Unuk River, K-9 Chickamin River to 2722, K-13 Mahoney Mountain. (Table 1). We observed 444 goats in about 10 hours of flying, or 46 goats/hour. The ratio of 15 kids per 100 adults was lower than previous counts.

During fall 2000 we completed aerial surveys in the following TCAs: K-3 Rudyerd Bay to Smeaton Arm, K-4 Wilson Arm to Boca de Quadra, K-6 Cleveland Peninsula, K-12A Mirror Lake to Swan Lake, K-12B Swan Lake/Mt. Reid, K13 Deer Mountain to Mahoney Peak, and K-14 South end of Boca de Quadra to Portland Canal (Table 1). We observed 435 goats in about 7 survey hours. Our observation rate of 61 goats/hour was up from the previous year, and the highest enumeration rate since 1990. However, this rate is well below the long-term 20-year average of 79 goats per hour. The 2000 ratio of 22 kids/100 adults was well below the 10-year average ($\bar{x}$ =28:100). The high kid count near Mahoney Peak suggests good reproduction in that introduced herd.

We observed a notable increase in the number of goats in TCA K-12A where we also counted the highest kid to adult ratio on record. K-13 is one of 2 areas where goats were introduced, which also had a high kid to adult ratio, indicating good recruitment (Table 2). It appears that the introduced populations are continuing to grow. TCA K-11 had the lowest count since 1993 and no kids were noted during the 1997 survey. Kids may easily be missed during surveys and the aerial count numbers likely represent only a portion of the total young of the year. Kids are hidden behind adults or vegetation and consequently counts represent a minimum estimate. We believe goat populations elsewhere in the subunit remained relatively stable during this report period.

Population Size

Results of aerial mountain goat surveys can only be interpreted as minimum population values (Ballard 1975). 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 the best available for Unit 1A goat numbers.

Population Composition

The 1999 and 2000 surveys resulted in an overall productivity estimate for Unit 1A of 15 and 22 kids/100 adults, respectively (Table 1). The ratios are not directly comparable to overall productivity in Unit 1A because different areas were surveyed each year. Productivity varied among TCAs from 5–40 kids per 100 adults during this report period.

Distribution and Movements

Radio collars from the previous introductions to Unit 1A are no longer transmitting and no new goats have been captured to provide additional movement or distribution data. Two female goats from the original introduction site near Mahoney Peak were still carrying radio collars and eartags during observations in 2000 and 2001 and appear to be in good health, considering both nannies are now between 15 and 18 years of age. Unfortunately the tag numbers have worn off making them unreadable and hence unidentifiable.

MORTALITY

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,	Aug. 1–Dec. 31

Shrimp Bay, and Gedney Pass	
1 goat by registration permit only	
Unit 1A, remainder of Revillagigedo Island	No open season.
Remainder of Unit 1(A)	Aug. 1–Dec. 31
2 goats by registration permit only	

Board of Game Actions and Emergency Orders. During fall 2001 we issued an emergency order closure for goat hunting on the Cleveland Peninsula, including subunits 1A and 1B south of a line between Sunny Bay and Yes Bay. Goats here are distributed over a large area and occur in very small, isolated groups. The nature of the landscape makes emigration of goats from other areas highly unlikely. Goats on the Cleveland Peninsula have historically occurred at low densities, and harvest during the past several years has reduced numbers even lower. Wildlife biologists conducted several aerial surveys of this area during September and October, 2001. Low counts during these surveys and data from the past 4 years raise concerns about the health and viability of this goat population. Between 1995 and 2000 hunters harvested a total of 15 goats from this area, including 6 females. Biologists believe that continuing the general hunting season in this area is not warranted due to the low number of goats, and the harvest of any additional goats could be detrimental to the population. Smith and Raedeke (1982) described the vulnerability of this isolated goat population on the Cleveland Peninsula, the fragmented habitat, and the potential for periodic local extinction.

Hunter Harvest. (Table 3) One hundred seventy-four permits and 154 permits were issued for Unit 1A during 1999 and 2000, respectively. Of these, 80 permittees actually hunted during 1999 and 68 hunted during 2000. During the 1999 season, no hunters killed 2 goats, and during the 2000 season 2 hunters killed 2 goats. Thus, 9 hunters killed 9 goats in 1999 and 18 hunters killed 20 goats during the 2000 season. The harvest of 9 goats in 1999 was the lowest on record, and likely resulted from extremely poor weather during the entire season. Hunters' ability to get into the field was hampered by persistent low clouds and poor visibility.

During average years the majority of the goat harvest is split between August and September, with a few taken during October depending on weather patterns. During 1999 and 2000 the harvest was more evenly distributed over the prime 3 months; during the 2000 season 3 goats were harvested during December.

Permit Hunts. Goat hunting in Unit 1A has been regulated by registration permits for the past 19 years. During 1982–1993, a second permit was available for hunters who killed a goat and returned their first 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.

Hunter Residency and Success. Hunters from all residency categories harvested the fewest goats on record from Unit 1A during 1999. Two nonresidents hunted goats successfully in Unit 1A during 1999, and 11 nonresidents killed goats during 2000, the highest nonresident harvest since 1988 (Table 4). Forty-four and 33% of the 1999 and 2000 harvests, respectively, were by hunters residing within the subunit. Alaska residents composed 77% and 60% of the 1999 and 2000 harvest, respectively. Overall hunter success during 1999 was 14%, and in 2000 was 49% (Table 4).

Harvest Chronology. Unlike recent years where the majority of goat harvests have occurred during September, the 1999 harvest was split between August and September with 13 goats taken during each month (Table 5). During the 2000 season, 3 goats were also taken in December. There appears to be an increasing interest in late season goat hunt hunting in Southeast Alaska.

Transport Methods. Airplanes accounted for 78% and 75% of the transportation used by successful hunters during the past two seasons (Table 6). Airplanes accounted for 78% of the transportation used by hunters during the past 5 seasons (range 73–83%). 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 floatplanes and begin their hunt above timberline near goat habitat.

Other Mortality

Cyclic and unpredictable weather 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 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 alpine and subalpine habitats, they are more vulnerable to predation as they seek refuge at lower elevations in old-growth forest where food and escape habitat is much more limited. Deer numbers are low throughout most of Unit 1A, leaving goats as alternative prey for wolves. Avalanches and snow slides also account for some goat mortality during years of heavy snowfall. No evidence of orf or other disease was observed during this report period.

CONCLUSIONS AND RECOMMENDATIONS

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 use areas within the unit, and we anticipate increased nonresident hunter participation. A total of 14 nonresidents hunted goats in Unit 1A and 11 of those were successful. This is the highest number of nonresident hunter's during any season since the inception of the guide requirement.

The 1991 Upper Mahoney Lake goat introduction appears to have been a success. Productivity remains high and the herd has increased from the original 15 to at least 87 goats in fall 2001. 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. We anticipate going to the BOG in fall 2002 with a proposal to open the season in this area to a limited number

of drawing permits. We intend to ask the board to eliminate the 2-goat bag limit, and we are considering a request to close the Cleveland Peninsula to all goat hunting.

Mountain goat populations appear to be stable throughout most of Unit 1A. Several areas we will be watching closely are the Cleveland Peninsula and Yes Bay. These 2 adjacent areas south of the Bradfield Canal will be surveyed annually during the next few years. Recent low counts around Yes Bay/Reflection Lake on the northern Cleveland Peninsula are probably the result of predation and over-browsing of winter habitat rather than hunter harvest. High productivity observed during recent surveys suggests that the population in the Yes Bay area may be slowly rebounding. Our objective of maintaining goat densities greater than 20 goats per hour of survey time has consistently been met.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

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PREPARED BY:
Boyd Porter
Wildlife Biologist III

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1 Unit 1A mountain goat survey data, 1968–2000

Survey dates[a]	Nr of kids	Nr of adults	*TOTAL GOATS*	Kids-100 adults	Count time (hrs.)	Goats/hour
Aug. 20–Sept. 18, 1968	162	553	715	29	4.9	146
Sept. 1–Sept. 16, 1971	111	357	468	31	3.9	120
Aug. 16–Sept. 16, 1973	35	149	184	23	2.5	74
Aug. 27–Sept. 21, 1974	14	50	64	28	1.8	35
Aug. 12–Sept. 11, 1975	84	270	354	31	7.6	46
Sept. 1–Sept. 11, 1976	73	283	356	26	8.0	44
Aug. 31–Sept. 6, 1977	165	354	519	47	6.3	82
Sept. 5–Sept. 9, 1978	126	404	530	31	5.2	102
Sept. 18–Sept. 21, 1979	62	238	300	26	3.8	79
Aug. 20–Sept. 12, 1980	215	617	832	35	9.6	87
Aug. 26–Sept. 21, 1981	153	461	614	33	6.0	102
Aug. 29–Sept. 18, 1982	167	515	682	32	6.9	99
Aug. 30–Sept. 23, 1983	177	658	835	27	7.5	111
Sept. 5–Sept. 24, 1984	174	666	840	26	7.1	118
Sept. 9–Sept. 26, 1985	75	311	386	24	3.3	117
Sept. 12–Sept. 15, 1986	64	359	423	18	4.0	106
Sept. 23–Oct. 8, 1987	39	182	221	21	2.0	110
Sept. 3–Sept. 19, 1988	104	304	408	34	4.4	93
Sept. 10–Sept. 13, 1989	124	415	539	30	5.5	98
Sept. 6–Oct. 3, 1990	193	603	796	32	9.3	85
Aug. 30–Sept. 5, 1993	47	163	210	29	6.8	31
Sept. 8–Oct. 1, 1994[b]	81	414	495	19	8.8	56
Aug. 28–Sept. 4, 1995	55	290	345	19	8.7	40
Sept. 3–Sept. 30, 1996	112	309	421	36	10.6	40
Sept. 9–Sept. 29, 1997	147	551	698	37	12.0	46
Sept. 13–Sept. 21, 1998	102	450	552	40	10.4	53
Sept. 12–Sept. 27, 1999	56	377	423	15	7.8	44
Aug. 23–Oct. 4, 2000	79	356	435	22	7.1	61

[a]Most comparable data is from 1975–2000.

[b]Includes a 48 minute survey of the Deer Mountain/Upper Mahoney Lake introduced population on September 8. Fourteen adults and 4 kids were observedTable 2 Unit 1A mountain goat trend count area surveys, 1980–2000

SURVEY AREA	*Year*	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
K-3	2000	60	13	73	1.5	48	22	0
	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	2000	73	10	83	1.0	83	14	2
	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	2000	14	3	17	1.0	17	21	0
	1999	149	16	165	1.3	127	11	2
	1998	158	36	194	2.0	97	23	3

Table 2 continued

SURVEY AREA	*Year*	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	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
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

Table 2 continued

SURVEY AREA	*Year*	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	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

Table 2 continued

SURVEY AREA	*Year*	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	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	2000	26	7	37	0.8	32	19	0
	1998	27	12	39	0.5	78	44	1
	1996	18	5	23	0.8	31	28	0
	1995	32	4	36	0.7	51	12	0
	1992	27	7	34	0.4	79	26	0
K-12B	2000	76	21	87	1.2	41	28	0
	1998[b]	62	12	74	1.3	57	19	0
	1996	74	35	109	1.6	68	47	6
	1995	64	13	77	1.8	43	20	1
	1992	35	15	50	1.5	33	43	3
	1991	18	7	25	--	--	39	--
	1990	20	9	29	1.1	26	45	2
	1988	29	14	43	1.2	36	33	2
K-13[e]								
	1998	46	13	59	0.8	79	28	1
	1997	35	13	48	1.1	44	37	1

Table 2 continued

SURVEY AREA	*Year*	Adults	Kids	Total goats	Survey time (hrs)	Goats observed/hr	Kids: 100 adults	Sets of twins
	1996	26	13	39	1.0	39	50	0
	1994	14	4	18	0.8	23	28	0

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

Table 3 Unit 1A mountain goat harvest data by permit hunt, regulatory years 1985 through 2000

Hunt	Regulatory year	Permits issued[a]	Did not hunt	Unsuccessful hunters	Successful hunters	Harvest						Total harvest
						Males	(%)	Females	(%)	Unk	(%)	
RG001	1985–1986	261	122	88	51	29	(57)	22	(43)	0	(0)	51
	1986–1987	244	122	71	51	16	(31)	33	(65)	2	(4)	51
	1987–1988	195	107	61	27	14	(52)	3	(48)	0	(0)	27
	1988–1989	202	78	78	33	14	(42)	19	(58)	0	(0)	33
	1989–1990	182[b]	87	66	23	14	(16)	9	(39)	0	(0)	23
	1990–1991	208[c]	91	76	20	14	(70)	6	(30)	0	(0)	20
	1991–1992	245[d]	127	80	16	10	(63)	5	(31)	1	(6)	16
	1992–1993	246	120	76	23	17	(74)	6	(26)	0	(0)	23
	1993–1994	299	197	52	33	20	(61)	13	(39)	0	(0)	33
	1994–1995[e]	215	135	55	20[f]	11	(55)	9	(45)	0	(0)	20
	1995–1996	201	112	54	24[g]	14	(58)	10	(42)	0	(0)	24
	1996–1997	171	91	48	22	14	(64)	8	(36)	0	(0)	22
	1997–1998	177	82	51	36[h]	17	(47)	19	(53)	0	(0)	36
	1998–1999	205[b]	91	65	33[i]	20	(61)	13	(39)	0	(0)	33
	1999–2000	174	94	56	9	5	(56)	4	(44)	0	(0)	9
	2000–2001	154	86	31	24[f]	14	(58)	10	(42)	0	(0)	24

[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" categories.

[b] One permit not returned.

[c] Three permits not returned.

[d] Four permits not returned.

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

[f] Two hunters killed two goats (18 hunters killed 20 goats).

[g] One hunter killed two goats (23 hunters killed 24 goats).

[h] Five hunters killed two goats (31 hunters killed 36 goats).

[i] Four hunters killed two goats (29 hunters killed 33 goats).

Table 4 Unit 1A mountain goat hunter residency and success, regulatory years 1985 through 2000

Regulatory year	Successful					Unsuccessful					Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	
1985–1986		30	21	51	(37)		67	21	88	(63)	139
1986–1987		39	12	51	(42)		48	23	71	(58)	122
1987–1988	15	0	12	27	(31)	44	3	14	61	(69)	88
1988–1989	19	0	14	33	(33)	35	0	31	66	(67)	99
1989–1990	18	4	1	23	(26)	49	16	1	66	(74)	89
1990–1991	17	3	0	20	(20)	75	6	0	81	(80)	101
1991–1992	15	1	0	16	(17)	73	7	0	80	(83)	96
1992–1993	17	5	1	23	(23)	67	8	1	76	(77)	99
1993–1994	29	4	0	33	(39)	50	2	0	52	(61)	85
1994–1995	15	3	2	20	(27)	45	9	1	55	(73)	75
1995–1996	18	6	0	24	(31)	38	14	2	54	(69)	78
1996–1997	14	8	0	22	(31)	30	15	3	48	(69)	70
1997–1998	24	10	2	36	(41)	40	8	3	51	(59)	87
1998–1999	21	8	4	33	(34)	51	10	4	65	(66)	98
1999–2000	4	3	2	9	(14)	41	6	9	56	(86)	65
2000–2001	9	7	11	27	(49)	24	4	3	31	(51)	58

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

Table 5 Unit 1A goat harvest chronology percent by month, 1985 through 2000

REGULATORY YEAR	Aug	(%)	SEPT	(%)	Oct	(%)	Nov	(%)	Dec	(%)	Unk	(%)	*n*
1985–1986	7	(14)	25	(49)	15	(29)	0	(0)	4	(8)	0	(0)	51
1986–1987	8	(16)	30	(59)	4	(8)	1	(2)	8	(16)	0	(0)	51
1987–1988	9	(33)	8	(30)	6	(22)	3	(11)	1	(4)	0	(0)	27
1988–1989	8	(24)	19	(58)	5	(15)	1	(3)	0	(0)	0	(0)	33
1989–1990	4	(17)	7	(31)	4	(17)	3	(13)	5	(22)	0	(0)	23
1990–1991	9	(45)	8	(40)	2	(10)	1	(5)	0	(0)	0	(0)	20
1991–1992	5	(31)	3	(19)	4	(25)	1	(6)	3	(19)	0	(0)	16
1992–1993	7	(31)	6	(26)	6	(26)	4	(17)	0	(0)	0	(0)	23
1993–1994	5	(15)	15	(46)	9	(27)	0	(0)	4	(12)	0	(0)	33
1994–1995	1	(5)	13	(65)	6	(30)	0	(0)	0	(0)	0	(0)	20
1995–1996	3	(13)	19	(79)	2	(8)	0	(0)	0	(0)	0	(0)	24
1996–1997	5	(23)	15	(68)	2	(9)	0	(0)	0	(0)	0	(0)	22
1997–1998	13	(36)	13	(36)	7	(20)	3	(8)	0	(0)	0	(0)	36
1998–1999	8	(25)	12	(36)	11	(33)	1	(3)	1	(3)	0	(0)	33
1999–2000	5	(56)	2	(22)	2	(22)	0	(0)	0	(0)	0	(0)	9
2000–2001	4	(17)	7	(29)	9	(38)	1	(4)	3	(12)	0	(0)	24

Table 6 Unit 1A mountain goat harvest percent by transport method, regulatory years 1985 through 2000

Regulatory year	Harvest percent by transport method								
	Airplane	Air (%)	Boat	Boat (%)	Dog sled	Sled (%)	Unk	Unk.(%)	*n*
1985–1986	46	(90)	5	(10)	0	(0)	0	(0)	51
1986–1987	42	(82)	9	(18)	0	(0)	0	(0)	51
1987–1988	17	(63)	10	(37)	0	(0)	0	(0)	27
1988–1989	28	(85)	5	(15)	0	(0)	0	(0)	33
1989–1990	11	(48)	12	(52)	0	(0)	0	(0)	23
1990–1991	12	(60)	8	(40)	0	(0)	0	(0)	20
1991–1992	8	(50)	8	(50)	0	(0)	0	(0)	16
1992–1993	20	(87)	3	(13)	0	(0)	0	(0)	23
1993–1994	23	(70)	10	(30)	0	(0)	0	(0)	33
1994–1995	14	(70)	6	(30)	0	(0)	0	(0)	20
1995–1996	21	(88)	3	(12)	0	(0)	0	(0)	24
1996–1997	18	(82)	2	(9)	2	(9)	0	(0)	22
1997–1998	30	(83)	6	(17)	0	(0)	0	(0)	36
1998–1999	24	(73)	9	(27)	0	(0)	0	(0)	33
1999–2000	7	(78)	2	(22)	0	(0)	0	(0)	9
2000–2001	18	(75)	6	(25)	0	(0)	0	(0)	24

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

LOCATION

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

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

BACKGROUND

HABITAT DESCRIPTION

ADF&G does not have an estimate for the amount of suitable goat habitat in Unit 1B. About 850 square miles is comprised of forest habitat, some of which serves as important goat winter range, particularly during periods of severe winter weather.

Mountain goats in Southeast Alaska use alpine, subalpine and some heavily forested habitats (Fox 1983, Schoen and Kirchhoff 1982, Smith 1985), typically in proximity to steep escape terrain that provides security from predators. Considered generalist feeders (Dailey et al. 1984), goats take advantage of a wide variety of plant types for food (Geist 1971, Adams and Bailey 1983).

In spring, goats occupy avalanche chutes and low elevation south facing slopes where they forage on alder, rhizomes, and new shoots of ferns. As snow melts in the summer, goats move to high elevation alpine and subalpine habitats where they feed on newly exposed and highly nutritious sedges and forbs (Schoen et al. 1989).

During winter, goats in the colder mainland areas of Southeast Alaska occupy steep or windswept slopes with little snow cover, while those in the warmer coastal areas typically descend to forest habitats during periods of heavy snowfall. Winter is a period of severe nutritional deprivation and food scarcity for mountain goats (Schoen et al. 1989). Forage availability and selection are influenced to large extent by snowpack depth and density. During winter, goats feed on conifers, mosses, and lichens, and to lesser degree shrubs, forbs, ferns, and grasses (Smith, 1986). As a result of high annual precipitation, the majority of goat winter range in Southeast Alaska is limited to forested habitats. During periods of severe winter weather and heavy snowfall goats may even descend to forested coastal shorelines.

The largest threats to mountain goat habitat are development activities associated with logging, mining, and hydroelectric power (Schoen et al. 1989). To date, an estimated 14,000 acres of forested habitat in the subunit have been logged and are now clearcuts in various stages of seral habitats and include some logging roads. Clearcuts and pole stands are considered poor goat winter habitat and roads can make goats vulnerable to exploitation by increased human access.

HUMAN–USE HISTORY

Mountain goats are indigenous to Unit 1B and are distributed throughout appropriate habitat. They have traditionally been hunted for food and trophies. Information about goats in the subunit is limited to aerial surveys, harvest records, anecdotal public reports, and observations by our staff.

REGULATION HISTORY

Prior to 1975, all Unit 1 subunits were managed under the same goat season and bag limit. Since statehood, season dates varied between August 1 and January 31, and the resident and nonresident bag limit was 2 goats. Since 1973, the Unit 1B goat season has remained August 1 to December 31. In the late 1960s and early 1970s, a succession of severe winters greatly reduced the goat population in the unit. Since 1975, the subunit has been managed separately from the remainder of Unit 1 and the bag limit has fluctuated from 1 to 2 goats.

Since 1980, a registration permit has been required to hunt goats in Unit 1B. From 1991 to the present the subunit has been divided into two separate registration hunts. In RG-001 (formerly #801), that portion of Unit 1B south of the North Fork Bradfield River, there is a 2-goat bag limit. In RG004 (formerly #804), that portion of the unit north of the North Fork Bradfield River, there is a one-goat bag limit.

Due to concerns about a population decline, from 1987 to 1989 the Muddy River, Horn Cliffs, and Le Conte Bay areas were managed via a separate registration hunt (#807). In 1987 and 1988, the bag limit was restricted to one male goat. From 1989 to 1991, the bag limit was changed to one goat of either sex; however, the taking of kids or nannies with kids was prohibited. Although the separate registration hunt for the Horn Cliffs area was abolished in 1991, the regulation prohibiting the taking of kids or nannies with kids remained in affect for that portion of Unit 1B north of the North Fork Bradfield River until 1994.

In July 1989 a law was enacted requiring all nonresident goat hunters to employ the services of a Big Game Guide. Since then, the percentage of goats taken by guided nonresidents has increased annually, with significant increases during the mid to late 1990s.

In 1997, the Federal Subsistence Board made a determination that all rural residents of Units 1B and 3 qualify as subsistence users of goats. In that portion of Unit 1B between LeConte Bay and the North Fork of the Bradfield River, federal regulations require a state permit for the taking of the first goat and a federal registration permit for the taking of a second goat.

Historical harvest patterns

From 1973 to 1997, the Unit 1B harvest averaged 31 goats per year, ranging from a low of 15 goats in 1975, to a high of 50 goats in 1990. In recent years the harvest has remained relatively stable, averaging 31 goats per year for the 10-year period ending in 1998. The overwhelming

majority of the annual harvest occurs in RG004, that portion of the unit north of the North Fork of the Bradfield River.

HARVEST CHRONOLOGY

Annual differences in fall and winter weather conditions have a profound influence on harvest chronology in the subunit. Between 1985 and 1998, most goat harvest during the 5-month season occurred during September and August.

Historical harvest locations

Since 1985 the largest percentage of the Unit 1B goat harvest has occurred in Le Conte Bay, Stikine River, and Thomas Bay, representing 18, 16, and 13 percent of the total harvest, respectively.

Hunters have limited access to most goat habitat in the unit, so hunting pressure tends to be focused near access points. Hunters access goat habitat by hiking up from saltwater, river drainages, or logging roads, or by using floatplanes to fly into the few usable subalpine and alpine lakes in the subunit. The few high elevation lakes suitable for landing aircraft are generally only accessible during the early season before lakes freeze over.

Goats can become increasingly accessible to hunters from saltwater later in the season when snow forces them to lower elevation winter range. In Unit 1B these areas include Le Conte and Thomas bays. Because of increased accessibility and vulnerability to harvest in some areas we monitor the late season harvest closely.

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 percentage 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 their hunts and/or kills, transportation used, and date and sex of kill. We also recorded anecdotal information from hunters and guides.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Data are insufficient to determine precise goat population trends in Unit 1B. Quantitative information on goat movement patterns and winter diet are limited to a radio telemetry study conducted in Unit 1A and the extreme southern portion of Unit 1B (Smith 1982). Although data are scarce, available information indicates Unit 1B goat populations have remained stable with the exception of the late 1960's and early 1970s when severe winters reduced the herd.

Population Size

Precise population estimates are not available for goats in the subunit. Based a mountain goat habitat capability model (Suring 1993), US Forest Service (USFS) and ADF&G biologists estimated that Unit 1B could support approximately 1,219 goats based on the availability of suitable winter habitat.

Population Composition

Table 1 shows the past 9 years of age composition data from aerial trend counts. Differences in sample size occur because inclement weather frequently makes complete surveys difficult. In the September 1999 and September 2000 surveys, kids composed 21% and 18%, respectively, of the goats classified. Annual differences in survey coverage, and uncertainties about the sightability of goats during aerial surveys, make it difficult to estimate abundance.

Distribution and Movements

Southeast Alaska mountain goats occur on most mainland ridge complexes. Goat distribution Information in the subunit is limited to observations made during aerial surveys, observations by staff, and anecdotal reports from the public. Although widely distributed across the subunit, in some areas goats are notably absent or present in small numbers despite the availability of apparently suitable habitat.

Goats typically occupy subalpine and alpine habitats from spring until fall. Depth and duration of snow cover can significantly influence winter movements of goats. In winter goats use windblown or steep slopes with little snow cover, or descend to low elevation forested areas during deep snow periods.

There appear to be sex-linked differences in movements and home range size (Smith 1982) in Southeast goats. Males moved between major ridge complexes, whereas females remained on ridges where they were captured. Inter-ridge movement by males appears to be associated with the rut and contributed to relatively large winter home ranges. Inter-ridge movements by males may be important for preventing problems associated with inbreeding.

During spring, goats generally moved to lower elevation, south-facing rock cliffs, brush, and forest habitats, presumably to take advantage of new green vegetation. Throughout the summer, goats dispersed to a variety of habitat types with an increase in elevation and greater use of northerly exposures. During fall, goats moved down in elevation but still utilized north-facing exposures and inhabited forest, alpine, subalpine, and cliff habitats. Throughout winter goats utilized a wide range of elevations, concentrating at mid-elevations and southern exposures on alpine and rock-cliff habitats with less forested habitat. However, goats substantially utilize steep, broken terrain throughout the year (Schoen 1979).

MORTALITY

Harvest

Season and bag limit	Resident and nonresident hunters
Unit 1B, that portion north of Bradfield Canal and the north fork of the	Aug. 1–Dec. 31 (General hunt only)

Bradfield River

1 goat by registration
permit only

Remainder of Unit 1B *Aug. 1–Dec. 31*
(General hunt only)

2 goats by registration
permit only

Board of Game Actions and Emergency Orders. Although Board of Game action was not required, prior to the fall 2000 hunting season we shortened the reporting period for successful goat hunters to 5 days region wide, under discretionary permit hunt requirements. No Board of Game actions were taken and no emergency orders were issued during the report period.

Hunter Harvest. The 1999 and 2000 Unit 1B harvests of 24 and 27 goats, respectively, were below our management goal of 35 goats (Table 2). Hunter success was 32% in 1999 and 36% in 2000, slightly below and slightly above the management goal of 35 percent, respectively. Males comprised 67% of the harvest in both years. The sex of harvested goats was obtained from registration hunt reports and was not verified by checking hunter kills. We distributed literature designed to help hunters identify male goats in the field and encouraged them to select males.

In recent years, interest in Southeast Alaska goat hunting by nonresident hunters has increased, and because of the guide requirement, we are seeing an associated increase in harvest by guided nonresident hunters. The number of guided hunts increased in RG004 from 3 in 1992 to a high of 16 in 2000. The number of goats harvested by guided hunters during this period increased from just 1 in 1992, to 9 and 8, respectively, in 1999 and 2000.

No federal subsistence permits to harvest a second goat were issued during this report period.

Hunter Residency and Success. Petersburg and Wrangell residents continue to represent the largest group of hunters and harvest the majority of goats taken in the subunit (Table 3). Local residents also represent the largest group of unsuccessful hunters.

During this report period, local residents had 32% success, nonlocal residents 22% success, and guided nonresidents 40% success. Different success rates between local residents, nonlocal residents, and nonresidents are due primarily to lack of effort by many locals rather than differences in hunting skills between groups. Many local hunters hunt primarily from the beach during the late season, hoping for an easy opportunity to harvest a goat. The overall success rate for those permittees who hunted was 32 and 36%, respectively, in 1999 and 2000.

From 1992 to 1998, the success rate for guided hunters in RG004 ranged from 25 to 83%, and averaged 54%. During this report period the guided hunter success rate was 70 and 50%, respectively, in 1999 and 2000. Because of the guide requirement, nonresident hunters typically enjoy the highest success rate.

Harvest in Particular Areas. Goat harvest occurred in 13 Unit 1B Wildlife Analysis Areas (WAAs) during this report period. In 1999, harvest occurred in 8 WAAs, with #1706 providing 38% of the subunit's total annual harvest. The remainder of the harvest was evenly distributed across the remaining 7 WAAs. In 2000, harvest occurred in 11 WAAs with #1605 and #1706 each accounting for 22% of the total kill. The remainder of the harvest was evenly distributed across the remaining 9 WAAs.

Harvest Chronology. Winter weather, particularly during the late season, can have a profound influence on harvest chronology. The greatest proportion of the 1999 harvest occurred in August and December. The highest percentage of the 2000 harvest occurred in December, followed by identical harvests in September and November (Table 4). In 2000, the proportion of the annual harvest taken in December surpassed that of any other month for the first time.

Prior to 1998, the highest proportion of the harvest traditionally occurred in September and August. In recent years there appears to have been a shift from early to late season effort. Although this may reflect recent winter weather conditions, it may also be attributable to an increasing hunter desire to either harvest goats with prime winter pelage, or to take advantage of easy hunting opportunities.

Transport Methods. In 1999 and 2000, 67 and 70%, respectively, of successful hunters accessed their hunting area by boat; the remainder used airplanes, with just 1 hunter using another transportation method (Table 5). The increased percentage of hunters using boats to access hunting areas may reflect a shift toward late season hunts when subalpine lakes are frozen and inaccessible by airplane.

Other Mortality

Although we received no reports of goat mortality unrelated to hunting, other sources of mortality can include predation by wolves, bears, and bald eagles, malnutrition, disease, and injury or death as a result of mishaps and avalanches.

In fall 2000, a guide photographed an adult nanny at Horn Cliffs that was severely infected with contagious ecthyma, commonly called "orf". Orf is a virus that causes blisters and scabs to form on the body of infected animals, primarily affecting the head, mainly the lips, mouth, nose, eyelids, and ears. The virus is spread by direct contact with scabs on infected animals, but can also be contracted through direct contact with scabs that have fallen to the ground. The disease can be fatal but no mortalities were documented in the unit as a result of the disease during this report period. Goats displaying symptoms of orf have been occasionally reported in the Horn Cliffs area in the past.

HABITAT

Assessment

Timber harvest and the resulting destruction of winter range continue to pose the most serious threat to goat habitat in the unit. Roads associated with logging increase hunter access and can make goats increasingly vulnerable to harvest. Department staff routinely review, and comment on, proposed timber sales in an attempt to minimize the effects of logging on important goat winter range.

Enhancement

No habitat enhancement projects for goats have been attempted in the unit.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Currently the results of aerial goat surveys can only be interpreted as minimum population estimates. Annual goat surveys performed only once in a trend count area may not accurately reflect population and composition trends (Ballard 1975). Variables that influence survey results are numerous and for the most part unquantifiable. Uncertainty about the sightability of goats during aerial surveys remains a primary concern. Research is needed to develop reliable methods of inventorying Southeast Alaska goat populations.

During the last two years we have witnessed a significant increase in the number of USFS guide use and service day requests for goat hunting on the 1B mainland. Recent USFS moratoriums imposed on the number of brown bear Big Game Guides and hunters in Units 1 and 4 may have resulted in increased interest in goat guiding.

In June 2001 a meeting was held between USFS permitting authorities, ADF&G, and Unit 1B goat guides to discuss recent increases in both the number of guides and the number of hunt requests for Guide Use Area 01-06. Of particular concern was the potential for localized overharvest and crowding. Guides provided information on the number of clients booked for fall 2001 and the anticipated timing and planned location of scheduled hunts. We will continue to monitor the goat harvest by guided hunters closely.

CONCLUSIONS AND RECOMMENDATIONS

During this report period the goat harvest was below the management objective of 35 goats annually and below the average annual harvest of 31 goats annually during the preceding 10-year period. Hunter success during 1999 and 2000 was slightly below and slightly above, respectively, the management objective of 35%.

We are increasingly concerned about the steady increase in the number of guides, the total number of guided hunts, and the number of goats killed by guided nonresident hunters. Because of the high profitability of goat guiding, many guides restricted from brown bear hunts in the unit are turning their attention toward goat hunts as an alternative source of income.

In recent years the subunit has experienced a shift from early to late season goat harvests. Because of the increased vulnerability of goats during the late season, and concerns about localized overharvest in areas easily accessible from saltwater, we will continue to monitor the harvest carefully, particularly during the late season.

Based on aerial survey data and hunter reports, goat populations appear stable in Unit 1B. Hunting pressure is generally low and tends to be concentrated in areas with easy access. Given recent increases in guided and late season hunts, the goat population and harvest will be monitored closely. Although preliminary at this time, we are considering proposals to the fall 2002 BOG to eliminate the 2-goat bag limit in southern Unit 1B, as well as a drawing permit hunt for nonresident hunters.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

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PREPARED BY:

Richard E. Lowell
Wildlife Biologist II

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 1B summer aerial mountain goat composition counts, regulatory years 1991–2000

Regulatory year[a]	Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
1991	67	(83)	14	(17)	0	21	81	35
1992	117	(70)	50	(30)	0	43	167	72
1994 (Aug. 1994)	90	(74)	31	(26)	0	34	121	35
1994 (June 1995)	339	(94)	21	(6)	0	6	360	32
1996 (Sept. 1996)	59	(74)	21	(26)	0	36	80	52
1997 (Sept. 1997)	144	(87)	21	(13)	0	15	165	73
1998	0	(0)	0	(0)	0	0	0	0
1999 (Sept. 1999)	65	(79)	17	(21)	0	26	82	29
2000 (Sept. 2000)	14	(82)	3	(18)	0	21	17	17

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

Table 2 Unit 1B mountain goat harvest data by permit hunt, regulatory years 1993 through 2000

Hunt No.	Year	Permits [a] issued	Nr hunted	(%) Did not hunt	Nr successful hunters	(%) successful hunters	Nr males	(%) males	Nr Females	Total harvest
RG001	1993		18		11	(61)	5	(45)	6	11
	1994		6		6	(100)	1	(17)	5	6
	1995		11		6	(54)	3	(50)	3	6
	1996		10		1	(10)	0	(0)	1	1
	1997		8		5	(63)	5	(100)	0	5
	1998		15		4	(27)	3	(75)	1	4
	1999		15		2	(13)	2	(100)	0	2
	2000		13		4	(31)	4	(100)	0	4
RG004	1993	147	66	(55)	25	(38)	19	(76)	6	25
	1994	144	80	(44)	28	(35)	19	(68)	9	28
	1995	125	59	(52)	22	(40)	20	(90)	2	22
	1996	147	60	(59)	21	(35)	15	(71)	6	21
	1997	156	70	(55)	28	(40)	21	(75)	7	28
	1998	119	45	(62)	16	(36)	13	(81)	3	16
	1999	139	60	(57)	22	(37)	14	(64)	8	22
	2000	127	63	(50)	23	(37)	14	(61)	9	23
Combined	1993		84		36	(43)	24	(67)	12	36
	1994		86		34	(40)	20	(59)	14	34
	1995		70		28	(40)	23	(82)	5	28
	1996		80		22	(31)	15	(68)	7	22
	1997		78		33	(42)	26	(79)	7	33
	1998		60		20	(33)	16	(80)	4	20
	1999		75		24	(32)	16	(67)	8	24
	2000		76		27	(36)	18	(67)	9	27

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

Table 3 Unit 1B mountain goat hunter residency and success, regulatory years 1993 through 2000

	Successful					Unsuccessful					
Year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
1993	18	16	2	36	(44)	32	13	1	46	(56)	82
1994	21	7	6	34	(40)	35	5	10	50	(60)	84
1995	10	9	9	28	(42)	27	8	3	38	(58)	66
1996	8	7	7	22	(32)	27	12	6	45	(67)	67
1997	20	8	5	33	(42)	30	10	5	45	(58)	78
1998	9	5	6	20	(33)	31	7	2	40	(67)	60
1999	15	1	8	24	(33)	32	14	4	50	(67)	75
2000	12	6	9	27	(36)	26	11	12	49	(64)	76

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

Table 4 Unit 1B mountain goat harvest chronology, percent by month, regulatory years 1993 through 2000

	Month										
	August		September		October		November		December		Total
Year	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	harvest
1993	9	(25)	15	(41)	9	(25)	1	(3)	2	(6)	36
1994	11	(32)	8	(24)	8	(24)	2	(6)	5	(15)	34
1995	7	(25)	12	(43)	5	(18)	2	(7)	2	(7)	28
1996	10	(45)	6	(27)	3	(13)	2	(9)	1	(6)	22
1997	16	(49)	5	(15)	5	(15)	4	(12)	3	(9)	33
1998	6	(30)	1	(5)	5	(25)	5	(25)	3	(15)	20
1999	7	(29)	4	(17)	2	(8)	5	(21)	6	(25)	24
2000	4	(15)	6	(22)	3	(11)	6	(22)	8	(30)	27

Table 5 Unit 1B mountain goat harvest, percent by transport methods, regulatory years 1993 through 2000

Year	Percent of harvest						
	Airplane		Boat		Other		Total harvest
	n	(%)	n	(%)	n	(%)	
1993	20	(56)	16	(44)	0	(0)	36
1994	22	(65)	12	(35)	0	(0)	34
1995	21	(75)	7	(25)	0	(0)	28
1996	12	(54)	9	(40)	1	(6)	22
1997	11	(33)	22	(67)	0	(0)	33
1998	9	(45)	11	(55)	0	(0)	20
1999	8	(33)	16	(67)	0	(0)	24
2000	7	(26)	19	(70)	1	(4)	27

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 popular with local and nonlocal hunters, mountain goat populations in easily accessible areas have been reduced from historic levels during the 1970's and early 1980's. In addition to hunting pressure, severe winter weather conditions and an outbreak of contagious ecthyma (orf) reduced goat numbers, resulting in unit-wide declines. Low goat numbers near the Juneau road system prompted the Board of Game (BOG) to close the area between the Taku Glacier and Eagle Glacier/River prior to the 1984 season. This was followed by a closure of the area south of the Endicott River on the west side of Lynn Canal in 1996. To boost goat numbers near Juneau, mountain goats from the Whiting River were reintroduced to Mount Juneau in summer 1989. All of these goats, individually marked prior to release, apparently left the area by 1992. In spite of this, goats reestablished themselves in the vicinity of Juneau, and are now routinely seen on nearly all local mainland mountains. This resurgence resulted in the BOG adopting a proposal in 1998 to allow an archery-only goat hunt between Pt. Salisbury and the Taku Glacier. The goat populations in other areas in Unit 1C have also rebounded, including the area on the west side of Lynn Canal, resulting in the BOG reopening this area in 1996.

There are two main issues of concern regarding mountain goat management in Unit 1C – guided hunting and tourism. Although goats are distributed throughout the Unit 1C mainland, hunting efforts are usually concentrated in areas where access is relatively easy. Because of this, 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 competition by guides for goat hunts in this area is increasing each year, and will eventually force ADF&G to deal with this high nonresident harvest by shortening the season, changing to a drawing hunt, or some other system to keep the nonresident harvest within acceptable limits.

Since their origin in the early 1980's, helicopter flightseeing tours have become the signature adventure for cruise ship tourists while visiting Juneau. The number of helicopter landings on the Juneau icefields has risen from just a few thousand during the early years of operation to nearly 19,000 in the late 1990's. What effects these overflights have on mountain goat populations are unknown, but concerns about negative influences of this industry on goats are becoming widespread.

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; and
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 1999 and 2000 fall hunts. Population surveys were conducted in a small portion of Unit 1C during the report period.

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 to high densities over most of the hunted range, based on the number of goats seen per hour as well as the general numbers seen during aerial surveys (Table 1). Aerial population surveys were conducted in the following locations: Pt. Salisbury to the Taku Glacier (registration hunt RG014); the south side of the Taku River from Lake Dorothy to Turner Lake; and the west side of Lynn Canal from the Endicott River to Pt. Couverdon. 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, as well as on Mt. Roberts and up the Sheep Creek valley.

MORTALITY

Harvest

Season and bag limits	Resident and nonresident hunters
Unit 1(C), that portion draining into Lynn Canal and Stephens Passage between 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.
Unit 1(C), that portion draining into Stephens Passage and Taku Inlet between Point Salisbury and Taku Glacier	*Oct. 1–Nov. 30* (General hunt only)
1 goat by registration permit by bow and arrow only	
Remainder of Unit 1C	Aug. 1–Nov. 30
1 goat by registration permit only	

Board of Game Actions and Emergency Orders. In fall 2000 the BOG adopted a proposal to change the season for goat hunting on the west side of Lynn Canal, south of the Endicott River. This opening date for this area was changed from October 1 to September 1. Similarly, the BOG changed the season opening date for goat hunting in RG014 (an archery only hunt) from October 1 to September 1.

Hunter Harvest. A total of 77 goats were taken during this report period, 38 in 1999 and 39 in 2000 (Table 2). The average annual harvest decreased by 3 goats over the preceding 2-year period. Males again made up a large part of the harvest (82%), which is substantially higher than the 71% male harvest during the previous report period. The predominantly male harvest resulted from guided hunts within the area. Registered guides are adept at differentiating male from female goats, and guided hunters prefer a male goat because of its trophy status. Also, 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. Because we do not require hunters to present goats for sealing, the reported harvest of male goats may be inflated, as hunters are sometimes reluctant to admit to killing a nanny.

Harvest was concentrated in three wildlife analysis areas (WAA's) during the report period (Table 7). One of these (2518) is in the upper Taku River and access to the area is by floatplane to an alpine lake. The other two areas (2824 and 2825) are in Tracy and Endicott arms. Both of these areas are accessible by boat and bear the brunt of Unit 1C commercial guiding operations.

Permit Hunts. Registration permit hunts RG012, RG013, and RG014 are incorporated under a single permit. The number of permits issued increased from a mean of 159 in the previous report period, to a mean of 185 in 1999–2000 (Table 3). In spite of this rather large increase in the number of permits issued, the mean annual number of hunters (n=77) remained about the same as during the previous report period (n=74). 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 50% during this report period, compared to 57% during 1997–98. Although local resident hunters harvested nearly as many goats during in 1999 and 2000 as non-residents (33 vs. 39, respectively), their average success rate was only 38% compared to 85% for non-resident hunters (Table 4). This is a reflection of nonresidents being required by statute to hunt with a guide, and the fact that most guides are better equipped to hunt goats than the average local resident hunter. The percentage of goats taken by nonresidents (50%) increased slightly from the previous report period (46%), but the number of goats harvested by nonresidents remained at 39. Successful hunters expended an average of 2.8 days per goat during the report period, a level above the mean of 2.5 days per goat during 1997–98 (Table 3). Unsuccessful hunters also expended an average of 2.8 days in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4-month season, accounting for 72% of the take in 1999 and 68% in 2000. 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 goat hunters in the unit. This trend continued during the report period, with 86% of successful hunters using them (Table 5). Other means of transportation included airplanes and highway vehicles. Highway vehicles were used along the Juneau road system.

Commercial Services. The use of commercial services remained about the same as the previous report period, with 51% of hunters using a commercial service versus 44% during 1997–98. Seventy percent of hunters who used commercial services used a guide, and 29% used commercial transportation to the field. 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. Wounding loss may be responsible for additional deaths, but we have not gathered data related to this cause.

HABITAT

Assessment

Unit 1C winter and summer goat range 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, US Forest Service land managers 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

Aerial surveys were completed in three areas. Although management objectives regarding aerial surveys south of the Taku River were not met, this is not cause for alarm as the lower sighting rate is likely the result of a small area being surveyed. Efforts will be made during the next report period to gather more survey information in this area. A survey of the Chilkat Range south of the Endicott River enumerated 36 goats per hour, surpassing the management objective of 30 goats/hour. As weather and funding permit, aerial surveys should be conducted to determine population trends throughout the unit. We intend to define discrete trend count areas, which will provide data that is more comparable year to year.

Hunter effort and success was lower than the preceding report period. In both years of this report period hunters predominantly killed males. 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 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. We intend to propose that the BOG open this season at an earlier date to increase hunter effort.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

LITERATURE CITED

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PREPARED BY:

Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 1C mountain goat composition counts south of the Taku River, regulatory years 1986 through 2000

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
1999[4]	54	12	66	22	18	33
2000[5]	57	3	60	5	5	47
	143	30	179	48	17	36

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).

4 Registration hunt area RG014.

5 The first survey was conducted at Lake Dorothy south of the Taku River. The second survey was conducted in the Chilkat Range over the course of 2 days.

Table 2 Unit 1C annual goat harvest, regulatory years 1990 through 2000

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
1999	28	10	0	38
2000	35	3	1	39

[1] Three of these goats were taken illegally.

Table 3 Unit 1C goat hunter effort and success, regulatory years 1990 through 2000

		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
1999	190	38	97	2.6	40	104	2.6	78	201	2.6
2000	180	39	122	3.1	37	89	2.5	76	211	2.9

Table 4 Unit 1C goat hunter success by community of residence, regulatory years 1990 through 2000

		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
1999	49	17	3	18	29	8	3
2000	51	16	2	21	24	9	4

Table 5 Unit 1C transport methods used by successful goat hunters, regulatory years 1990 through 2000

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)
1999	5	(13)	32	(84)	0	(0)	0	(0)	1	(3)
2000	5	(13)	34	(87)	0	(0)	0	(0)	0	(0)

Table 6 Commercial services used by Unit 1C goat hunters, regulatory years 1991 through 2000

Year	Unit residents		Other AK residents		Nonresidents		Total use		Registered guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1991	21	3	1	1	0	7	22	11	5	6	0
1992	38	4	6	2	2	10	46	16	7	9	0
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
1999	28	9	6	2	0	21	34	32	24	7	0
2000	25	11	8	2	0	25	33	38	25	13	0

Not all hunters report commercial services used

Table 7 Unit 1C mountain goat harvest from all Wildlife Analysis Areas (WAA's), regulatory years 1990 through 2000

WAA	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
2202			1			2						3
2203		2		1			1	3	1			8
2304												-
2305									1			1
2306												-
2307												-
2408	1					2		1		1		5
2409			1			3	1	2			1	8
2410				2	1		1	3				7
2411					1	1		3		1		6
2412	1	1	1									3
2413							1	2	3			6
2514	2							1	2			5
2515								1				1
2517											1	1
2518	3	3	5	6	1	4	2	4	2	2	6	38
2519					1	1			2	1		5
2722												-
2823	3		1	3	4							11
2824	2	7	16	14	23	15	17	15	19	20	18	166
2825	9	3	8	10	7	7	8	8	8	13	11	92
2926			3	7	2	1						13
2927			1	4	2		3	3			2	15
Unkn	9	6	2	0	0	0	0	0	0	0	0	17
TOTAL	30	22	39	47	42	36	34	46	39	38	39	411

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 three separate registration permit hunts with separate hunt areas in Unit 1D (RG023, RG024, and RG026). Also, the Skagway area hunt is bounded by the Taiya River, the Yukon and White Pass Railroad, and the Canadian border and has been closed to goat hunting since 1985, where the allowable harvest became 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. Based on aerial survey information, mountain goat populations appear to be fairly healthy in the remainder of the subunit.

Hundertmark et. al. (1983) examined winter habitat use by mountain goats in the Chilkat Valley. They suggested that the increased access afforded by timber and mineral development would increase hunting pressure and illegal harvest. This added pressure on goats was considered detrimental to goat populations as is habitat loss resulting from logging and mining.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population management objectives identified by staff for Unit 1D goats 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%; and

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

METHODS

Both ADF&G and Bureau of Land Management (BLM) personnel conducted aerial surveys within the subunit during 1999 and 2000. Results from BLM surveys, though not directly comparable to ADF&G data due to different survey aircraft and methodology, are still useful. A common registration permit was used to administer hunts RG023, RG024, and RG026. Harvest parameters, including hunter effort and success rates, were determined for each hunt.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

With only occasional unstandardized surveys flown under a variety of conditions, mountain goat population status in Unit 1D is difficult to evaluate. Survey results vary from year to year for most areas (Tables 1a, b, and c). Some of these variations are undoubtedly due to the intensity and scope of the surveys in any given area. Although some differences within an area's survey results are related to survey conditions, the degree to which any one survey is influenced is unknown. We augment ADF&G survey results with BLM data to provide a more comprehensive evaluation of the Unit 1D goat population.

Historical data suggest that hunting pressure has the potential to reduce goat numbers rapidly in easily accessible areas, such as the Skagway hunt area (Table 1a). Despite the closure, recovery of goats in this area has apparently been slow. In hunt area RG023 a portion of the Takshanuk Mountains borders the Haines Highway. Because other areas in northern Southeast Alaska have exhibited low goat population growth even after several years of hunting closure, these highly accessible areas merit yearly monitoring.

Population Composition

We did not conduct any population estimates during this report period. Rather, we use our surveys to monitor population trends and kid-to-adult ratios in certain areas. We concentrated our effort in the main harvest areas (Taiya Inlet and Takshanuk Mountains) and one location where a hydroelectric project may be initiated. Based on the overall number of goats, percent of kids, and number of goats seen per hour of survey time, the goat population appears healthy (Tables 1a, b, and c).

MORTALITY

HARVEST

Season and bag limits	Resident and nonresident hunters
Unit 1D, that portion between	No open season.

Taiya Inlet and River and the White Pass and Yukon Railroad	
Unit 1D, that portion north and east of the Chilkat River, south of the Canadian border, and south and west of the Ferebee River and Glacier 1 goat by registration permit only	Sept. 15–Nov. 15 (General hunt only)
Unit 1D, that portion north of the Haines Highway and west of the Chilkat River, between the Ferebee River and Glacier and Taiya River and Inlet, and between the White Pass and Yukon Railroad and the Katzehin River 1 goat by registration permit only	Sept. 1–Nov. 30 (General hunt only)
Remainder of Unit 1D 1 goat by registration permit only	Aug. 1–Dec. 31 (General hunt only)

Board of Game action and Emergency Orders. Although Board of Game action was not required, prior to the fall 2000 hunting season, we shortened the reporting period for successful goat hunters to 5 days region wide, under discretionary permit hunt requirements. Emergency orders were issued in 1999 and 2000 to close the eastern portion of the RGO24 area, which borders Taiya Inlet.

Hunter Harvest. A total of 47 goats were harvested during the report period, 25 in 1999 and 22 in 2000 (Table 2). The 1999 harvest consisted of 10 males and 15 females, compared to the 2000 harvest of 13 males and 9 females. The 2000 harvest was lower than the average annual harvest of 24 for the preceding six years and 25 for the last 11 years. However, the 1999 harvest was close to or equal to those averages (Table 2).

Permit Hunts. Unit 1D mountain goat hunting is regulated under 3 registration permit hunts, administered by a common hunt report. 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. An average of 166 permits were issued during 1999–2000, compared to a mean of 153 during 1997–1998, and a mean of 165 since 1990.

Hunter Residency and Success. A mean of 26% of goat hunters were successful during the report period (Table 4). This is lower than the 29% mean for 1997–98, and lower than the mean of 30%

during 1990–94, but meets the management objective of 25% hunter success. Local residents continue to comprise the majority of Unit 1D goat hunters. In 1999 and 2000, residents of the subunit took 22 (88%) and 17 (77%) of harvested goats, respectively. In 1999 non-local Alaska residents took 3 of the 25 goats harvested, which compares closely to 3 of 22 in 2000. Only Alaska residents hunted for goats in this Unit in 1999, and in 2000 a total of 6 nonresidents (6%) hunted goats; two of them were successful.

Harvest Chronology. Goats can be hunted in Unit 1D from August 1 through December 31, but the season varies between the three hunt areas. Over the years most goats have been harvested from late September to early November. During this report period 32% of the goats were harvested in November, 34% in October, and 21% in September.

Transport Methods. Boats and highway vehicles continue to be the transport methods used most often by successful hunters, amounting to 55% and 28%, respectively during the report period (Table 5). The high percentage of successful hunters using boats seems related to heavy snows forcing goats down to low elevations along Taiya Inlet, leaving them available to hunters on the water. Frequently, nannies descend lower on the cliffs than billies, increasing the chance for a higher-than-desired female harvest. The high number of nannies taken on the east side of Taiya Inlet resulted in two emergency closures this report period. Some hunters, especially Klukwan residents, walk to their hunting area along the Haines Highway.

Commercial Services. Because most Unit 1D goat hunters are local residents, there is little use of commercial services (Table 6). Most hunters have access to either a highway vehicle or a boat and thus provide their own transportation. During the report period only 7 of 145 hunters used commercial services, and 5 of these were nonresidents who were required by state statute to be accompanied by a guide while goat hunting.

Location of Harvest. Accessibility of mountain goat haunts is likely the most important factor in determining vulnerability of goats to hunters. The Takshanuk Mountains are skirted by the Haines Highway on one side, and this area has consistently borne much of the goat harvest in the unit. The east side of Taiya Inlet, readily accessible by boat, has a similar high level of harvest depending on weather conditions. By establishing point values that discourage the taking of females, we are able to manage areas that are used intensively with increased precision.

CONCLUSIONS AND RECOMMENDATIONS

Finer-scale mountain goat management continues to be necessary in Unit 1D as hunting pressure increases. We will continue to use a single application/report for the 3 hunts in the subunit. Careful population and harvest monitoring is necessary, and emergency closures may be required to avoid excessive harvest. Composition surveys should be conducted annually in high use areas. The Skagway closed area should be surveyed again to assess the possibility of reopening the area to hunting, and if opened would probably be managed with a drawing permit. Finally, permanent trend count areas with well-defined boundaries should be established to enhance comparable surveys from year to year.

As predicted in the last management report, helicopter activities in Unit 1D have increased, as have our concerns about their immediate and long-term effects on mountain goats. There are

currently two heliskiing companies based in Haines, and the area is gaining some renown among afficionados of remote skiing. Flightseeing is expected to expand and as a corollary, the practice of using helicopters to access remote areas for hiking and mountaineering is also expected to increase. Cote's (1996) research concerning mountain goat responses to helicopter activity indicates that we should investigate ways of monitoring these various uses of goat habitat. By sharing information with the BLM, our management of goats in this area will continue to become more effective.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

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PREPARED BY:
Polly Hessing
Wildlife Biologist II

SUBMITTED BY:
Bruce Dinneford
Management Coordinator

Table 1a Unit 1D mountain goat composition counts, Skagway closed area, regulatory years 1981–2000

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			No survey			
1991			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			No survey			
1998			No survey			
1999			No survey			
2000			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 River.

Table 1b Unit 1D mountain goat composition counts, hunt areas RG023 and RG024, regulatory years 1990–2000

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Klukwah Mt. (K) and Ferebee Glacier/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
1996–1997	*No survey*					
1998	69	23	92	33	(25)	58
1999–2000	*No survey*					
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
1996–1997	*NO SURVEY*					
1998	22	6	28	27	(21)	20
1999–2000	*NO SURVEY*					
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
1996–2000	*No survey*					
East of Ferebee Glacier/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
1995–2000	*No survey*					
	Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass					
1995	64	9	73	14	12	50.5
1996–2000	*No survey*					
	Twin Dewey Peaks, Skagway Pass, Warm Pass					
1995	20	6	26	30	(23)	20
1996–2000	*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
1998–1999	*No survey*					
2000	97	21	108	22	19	83

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

[2] Includes only the Chilkoot River side of the mountain range from Klukwah Mt. to Chilkoot Inlet.

Table 1c Unit 1D mountain goat composition counts, hunt area RG026, regulatory years 1988–2000

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
1995–00	*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
1995–00	*No survey*					
East of Chilkoot Inlet-Katzehin River South						
1993	*No survey*					
1994	32	10	42	31	24	98
1995–1996	*No survey*					
1997	5	2	7	40	29	N/A
1998–2000	*No survey*					

[1] First survey listed conducted by the BLM in a PA-18 aircraft.

[2] Survey consisted of a significantly larger area than previous surveys represented.

[3] Survey time not available.

Table 2 Unit 1D annual mountain goat harvest, regulatory years 1988–2000

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
1999	10	15	0	25
2000	13	9	0	22

Table 3 Unit 1D mountain goat hunter effort and success, regulatory years 1990–2000

		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
1999	170	25	40	1.6	60	175	2.9	85	215	2.7
2000	161	22	48	2.2	73	172	2.4	96	222	2.3

Table 4 Unit 1D goat hunter success by community of residence, regulatory years 1990–2000

		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
1999	29	22	3	0	38	22	0
2000	23	17	3	2	54	16	4

Table 5 Unit 1D transport methods used by successful goat hunters, regulatory years 1990–2000

	Airplane		Boat		Foot		Hwy vehicle		Other[1]	
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)
1999	0	(0)	18	(72)	3	(12)	3	(12)	1	(4)
2000	0	(0)	8	(26)	3	(14)	10	(45)	1	(5)

[1] Includes unknown transportation

Table 6 Unit 1D commercial services reported by goat hunters, regulatory years 1991–2000

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
1999[2]	56	2	21	1	0	0	77	3	1	1	1
2000[3]	69	0	19	0	1	4	89	4	4	0	0

[1] Only 37% of hunters reported whether they used, or did not use, commercial services in 1991.
[2] Six percent of hunters did not report whether they used commercial services in 1999.
[3] Three percent of hunters did not report whether they used commercial services in 2000.

Table 7 Unit 1D Goat harvest by Wildlife Analysis Areas (WAA), regulatory years 1990 through 2000

	WAA							
Regulatory year	4302	4303	4304	4405	4406	4407	4408	*Total*
1990	16	2	0	5	0	7	1	32
1991	13	2	0	3	0	4	3	25
1992	13	1	0	5	0	3	1	23
1993	11	5	0	4	1	1	3	25
1994	13	1	0	6	0	4	1	25
1995	14	0	0	0	0	3	1	18
1996	8	0	0	0	4	5	3	20
1997	16	5	0	1	0	5	0	27
1998	17	2	0	0	0	5	3	27
1999	7	0	0	2	0	12	4	25
2000	10	2	0	1	0	9	0	22

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 introduction, and seasons have continued to this time. In 1976 a registration permit system was initiated. 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 Chichagof 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 increasing and dispersing, 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 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 $\geq$ 50% males in the harvest of goats 1–6 years of age; and
3. Maintain a mountain goat population sufficient to provide an annual hunter success rate of at least 15%.

METHODS

Unit 4 goat hunting 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 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.

A total of 135 goat horns voluntarily submitted by successful hunters were examined during 1998–2001. 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.

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 tally of 1013 goats. 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 65% of all goats being seen. Under this assumption the goat population on the island may exceed 1350 animals. Since that time, only select portions of Baranof Island have been surveyed. 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 alpine range is not currently threatened by destructive resource extraction activities (logging and mining with accompanying roads), and winter range appears to be secure for the immediate future. The only recent population estimate for Baranof Island was made in 1991 by E. L. Young, who estimated 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 harvest sex ratios do not reflect population-wide sex ratios.

From 1976 to present, 826 harvested goats have been aged based on discreet annuli in horns (Brandborg 1955). With the exception of kids and yearlings, I suspect that hunters are not selecting against any age class of goat. It is clear that billies are selected over nannies. With this in mind, I assume that within a particular sex, hunter harvest generally gives some indication of the proportion of goats in the population. The long-term median age of billies taken by hunters from Unit 4 is 2 years old, while median age of nannies is 3 years (Figure 1). Mean ages of harvested billies and nannies are 3.83 years and 4.88 years, respectively.

Nannies probably live longer than billies. Eight percent of harvested nannies were $\geq$ 10 years of age, whereas less than 2% of billies were $\geq$ 10 years. The oldest nanny killed was 17 years and the oldest billy was 13 years.

Distribution and Movements

Mountain goats inhabit all available summer range on Baranof Island north of Gut and Whale bays. Goat densities in the various alpine areas are unknown, but I suspect that at least some goat habitats are saturated. There are occasional goat observations south of Whale and Gut bays reported 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 cliffs 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 135 goats from the 1998–2001 seasons yielded data on horn growth.

I suspect that horn growth reflects body growth patterns. Because no annuli are discernable until a 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. Likewise, growth from the year of death cannot be reliably used, as growth may not be completed during that particular year. Additionally, after 6 years of age, growth annuli are so small that accurate measurements are impossible. The 1998–2001 horn measurements yielded 270 usable annuli that could be assigned to any particular year.

Despite earlier indications that incremental horn growth may reflect winter severity (Whitman 2000), addition of horn growth data from the 1999–2001 seasons has led to the conclusion that there is no correlation between horn growth and winter severity (Figure 2).

MORTALITY

Harvest

Season and bag limit	Resident and nonresident hunters
1 goat by registration permit only	Aug. 1–Dec. 31 (General hunt only)

Regulations adopted by the Federal Subsistence Board are identical to state regulations.

Board of Game Actions and Emergency Orders. Although Board of Game action was not required, prior to the fall 2000 hunting season we shortened the reporting period for successful goat hunters to 5 days region wide, under discretionary permit hunt requirements. No Board actions were taken and no emergency orders were issued during the period.

Hunter Harvest. During 1999 and 2000, 300 and 312 registration permits were issued, respectively (Table 1). This resulted in 36 (1999) and 60 (2000) goats being legally harvested. The percent of permittees who actually hunted was 40% and 49%, respectively, during the 2 years. For those hunters going afield, the success rate was 30% in 1999 and 39% in 2000. Five-year averages for the period 1996–2000 were: permits issued, 307; hunters afield, 138; and reported goat harvest, 51. Hunters reported sex of goats in the harvest as 61% males in 1999 and 52% in 2000 (Table 1). With the current population estimate for goats in Unit 4 at 1367 animals, documented harvest accounts for a mortality less than 4% annually.

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

Hunter Residency and Success. Baranof Island residents continue to be the primary users of Unit 4 goats (80% of hunters were local residents during 1999 and 2000, Table 2). The proportion of nonresident, guided hunters appears to be increasing (12% in both years), 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. However, this trend appears to be changing, with more hunters electing to hunt after early-season snows drive goats to lower elevations. During 2000, 19 goats (32%) were harvested during December, with lesser numbers in all other months (Table 3). During 1999, hunters took the largest monthly total during November, when 11 goats (31%) were reported harvested.

Transport Methods. Boats continue to provide the majority of transportation for Unit 4 goat hunters. During 1999 and 2000, successful hunters used boats for primary access 78% and 77%, 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 and accidental deaths due to falls, rockslides, and avalanches undoubtedly take some toll on the 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 report 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. 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 evaluation. Future assessment work should be explored in an effort to determine goat sightability during aerial survey efforts. These data will allow a better estimation of goat population size on the island.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

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PREPARED BY:

Jackson S. Whitman
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 4 mountain goat harvest data for registration permit hunt RG150, regulatory years 1996–2000

Year	Permits issued	Did not report	Did not hunt	Unsucess-ful hunters	Successful hunters	Males	Females	Sex unk.	Illegal	Total Harvest
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
1999	300	0	181	83	36	22	14	0	0	36
2000	312	2	160	90	60	31	29	0	0	60

Table 2 Unit 4 mountain goat hunter residency and success for registration permit hunt RG150, regulatory years 1996–2000

	Successful				Unsuccessful				
Year	Local[a] resident	Nonlocal resident	Nonres	Total	Local[a] resident	Nonlocal resident	Nonres	Total	Total hunters
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
1999	22	5	9	36	70	8	5	83	119
2000	47	1	12	60	76	8	6	90	150

[a]Residents of Baranof Island.

Table 3 Unit 4 mountain goat harvest chronology by month for registration permit hunt RG150, regulatory years 1996–2000

	Month					
Year	August	September	October	November	December	Total
1996	4	13	3	9	13	42
1997	24	9	6	9	7	55
1998	11	12	18	13	9	63
1999	8	8	4	11	5	36
2000	9	10	12	10	19	60

Table 4 Unit 4 mountain goat harvest by transport method used by successful hunters for registration permit hunt RG150, regulatory years 1996–2000

Year	Airplane	Boat	Snow machine	Offroad vehicle	Vehicle	Walked	Total
1996	12	25	1	0	3	1	42
1997	18	30	0	0	4	3	55
1998	8	50	0	1	3	1	63
1999	4	28	0	0	3	1	36
2000	9	46	0	0	1	4	60

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 _____

Figure 1. Age at death of 826 mountain goats (*Oreamnos americanus*) harvested from 1976–2000 in Game Management Unit 4, Southeast Alaska.

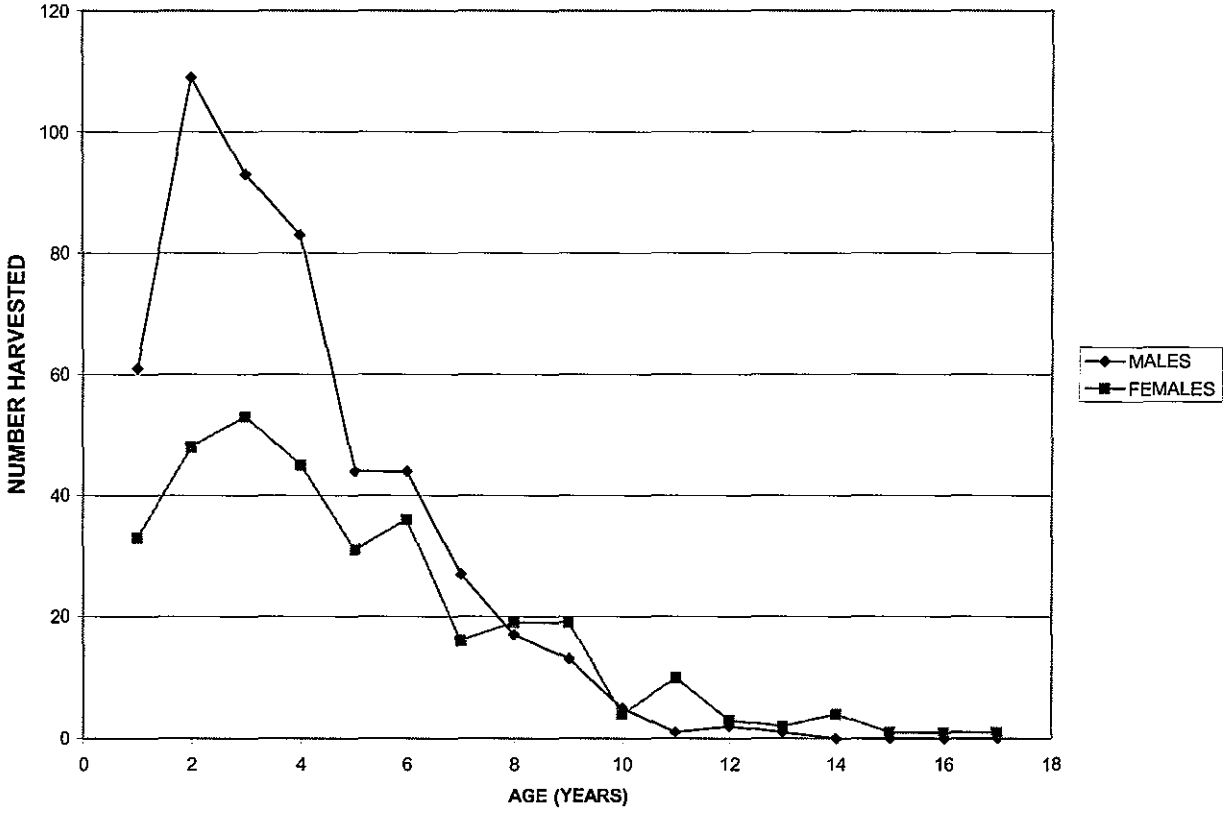
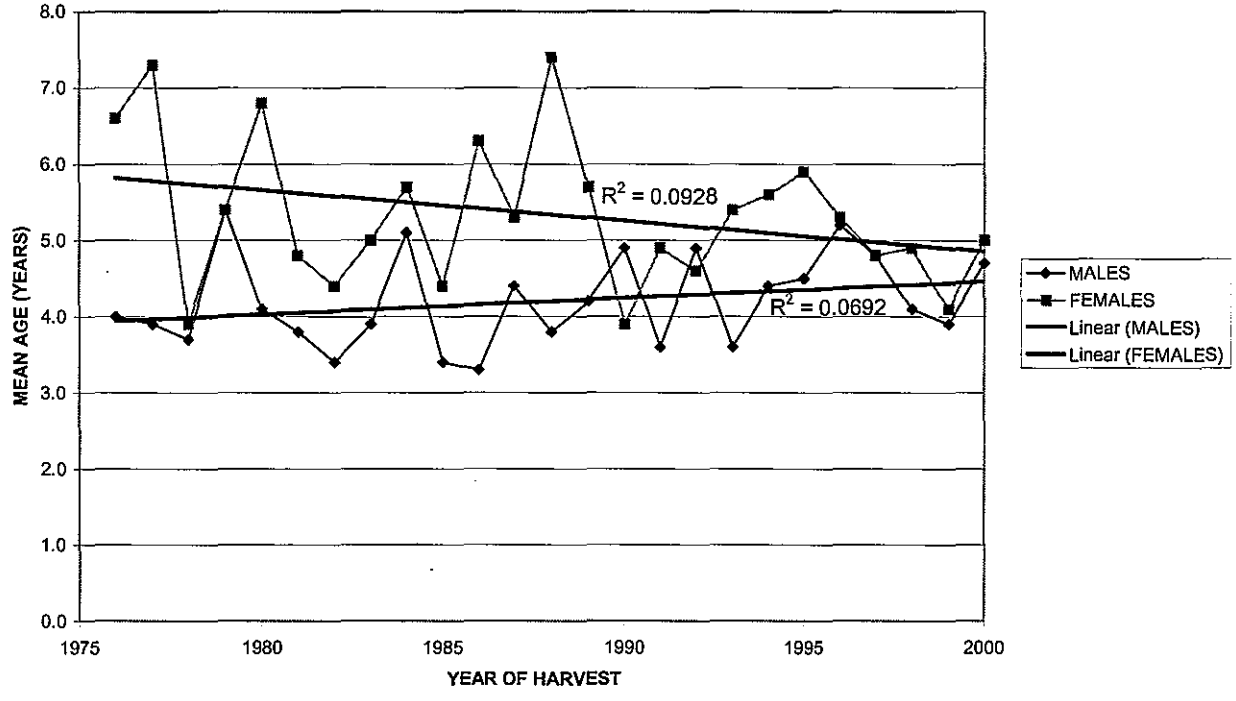


Figure 2. Mean age of harvested mountain goats (*Oreamnos americanus*) from 1976–2000 in Game Management Unit 4, Southeast Alaska.



Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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. Unit 5A surveys and anecdotal accounts from guides, pilots, and hunters during the 1980s 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 were relatively abundant throughout the area.

Nearly all Unit 5 hunting effort is concentrated in Unit 5A for several reasons. First, much of Unit 5B is in Wrangell St. Elias National Park and closed to hunting for mountain goats (the national preserve remains open to hunting), and secondly, the primary goat habitat open to hunting is at Icy Bay and is difficult to access. Private property there belongs to a Native corporation and is not open for hunting to the general public.

There is a state registration permit hunt and a federal hunt for goats in this unit. Season dates for the federal hunt extend to the end of January, whereas the state hunt ends at the end of December. ADF&G receives information from all successful hunters, but information from

unsuccessful federal permittees is often difficult to attain, as the US Fish and Wildlife Service, the data manager, is not adamant about reporting requirements.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Unit 5 mountain goat management objectives identified by staff are as follows:

1. Increase the estimated population from 850 to 1250 goats;
2. Maintain a hunter success rate of 25%; and
3. Conduct aerial surveys in areas of concentrated harvest at least every 3 years.

METHODS

Several aerial surveys were conducted within the unit for the first time since 1989. Lack of survey effort during the 1990's 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 Area Office makes it difficult to plan for and conduct aerial surveys there. Because of a higher than usual harvest of goats in Nunatak Fiord during the report period, we made it a priority to begin collecting goat population information in this unit. Hunters were required to obtain registration permits from ADF&G offices, which helped in-season monitoring of hunter effort and success. Information collected from registration reports included the number of days hunted, method of transportation used, hunt dates, commercial services used, and sex and date of kill. Anecdotal information was gathered from hunters, ADF&G field personnel, and USFS personnel stationed in Yakutat.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Aerial surveys were conducted throughout much of Unit 5A during this report period (Table 1). Since there is not an optimal survey aircraft stationed in Yakutat, these surveys were flown opportunistically when the USFS had a helicopter available. The area from Alsek Lake to Tanis Lake was surveyed under very warm mid-day conditions, resulting in few goats being seen despite the presence of numerous tracks on snowfields. Information from this survey is only marginally useful. The area between Harlequin and Tanis lakes and the north side of Nunatak Fiord were both surveyed under cool and overcast conditions, conducive to good survey results. The number of goats per hour and the percent kids observed in the area east of Harlequin Lake were indicative of healthy goat populations. On the north side of Nunatak Fiord, goat numbers were lower than expected, but further survey efforts should give us a better indication of the population status.

Overall, aerial surveys indicated that Unit 5 goat populations were healthy based on the number of goats seen per hour and the number of kids in the population. In the past we estimated about 1000 goats in Unit 5. Although we did not conduct unitwide aerial surveys during the report period, we did survey approximately 50% of Unit 5A (or 25% of Unit 5) and counted 150 goats under poor conditions. We estimate that sightability was about 50%, thus actual goat numbers

would be about 300 in the area surveyed, and translates to a unit wide population estimate of about 1,000 goats.

MORTALITY

Harvest

Season and bag limits	Resident and nonresident hunters
1 goat by registration permit only	Aug. 1–Dec. 31 (General hunt only)

Hunter Harvest. Twenty-nine goats were harvested during the report period, 19 in 1999 and 10 in 2000, all taken under state registration permits. The sharp increase in harvest during 1998 and 1999 can be attributed to an increase in non-local resident and nonresident hunters (Table 3). Two local residents were guiding illegally and were charged and convicted during the fall of 1999. In addition to these two illegal operations, there was also a Yakutat resident who was transporting non-local goat hunters to the field. Largely because of these factors the goat harvest increased to the point where we were forced to close part of Unit 5A by emergency order in 2000. The percentage of males harvested was 53% in 1999, 70% in 2000, and 59% overall. The 2-year average is slightly lower than the 63% male harvest over the previous 9 years (Table 2). There were 4 goats of unknown sex killed, and for conservative management purposes we counted these as female goats. Three of the goats harvested during the report period were taken in Unit 5B.

The harvest of 19 goats in 1999 was the highest since 1983 when 23 goats were killed. Goat hunting has never attracted a lot of attention in Yakutat, probably due to the cost and logistical difficulty of hunting goats there. During 1990–97 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 1999–2000, the number of hunters decreased by 3 from the previous report period (Table 4), while the number of goats harvested increased from 21 to 29 animals (Table 2). Most of the harvest occurred in 1999 when the illegal guiding activity was taking place, and nearly all of the harvest came from Nunatak Fiord. Anecdotal information from some Yakutat residents suggests that there may have been additional illegal harvest during the report period, but it is impossible to quantify.

Permit Hunts. A total of 44 and 45 registration permits were issued during 1999 and 2000, respectively, 20 fewer than the previous report period (Table 4). Hunting effort differed slightly between 1999 and 2000 with 26 and 21 people hunting, respectively. The mean of 24 hunters per year during the report period is similar to the 1997–98 mean of 25, but noticeably higher than 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 this unit.

No information on federal goat permits was obtained from the USFS during this report period.

Hunter Residency and Success. Goat hunter success averaged 62%, substantially higher than the previous 2-year mean of 42% (Table 3). Eight of 19 successful hunters in 1999 were Yakutat residents; in 2000 Yakutat residents did not harvest any goats. During this same period, harvest by other Alaska residents went from 3 in 1999 to 6 in 2000. Nonresidents accounted for 5 goats

in 1999 and 4 in 2000. There were also 3 goats harvested in 1999 that were taken illegally, but there is confusion as to who took them. Alaska State Fish and Wildlife Protection Troopers provided us information associated with this investigation, but we have not ascertained a clear picture of these events. The number of Yakutat residents hunting during the 1999–2000 period was 13, nonlocal Alaska residents 15, and nonresidents 16. Several events in Unit 5 will result in a change in hunting effort that favors local residents. First, the USFS is considering a decrease in the number of allowed commercial goat hunts which will lower the nonresident effort, and local sentiment against non-local hunters in Yakutat may result in a reduction in transporter efforts.

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 1999 harvest was concentrated in November when all but 2 of the 19 goats were taken. 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. In 2000, the harvest was divided more evenly throughout the fall with 2 being taken in September, and 3 each in October and November.

Transport Methods. Eighty-four and seventy percent of successful hunters used boats during 1999 and 2000, respectively. In most cases goats are hunted from saltwater, and landing an aircraft in these areas is hazardous. Also, hunting from a boat allows hunters the latitude of covering large areas of goat habitat with little effort, whereas a hunter dropped off by airplane is limited to a much smaller area.

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 deep, persistent snowfall.

CONCLUSIONS AND RECOMMENDATIONS

Efforts to obtain mountain goat population information through aerial sex and age composition counts were a priority during the last year of this report period. Additional effort should be made over the next several years to gather population information, especially in the Nunatak Fiord area. Hunting pressure is increasing, and better population information, especially in areas of concentrated harvest, is essential. Our hunt records indicate that hunting effort has been low in most areas in Unit 5, and based on aerial surveys we believe that goat populations could support additional harvest in all but the most popular hunt areas.

In February 2002, Region I Division of Wildlife Conservation wildlife managers met in Ketchikan to review existing goat management objectives. As a result of that meeting, revised objectives will be put in place for the region.

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PREPARED BY:

Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 5 mountain goat composition counts, regulatory years 1986 through 2000

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
1990–1999			**NO SURVEYS**			
2000			**NUNATAK BENCH**			
	69	**13**	**82**	**19**	**16**	**91**
	40	6	46	15	13	52
			EAST HARLEQUIN LAKE			
	55	**16**	**71**	**29**	**23**	**70**
			GATEWAY KNOB[1]			
	48	**4**	**52**	**8**	**8**	**25**

[1] Survey flown under warm and sunny conditions.

Table 2 Unit 5 annual goat harvest, regulatory years 1990 through 2000

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
1999	10	6	3	19
2000	7	2	1	10

Table 3 Unit 5 goat hunter success by community of residence, regulatory years 1990 through 2000

		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
1999[1]	73	8	3	5	2	3	2
2000	48	0	6	4	3	3	5

[1] Three goats were taken illegally by hunters of unknown residency.

Table 4 Unit 5 goat hunter effort and success, regulatory years 1990 through 2000

		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
1999	44	19	31	1.6	7[1]	15	3.0	26	46	1.9
2000	45	10	31	3.1	11	16	1.5	21	47	2.2

[1] Days per hunt data only available for 5 of these hunters.

Table 5 Unit 5 transport methods used by successful goat hunters, regulatory years 1990 through 2000

	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
1999	3	16	16	84	0	0	0	0	0	0
2000	3	30	7	70	0	0	0	0	0	0

Table 6 Unit 5 commercial services used by goat hunters, regulatory years 1990 through 2000

	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
1999	11	0	5	0	0	7	16	7	7
2000	3	0	3	6	0	8	6	14	8

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 events caused significant reductions in the mountain goat population during the last 60 years. 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 a similar reduction 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. Goat numbers remained low during the late 1970s and 1980s because of hunter harvest (Griese 1988*a*) and predation (Reynolds 1981, Griese 1988*b*). By 1987 the estimated population was approximately 3400. It declined to 3000 by 1994 but rebounded to approximately 4000 goats by 1999 as a result of conservative harvest strategies and mild winters.

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 tracking harvest 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 the number of females taken by 2, and lost goats or unknowns by 1.5 (unless the lost goat was identified by sex by a guide). 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 970 goats during 1999 and 1110 goats in 2000 (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 4000 goats unit-wide in 1999–00 and 3640 goats in 2000–01.

Population size and trend varied among units over the past 5 years. Unit 6D (West) had the highest number of goats, but the population began declining during the reporting period (Table 1). Hunt area RG252 declined by 13% and RG249 by 45% since 1998. The goat population in Unit 6D (East) was relatively stable during the reporting period. Goats in Unit 6C peaked during 1997 when hunting resumed after a 10-year closure (Table 1). The population has since stabilized. Goat populations in Units 6A decreased by 8%, driven by declines in RG214 and RG215. Goats in Unit 6B also declined (by 20% since 1998), but part of the decline may be attributed to a survey in RG266 during which goats were lower than usual and concealed in heavy brush.

Survey data and estimates produced since 1989 indicate long-term trends of goat populations in Unit 6 (Fig. 2). Goat numbers in Unit 6A declined through 1994, but have since stabilized. Unit 6B population has been relatively stable since 1989. Unit 6C goats increased steadily because hunting was closed in 1989. This population more than tripled by 1997 and has since stabilized. Goats in Unit 6D (West) increased through 1992, decreased slightly during the next 2 years, then resumed increasing through 1998. The Unit 6D (East) goat population was stable between 1989 and 1994, then increased to an historic high by 1998 where it has remained.

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.

Population Composition

The kid-to-older goat ratio and percent kids for all areas counted during 1999–00 were 16:100 and 14%, respectively (Table 1). These values for 2000–01 were 18:100 and 15%, respectively. 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.

Board of Game Actions and Emergency Orders. The Board of Game made no changes to mountain goat regulations during the reporting period.

Eight emergency orders were issued closing registration permit hunts when MAH was reached. During 1999–00, hunts RG226, RG249 (1 partial closure and 1 full closure), and RG52 were closed. During 2000–01, hunts RG226, RG245, RG249 and RG266 were closed. These were routine management actions.

Hunter Harvest. Unweighted and weighted harvest during 1999–01 was 67 and 73, respectively (Table 2). Harvest during 2000–01 was 68 and 83, respectively. The harvest included 45 males (69%) and 12 females (18%) during1999–01. In 2000–01, the sex composition was 47 males (73%) and 19 females (30%). There were 6 goats of unknown sex taken during the reporting period.

Sex composition of the harvest varied by unit. In Units 6A and 6B, most hunters were guided nonresidents who reported taking almost 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 and experienced goat hunters), who harvested 71 and 75% billies. Most hunters in Unit 6D were nonlocal residents who reported 63% and 70% billies during this period. The relatively low proportion of billies

taken in RG252 (1999) and RG266 (2000), occurred because air and boat charters dropped multiple hunters into primarily nanny/kid areas. Hunters were aware that nannies counted as 2 goats toward the harvest quota, sex verification was not required, hence additional nannies may have been taken and reported as billies.

MAH during 1999–00 and 2000–01 was 108 and 110, respectively (Table 2). Weighted harvest exceeded MAH in 7 of 16 hunts during this reporting period. In Unit 6A and 6B, weighted harvest rates ranged from 1.0 to 2.5 since 1996–97 (Fig. 3 and 4). The harvest in Unit 6C during the same period was 2.3-3.3 (Fig. 5). In Units 6D (East) and 6D (West), the harvest rates were 1.6—3.3 and 2.5—5.2, respectively, since 1996—97 (Figs 6 and 7). MAH in RG249 (1998-2000) and RG266 (2000—01) was exceeded because of high hunter effort, harvest of nannies, and easy access from Valdez (Table 2). Conservative MAH's and resulting low harvest overall were part of our tracking harvest 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). 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. 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. Number of permits issued reached an historic low of 148 in 1995–96, then increased to 311 by 2000–01 (Table 2).

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 51.5%, which was within the normal range during the last 5 years.

Harvest Chronology. September and October were the most productive months overall for goat harvest during the reporting period (Table 4). In Unit 6C the season is open for 1 week each during October and November.

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 and airplanes were primarily used. ORV's and highway vehicles were used following the opening of RG245 in 2000–01 with road access from Valdez.

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 et al. (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 clear-cut 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. Clear-cutting 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. Clear-cutting in hunt area RG204 along the North Fork Yakataga River began during spring 2001 in the Porcupine Creek drainage on University of Alaska (UA) lands. RG204 has the largest population (200 goats) in Game Management Unit 6A.

UA and ADF&G have made some progress in eliminating goat winter habitat from logging in Unit 6A. However, actual evidence of goat use (hair, pellets or goats) must be observed in each individual cut unit before removing from the harvest schedule. This mandate precludes conservation of potential or previously used winter habitat during higher goat population cycles. Searching cut units is labor intensive and requires helicopter support, which UA provided during spring, 2001. ADF&G searched 18 cut units in RG204 and found winter goat use in two units. We did not search any cut units that require helicopter logging because the timber market will not support any logging in those units in the near future (Jeff Hermanns, UA Forester, pers. Comm.).

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 et al. 1996) and restricted hunter harvest, the goat population has remained low. 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 3600. The population was stable to slightly declining since 1996, 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. Weighted harvest rate in the future should not exceed 6%, unless kid survival improves. Hunt areas RG249 and RG266 will be closed earlier in anticipation of high nanny harvest, low kid survival, and easy access by hunters

We achieved our objective of 70% males in the harvest. However, hunter reports were possibly biased. Since the requirement that hunters have sex verified by ADF&G staff was suspended, hunters may have been reluctant to voluntarily report harvest of females. This bias was likely limited to Unit 6D.

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PREPARED BY:

Dave Crowley
Wildlife Biologist III

SUBMITTED BY:

Mike McDonald
Wildlife Biologist III

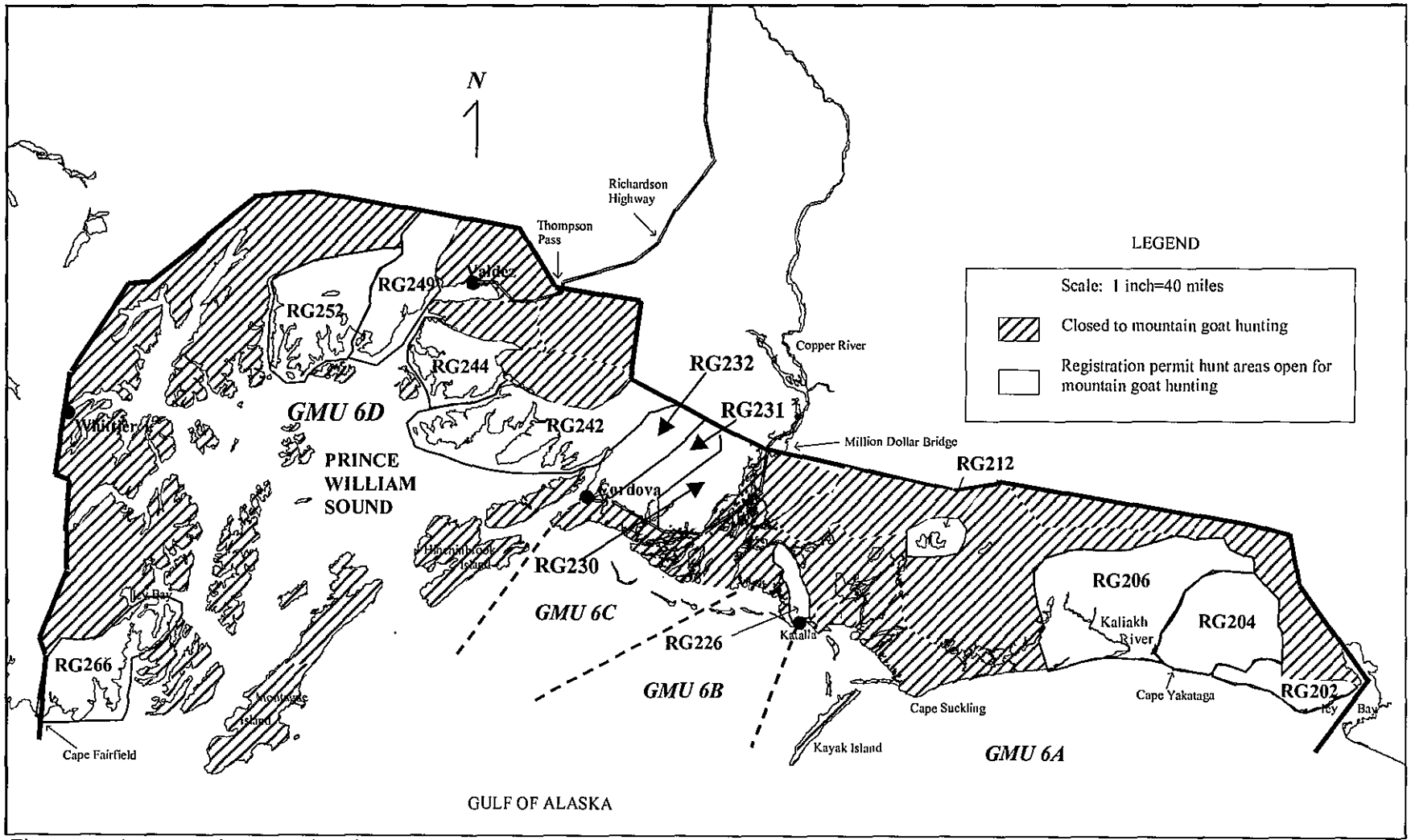

Figure 1 Unit 6 mountain goat registration permit hunts 1996–2000.

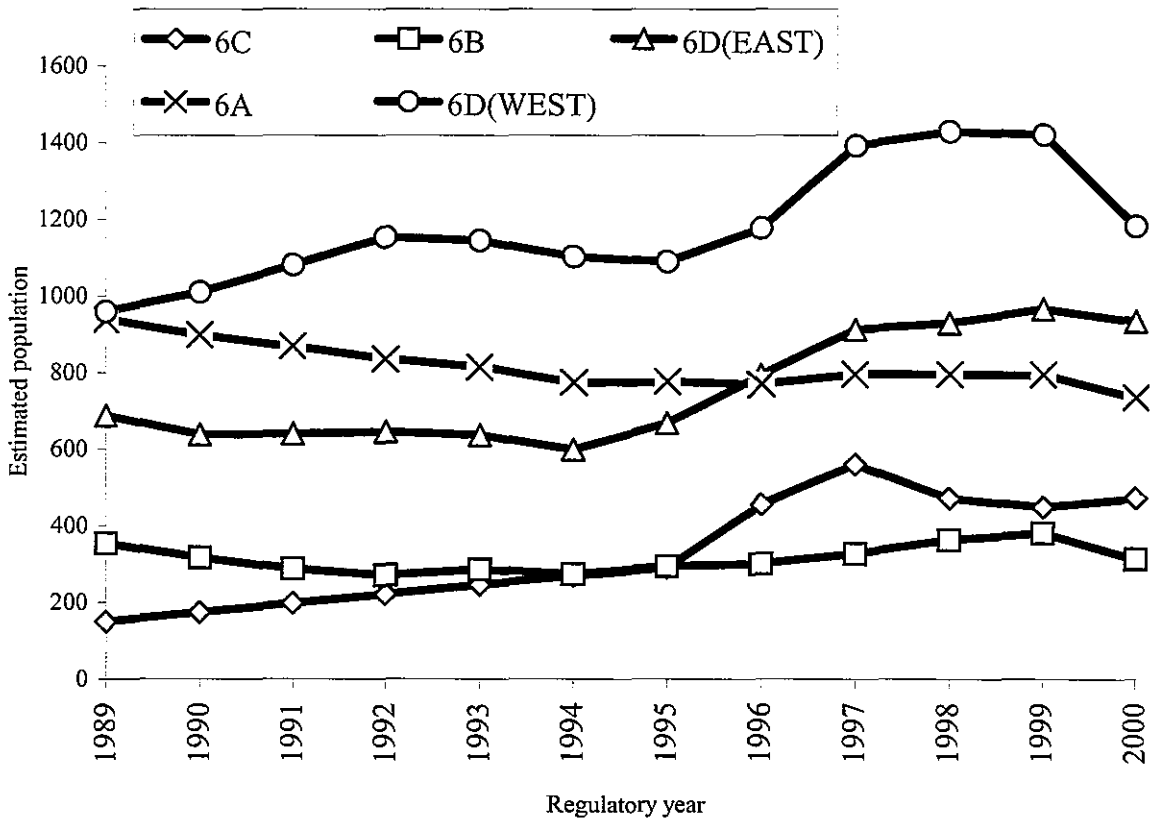

Figure 2 Unit 6 mountain goat estimated population size 1989–2000.

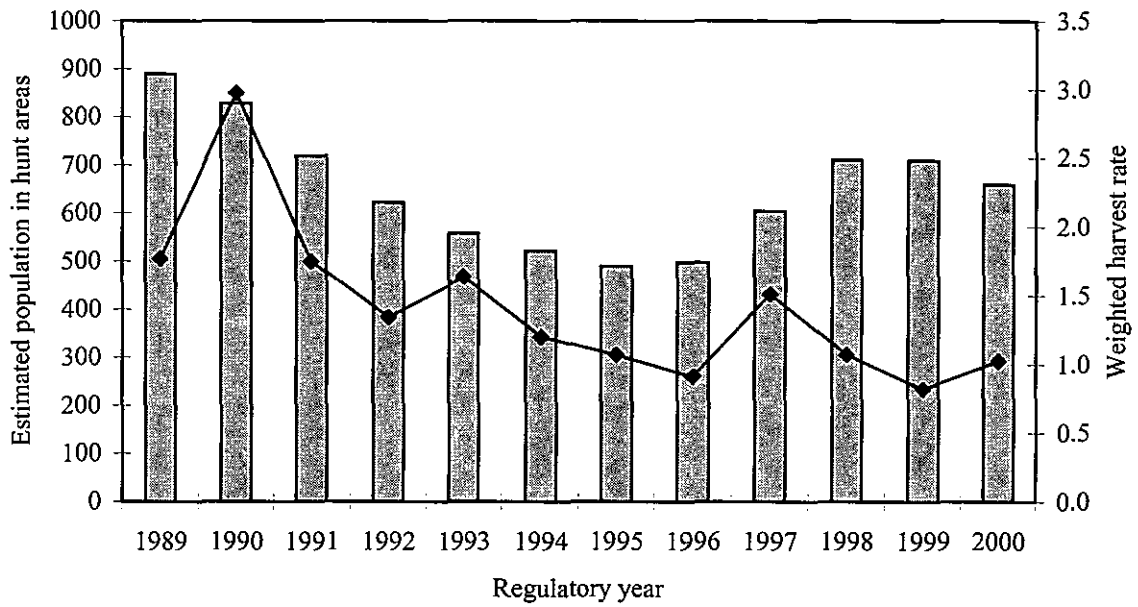

Figure 3 Estimated mountain goat populations and weighted harvest rate (nannies = 2 goats, lost goats = 1.5, billies = 1 goat) in permit hunt areas of Unit 6A, 1989–2000.

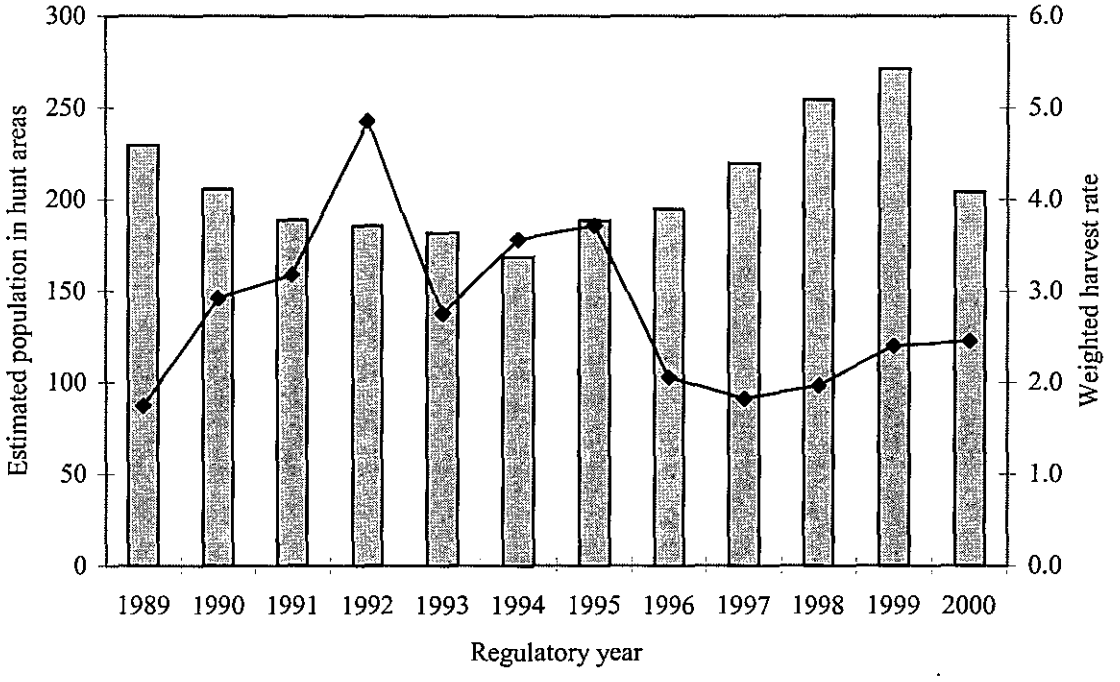

Figure 4 Estimated mountain goat populations and weighted harvest rate (nannies = 2 goats, lost goats = 1.5, billies = 1 goat) in permit hunt areas of Unit 6B, 1989–2000.

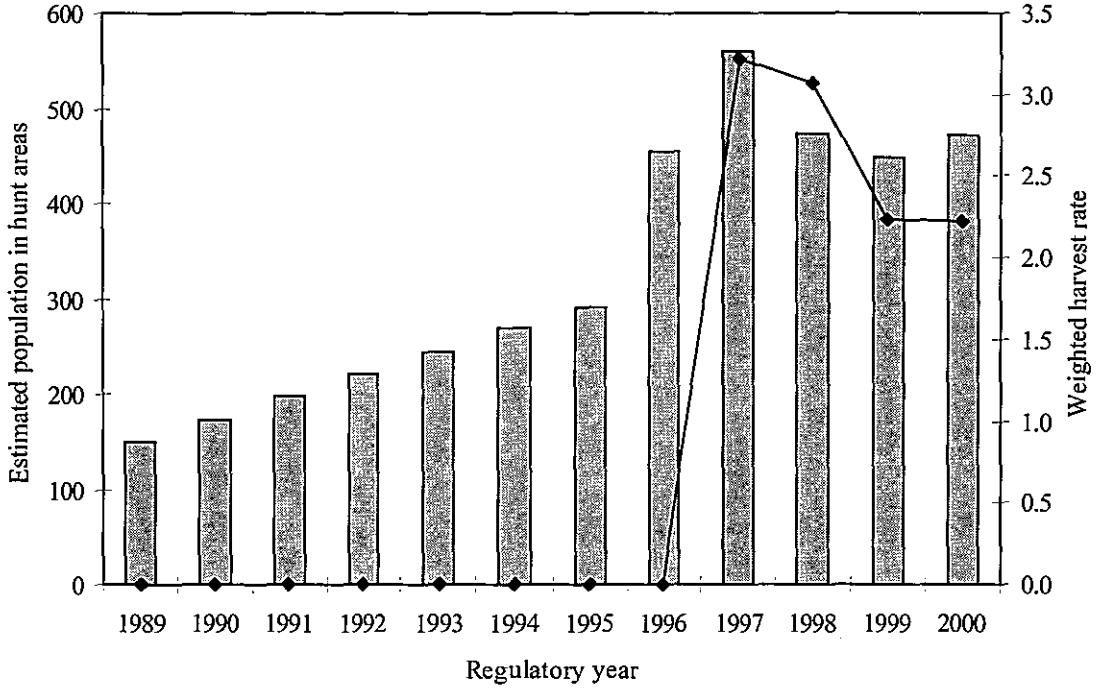

Figure 5. Estimated mountain goat populations and weighted harvest rate (nannies = 2 goats, lost goats = 1.5, billies = 1 goat) in permit hunt areas of Unit 6C, 1989–2000. Hunting resumed during 1997.

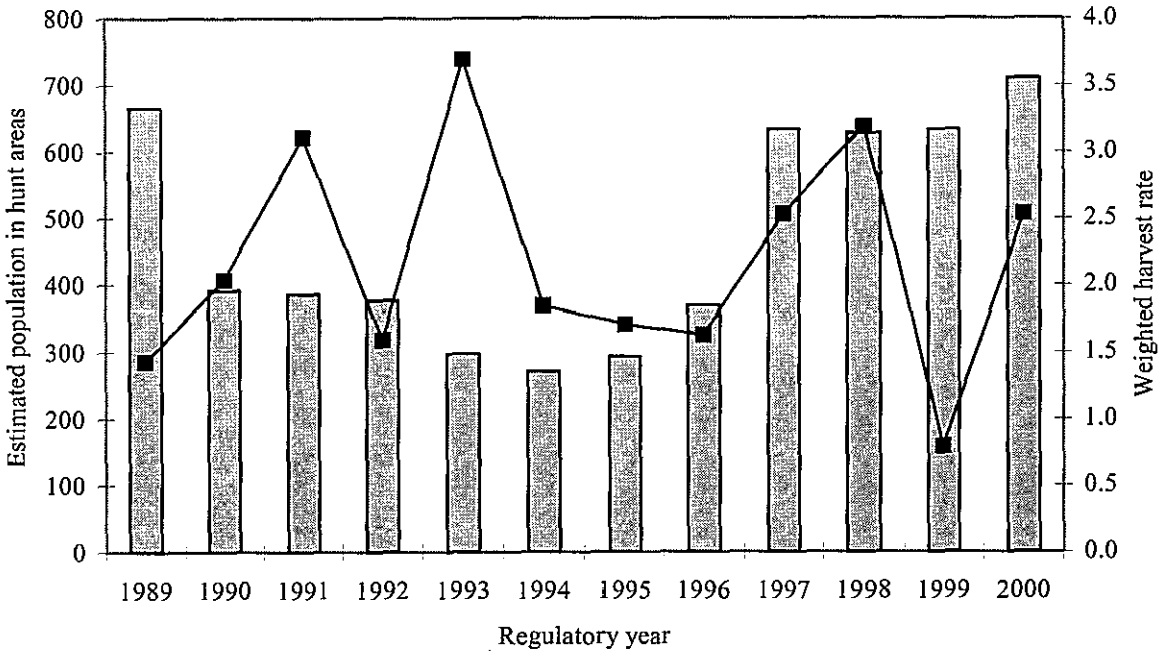

Figure 6. Estimated mountain goat populations and weighted harvest rate (nannies = 2 goats, lost goats = 1.5, billies = 1 goat) in permit hunt areas of Unit 6D (East), 1989–2000.

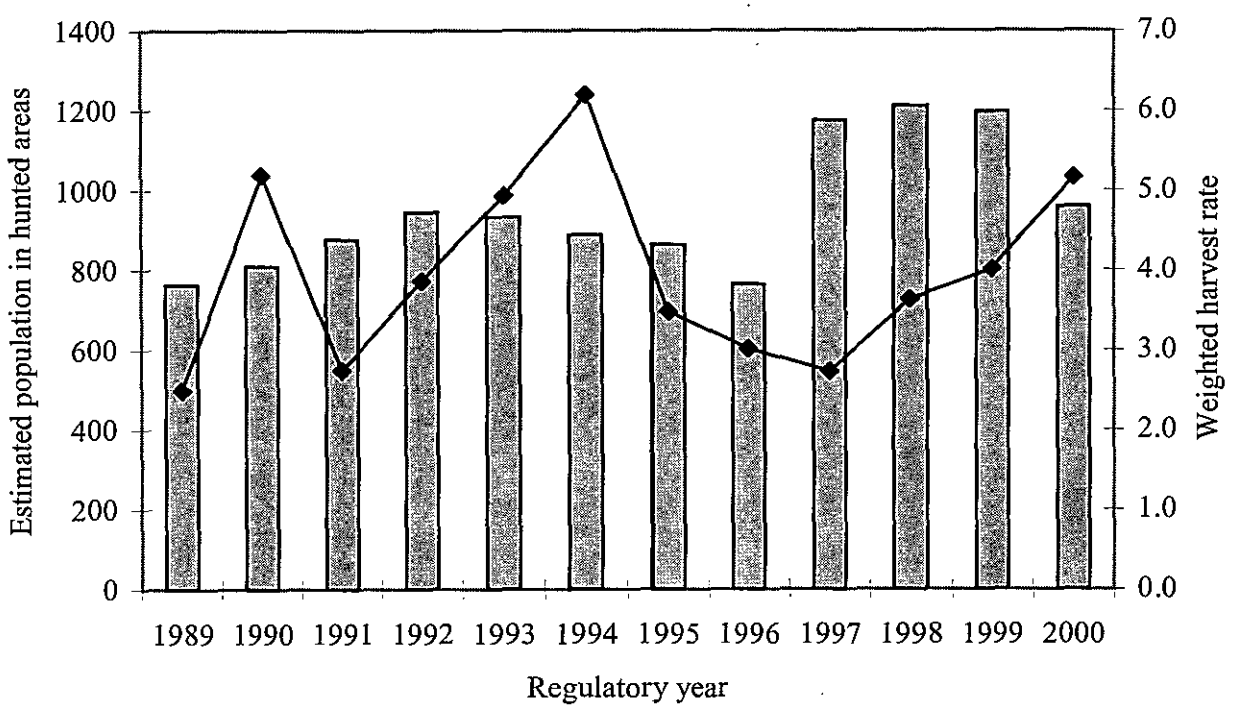

Figure 7. Estimated mountain goat populations and weighted harvest rate (nannies = 2 goats, lost goats = 1.5, billies = 1 goat) in permit hunt areas of Unit 6D (West), 1989–2000.

Table 1 Unit 6 summer/fall mountain goat composition counts and estimated population size, 1996–00.

Unit	Hunt nr. or area	Regulatory Year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size
6A	RG202	1996-1997	None	--	--	--	--	--	--	93
		1997-1998	None	--	--	--	--	--	--	93
		1998-1999	Full	62	(81)	15	(19)	24	24	92
		1999-2000	None	--	--	--	--	--	--	90
		2000-2001	None	--	--	--	--	--	--	90
	Brower Ridge	1996-1997	None	--	--	--	--	--	--	44
		1997-1998	None	--	--	--	--	--	--	43
		1998-1999	None	--	--	--	--	--	--	43
		1999-2000	None	--	--	--	--	--	--	43
		2000-2001	None	--	--	--	--	--	--	43
	RG204	1996-1997	None	--	--	--	--	--	--	170
		1997-1998	None	--	--	--	--	--	--	185
		1998-1999	Partial	138	(82)	25	(15)	18	169	189
		1999-2000	None	--	--	--	--	--	--	195
		2000-2001	None	--	--	--	--	--	--	195
	RG206	1996-1997	None	--	--	--	--	--	--	234
		1997-1998	Partial	103	(54)	19	(16)	18	191	226
		1998-1999	Partial	55	(29)	14	(20)	25	190	225
		1999-2000	None	--	--	--	--	--	--	225
		2000-2001	None	--	--	--	--	--	--	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	1996-1997	None	--	--	--	--	--	--	92
		1997-1998	Full	63	(73)	23	(27)	37	86	103
		1998-1999	None	--	--	--	--	--	--	100
		1999-2000	None	--	--	--	--	--	--	95
		2000-2001	Full	65	(87)	10	(13)	15	75	90
	RG214	1996-1997	None	--	--	--	--	--	--	27
		1997-1998	Partial	13	(56)	3	(19)	23	23	28
		1998-1999	None	--	--	--	--	--	--	20
		1999-2000	None	--	--	--	--	--	--	12
		2000-2001	Full	4	(100)	--	--	--	4	5
	RG215	1996-1997	None	--	--	--	--	--	--	92
		1997-1998	Full	65	(77)	19	(23)	29	84	101
		1998-1999	None	--	--	--	--	--	--	104
		1999-2000	None	--	--	--	--	--	--	106
		2000-2001	Full	39	(78)	11	(22)	28	50	60
	Suckling Hills	1996-1997	None	--	--	--	--	--	--	14
		1997-1998	Full	8	(62)	5	(38)	63	13	16
		1998-1999	None	--	--	--	--	--	--	20
		1999-2000	Partial	17	(81)	4	(19)	24	21	27
		2000-2001	None	--	--	--	--	--	--	26

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		1996-1997	Partial	--	--	--	--	--	--	769
TOTAL		1997-1998	Partial	252	(38)	69	(21)	27	670	795
		1998-1999	Partial	255	(38)	54	(17)	21	677	795
		1999-2000	Partial	17	(3)	4	(19)	24	674	794
		2000-2001	Partial	108	(17)	21	(16)	19	625	735
6B	RG226	1996-1997	Full	112	(82)	25	(18)	22	137	151
		1997-1998	None	--	--	--	--	--	--	158
		1998-1999	Full	135	(89)	16	(11)	12	151	181
		1999-2000	None	--	--	--	--	--	--	186
		2000-2001	Full	76	(80)	19	(20)	25	95	114
	RG220	1996-1997	None	--	--	--	--	--	--	44
		1997-1998	Full	44	(86)	7	(14)	16	51	61
		1998-1999	None	--	--	--	--	--	--	73
		1999-2000	Full	59	(83)	12	(17)	20	71	85
		2000-2001	None	--	--	--	--	--	--	90
	Goat Mt.	1996-2000	None	--	--	--	--	--	--	110
6B		1996-1997	Partial	112	(63)	25	(18)	22	177	195
TOTAL		1997-1998	Partial	44	(23)	7	(14)	16	195	220
		1998-1999	Partial	135	(64)	16	(11)	12	212	254
		1999-2000	Partial	59	(26)	12	(17)	20	226	271
		2000-2001	Partial	76	(45)	19	(20)	25	170	204
6C		1996-1997	Partial	118	(30)	34	(22)	29	389	455
TOTAL		1997-1998	Full	396	(83)	84	(18)	21	480	560
		1998-1999	Full	359	(91)	34	(9)	9	393	473
		1999-2000	Full	326	(84)	60	(16)	18	386	448
		2000-2001	Partial	123	(30)	13	(3)	11	416	472
6D	RG242	1996-1997	Full	248	(78)	72	(23)	29	320	369
		1997-1998	None	--	--	--	--	--	--	378
		1998-1999	Full	283	(85)	50	(15)	18	333	386
		1999-2000	None	--	--	--	--	--	--	406

		2000-2001	Full	331	(83)	66	(17)	20	397	465
	RG243	1996-1997	None	--	--	--	--	--	--	105
		1997-1998	None	--	--	--	--	--	--	126
		1998-1999	None	--	--	--	--	--	--	148
		1999-2000	Full	134	(87)	20	(13)	15	154	178
		2000-2001	None	--	--	--	--	--	--	171
	RG244	1996-1997	None	--	--	--	--	--	--	227
		1997-1998	Full	186	(83)	37	(17)	20	223	255
		1998-1999	None	--	--	--	--	--	--	242
		1999-2000	None	--	--	--	--	--	--	227
		2000-2001	Full	102	(84)	19	(16)	19	121	145
6D	RG245	1996-1997	None	--	--	--	--	--	--	65
		1997-1998	Partial	35	(40)	8	(19)	23	87	96
		1998-1999	None	--	--	--	--	--	--	97
		1999-2000	Partial	42	(46)	4	(9)	10	91	100
		2000-2001	None	--	--	--	--	--	--	100
	Heiden Canyon	1996–2000	None	--	--	--	--	--	--	55
6D (East)		1996-1997	Partial	248	(36)	72	(23)	29	697	793
TOTAL		1997-1998	Partial	221	(28)	45	(17)	20	779	912
		1998-1999	Partial	283	(36)	50	(15)	18	795	929
East of Valdez Port,		1999-2000	Partial	176	(21)	24	(3)	14	823	966
Narrows and Arm		2000-2001	Partial	433	(55)	85	(11)	20	784	934
6D	RG249	1996-1997	None	--	--	--	--	--	--	406
		1997-1998	Full	347	(76)	109	(24)	31	456	502
		1998-1999	None	--	--	--	--	--	--	502
		1999-2000	Partial	169	(40)	23	(12)	14	422	493
		2000-2001	Full	203	(88)	29	(13)	14	232	277

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	1996-1997	Full	161	(81)	38	(19)	24	199	239
		1997-1998	None	--	--	--	--	--	--	291
		1998-1999	Full	249	(87)	37	(13)	30	286	328
		1999-2000	None	--	--	--	--	--	--	307
		2000-2001	None	--	--	--	--	--	--	287
	RG266	1996-1997	None	--	--	--	--	--	--	358
		1997-1998	Full	264	(78)	76	(22)	29	340	382
		1998-1999	None	--	--	--	--	--	--	382
		1999-2000	None	--	--	--	--	--	--	396
		2000-2001	None	--	--	--	--	--	--	396
6D (West)	Remainder	1996-1997	Partial	23	(13)	9	(5)	39	176	174
Valdez, Sargent Icefield, Mt. Castner, Whittier, College Fiord		1997-1998	None	8	(5)	--	--	--	--	217
		1998-1999	None	--	--	--	--	--	--	217
		1999-2000	None	--	--	--	--	--	--	223
		2000-2001	None	--	--	--	--	--	--	223
6D (West) TOTAL		1996-1997	Partial	184	(17)	47	(20)	26	1063	1176
		1997-1998	Partial	619	(51)	185	(23)	30	1210	1392
		1998-1999	Partial	249	(20)	37	(13)	15	1253	1429
West of Valdez Port, Narrows and Arm		1999-2000	Partial	169	(14)	23	(12)	14	1190	1420
		2000-2001	Partial	203	(21)	29	(13)	14	954	1182

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		1996-1997	Partial	432	(25)	119	(22)	28	1760	1970
TOTAL		1997-1998	Partial	840	(42)	230	(21)	27	1988	2304
		1998-1999	Partial	532	(26)	87	(14)	16	2048	2358
		1999-2000	Partial	345	(17)	47	(12)	14	2013	2386
		2000-2001	Partial	636	(37)	114	(15)	18	1738	2116
UNIT 6		1996-1997		662	(79)	178	(21)	27	840	3495
TOTAL		1997-1998		1532	(80)	390	(20)	25	1922	3987
		1998-1999		1281	(87)	191	(13)	15	1472	3997
		1999-2000		747	(77)	123	(14)	16	970	4009
		2000-2001		943	(85)	167	(15)	18	1110	3638

Table 2 Unit 6 mountain goat harvest data by permit hunt, 1996–00.

Unit/ hunt no.	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	1996-1997	10	2	20	5	63	3	38	3	(100)	0	(0)	0	3	3	3
	1997-1998	13	10	77	1	33	2	67	2	(100)	0	(0)	0	2	2	3
	1998-1999	20	10	50	8	80	2	20	2	(100)	0	(0)	0	2	2	3
	1999-2000	12	10	83	1	50	1	50	1	(100)	0	(0)	0	1	1	3
	2000-2001	11	5	45	3	50	3	50	1	(100)	0	(0)	2	3	5	3
6A/RG204	1996-1997	6	2	33	2	50	2	50	2	(100)	0	(0)	0	2	2	4
	1997-1998	7	4	57	1	33	2	67	2	(100)	0	(0)	0	2	2	4
	1998-1999	8	3	38	3	60	2	40	1	(100)	0	(0)	1	2	3	4
	1999-2000	5	2	40	1	33	2	67	1	(100)	0	(0)	1	2	3	7
	2000-2001	13	9	69	2	50	2	50	2	(100)	0	(0)	0	2	2	7
6A/RG206	1996-1997	4	0	0	2	50	2	50	2	(100)	0	(0)	0	2	2	3
	1997-1998	7	3	43	0	0	4	100	4	(100)	0	(0)	0	4	4	4
	1998-1999	5	3	60	0	0	2	100	2	(100)	0	(0)	0	2	2	5
	1999-2000	7	4	57	1	33	2	67	1	(100)	0	(0)	0	1	1	5
	2000-2001	11	7	64	3	75	1	25	1	(100)	0	(0)	0	1	1	5
6A/RG212	1996-1997	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997-1998	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1998-1999	10	6	60	2	50	2	50	2	(100)	0	(0)	0	2	2	4
	1999-2000	5	4	80	0	0	1	100	1	(100)	0	(0)	0	1	1	4
	2000-2001	0	0	-	0	-	0	-	0	-	0	-	0	0	0	3
6A/RG215	1996-1997	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997-1998	9	2	22	4	57	3	-	2	(67)	1	(33)	0	3	4	4
	1998-1999	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1999-2000	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2000-2001	12	7	58	2	40	3	60	3	(100)	0	(0)	0	3	3	4

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits Issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6A TOTAL	1996-1997	20	4	20	9	56	7	44	7	(100)	0	(0)	0	7	7	10
	1997-1998	36	19	53	6	35	11	65	10	(91)	1	(9)	0	11	12	15
	1998-1999	43	22	51	13	62	8	38	7	(100)	0	(0)	1	8	9	16
	1999-2000	29	20	69	3	33	6	67	4	(100)	0	(0)	1	5	6	19
	2000-2001	47	28	60	10	53	9	47	7	(100)	0	(0)	2	9	11	22
6B/RG220	1994-1999	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2000-2001	9	8	89	0	0	1	100	1	(100)	0	(0)	0	1	1	4
6B/RG226	1996-1997	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1997-1998	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998-1999	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
	1999-2000	12	5	42	1	14	6	86	5	(100)	0	(0)	1	6	7	7
	2000-2001	9	4	44	2	40	3	60	2	(67)	1	(33)	0	3	4	3
6B TOTAL	1996-1997	9	3	33	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1997-1998	11	5	45	2	33	4	67	4	(100)	0	(0)	0	4	4	5
	1998-1999	11	4	36	2	29	5	71	5	(100)	0	(0)	0	5	5	5
	1999-2000	12	4	33	1	13	6	75	5	(100)	0	(0)	1	6	7	7
	2000-2001	18	4	22	2	14	4	29	3	(75)	1	(25)	0	4	5	7
6C/RG230	1998-1999	7	0	0	2	29	5	71	3	(75)	1	(25)	1	5	7	6
	1999-2000	7	1	14	3	50	3	50	3	(100)	0	(0)	0	3	3	6
	2000-2001	8	2	25	3	50	3	50	2	(100)	0	(0)	1	3	4	6
6C/RG231	1997-1998	12	0	0	2	17	10	83	8	(80)	2	(20)	0	10	12	14
	1998-1999	8	1	13	2	29	5	71	4	(80)	1	(20)	0	5	6	8
	1999-2000	5	1	20	1	25	3	75	1	(33)	2	(67)	0	3	5	4
	2000-2001	4	0	0	0	0	4	100	2	(50)	2	(50)	0	4	6	5
6C/RG232	1997-1998	4	0	0	0	0	4	100	2	(50)	2	(50)	0	4	6	6
	1998-1999	6	1	17	4	80	1	20	0	(0)	1	(100)	0	1	2	6
	1999-2000	7	2	29	3	60	2	40	2	(100)	0	(0)	0	2	2	7
	2000-2001	9	2	22	6	86	1	14	1	(100)	0	(0)	0	1	1	7

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6C TOTAL																
	1997-1998	16	0	0	2	13	14	88	10	(71)	4	(29)	0	14	18	20
	1998-1999	21	2	10	8	42	11	58	7	(70)	3	(30)	1	11	15	20
	1999-2000	19	4	21	7	47	8	53	6	(75)	2	(25)	0	8	10	17
	2000-2001	21	4	19	9	53	8	47	5	(71)	2	(29)	1	8	11	18
6D/RG242	1996-1997	23	11	48	6	50	6	50	6	(100)	0	(0)	0	6	6	5
	1997-1998	27	17	63	1	10	9	90	8	(89)	1	(11)	0	9	10	11
	1998-1999	29	14	48	6	40	9	60	6	(67)	3	(33)	0	9	12	13
	1999-2000	20	14	70	6	100	0	0	0	-	0	-	0	0	0	11
	2000-2001	36	26	72	3	30	7	70	5	(71)	2	(29)	0	7	9	15
6D/RG244	1996-1997	25	18	72	7	100	0	0	0	-	0	-	0	0	0	4
	1997-1998	13	10	77	3	100	0	0	0	-	0	-	0	0	0	12
	1998-1999	15	8	53	5	71	2	29	1	(50)	1	(50)	0	2	3	12
	1999-2000	19	11	58	5	63	3	38	2	(67)	1	(33)	0	3	4	8
	2000-2001	13	10	77	2	67	1	33	1	(100)	0	(0)	0	1	1	4
6D/RG245	1994-1999	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2000-2001	30	14	47	11	69	5	31	4	(80)	1	(20)	0	5	6	6
6D (EAST)	1996-1997	48	29	60	13	68	6	32	6	(100)	0	(0)	0	6	6	9
TOTAL	1997-1998	40	27	68	4	31	9	69	8	(89)	1	(11)	0	9	10	23
	1998-1999	44	22	50	11	50	11	50	7	(64)	4	(36)	0	11	15	25
	1999-2000	39	25	64	11	79	3	21	2	(67)	1	(33)	0	3	4	19
	2000-2001	79	50	63	16	55	13	45	10	(77)	3	(23)	0	13	16	25
6D/RG249	1996-1997	52	25	48	16	59	11	41	11	(100)	0	(0)	0	11	11	12
	1997-1998	66	29	44	16	43	21	57	20	(95)	1	(5)	0	21	22	25
	1998-1999	55	21	38	8	24	26	76	25	(96)	1	(4)	0	26	27	25
	1999-2000	51	18	35	9	27	24	73	20	(83)	4	(17)	0	24	28	21
	2000-2001	41	18	44	7	30	16	70	11	(73)	4	(27)	1	16	21	13

Table 2 Continued

Unit/ hunt no.	Regulatory year	Permits issued	Nr. did not hunt	Percent did not hunt	Nr. unsucc hunters	Percent unsucc hunters	Nr. succ hunters	Percent succ hunters	Males	(%)	Females	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]	Maximum allowable harvest [c]
6D/RG252	1996-1997	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1997-1998	21	14	67	4	57	3	43	3	(100)	0	(0)	0	3	3	10
	1998-1999	32	23	72	4	44	5	56	4	(80)	1	(20)	0	5	6	10
	1999-2000	27	15	56	4	33	8	67	5	(63)	3	(38)	0	8	11	12
	2000-2001	55	38	69	11	65	6	35	5	(83)	1	(17)	0	6	7	12
6D/RG266	1996-1997	33	11	33	15	68	7	32	4	(57)	3	(43)	0	7	10	8
	1997-1998	52	36	69	11	69	5	31	3	(60)	2	(40)	0	5	7	16
	1998-1999	62	35	56	18	67	9	33	7	(78)	2	(22)	0	9	11	16
	1999-2000	45	27	60	13	72	5	28	3	(60)	2	(40)	0	5	7	13
	2000-2001	50	16	32	20	59	14	41	6	(43)	8	(57)	0	14	22	13
6D (WEST)	1996-1997	85	36	42	31	63	18	37	15	(83)	3	(17)	0	18	21	20
TOTAL	1997-1998	139	79	57	31	52	29	48	26	(90)	3	(10)	0	29	32	51
	1998-1999	149	79	53	30	43	40	57	36	(90)	4	(10)	0	40	44	51
	1999-2000	123	60	49	26	41	37	59	28	(76)	9	(24)	0	37	46	46
	2000-2001	146	72	49	38	51	36	49	22	(63)	13	(37)	1	36	50	38
6D TOTAL	1996-1997	133	65	49	44	65	24	35	21	(88)	3	(13)	0	24	27	29
	1997-1998	179	106	59	35	48	38	52	34	(89)	4	(11)	0	38	42	74
	1998-1999	193	101	52	41	45	51	55	43	(84)	8	(16)	0	51	59	76
	1999-2000	162	85	52	37	48	40	52	30	(63)	10	(21)	0	48	50	65
	2000-2001	225	122	54	54	52	49	48	32	(70)	16	(35)	1	47	66	63
UNIT 6	1996-1997	162	72	44	55	61	35	39	32	(91)	3	(9)	0	35	38	44
TOTAL	1997-1998	242	130	54	45	40	67	60	58	(87)	9	(13)	0	67	76	114
	1998-1999	268	129	48	64	46	75	54	62	(85)	11	(15)	2	75	88	117
	1999-2000	222	113	51	48	44	60	55	45	(69)	12	(18)	2	67	73	108
	2000-2001	311	158	51	75	49	70	46	47	(73)	19	(30)	4	68	93	110

[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, 1996–00.

Unit	Regulatory year	Successful					Unsuccessful					Total hunters
		Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	
6A	1996-1997	0	0	7	7	(44)	0	2	7	9	(56)	16
	1997-1998	0	0	11	11	(61)	0	4	3	7	(39)	18
	1998-1999	1	0	7	8	(38)	8	1	4	13	(62)	21
	1999-2000	0	0	6	6	(67)	0	2	1	3	(33)	9
	2000-2001	1	2	6	9	(47)	1	5	4	10	(53)	19
6B	1996-1997	0	0	4	4	(67)	0	1	1	2	(33)	6
	1997-1998	0	1	3	4	(80)	0	1	0	1	(20)	5
	1998-1999	0	0	5	5	(71)	0	1	1	2	(29)	7
	1999-2000	0	0	6	6	(86)	0	1	0	1	(14)	7
	2000-2001	0	0	4	4	(67)	0	1	1	2	(33)	6
6C	1997-1998	13	1	0	14	(88)	2	0	0	2	(13)	16
	1998-1999	10	1	0	11	(58)	8	0	0	8	(42)	19
	1999-2000	6	1	1	8	(53)	7	0	0	7	(47)	15
	2000-2001	5	3	0	8	(47)	7	2	0	9	(53)	17
6D	1996-1997	7	14	3	24	(35)	9	27	8	44	(65)	68
	1997-1998	13	20	5	38	(52)	15	20	0	35	(48)	73
	1998-1999	8	32	9	51	(54)	10	24	7	43	(46)	94
	1999-2000	5	20	15	40	(52)	5	27	5	37	(48)	77
	2000-2001	7	24	18	49	(48)	13	35	6	54	(52)	103
Unit 6 Total	1996-1997	7	14	14	35	(39)	9	30	16	55	(61)	90
	1997-1998	26	22	19	67	(60)	17	25	3	45	(40)	112
	1998-1999	19	33	21	75	(53)	26	26	12	64	(45)	141
	1999-2000	11	21	28	60	(55)	12	30	6	48	(44)	110
	2000-2001	13	29	28	70	(48)	21	43	11	75	(51)	147

Table 4 Unit 6 mountain goat harvest chronology percent by month, 1996–00.

Unit	Regulatory year	Harvest Periods						*n*
		August	September	October	November	December	January	
6A	1996-1997	29	71	0	0	0	0	7
	1997-1998	9	55	36	0	0	0	11
	1998-1999	0	63	38	0	0	0	8
	1999-2000	67	33	0	0	0	0	6
	2000-2001	33	0	44	0	11	11	9
6B	1996-1997	100	0	0	0	0	0	4
	1997-1998	50	25	25	0	0	0	4
	1998-1999	80	20	0	0	0	0	5
	1999-2000	83	17	0	0	0	0	6
	2000-2001	50	50	0	0	0	0	4
6C	1997-1998	0	0	93	7	0	0	14
	1998-1999	0	0	73	27	0	0	11
	1999-2000	0	0	75	25	0	0	8
	2000-2001	0	0	63	38	0	0	8
6D	1996-1997	54	33	13	0	0	0	24
	1997-1998	0	42	50	8	0	0	38
	1998-1999	0	35	57	2	2	4	51
	1999-2000	0	43	55	3	0	0	40
	2000-2001	0	35	51	14	0	0	49
Unit 6	1996-1997	54	37	9	0	0	0	35
Total	1997-1998	4	34	55	6	0	0	67
	1998-1999	5	32	53	5	1	3	75
	1999-2000	15	33	47	5	0	0	60
	2000-2001	7	27	49	14	1	1	70

Table 5 Unit 6 mountain goat harvest percent by transport method, 1996–00.

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total
		n	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*n*
6A	1996-1997	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1997-1998	15	(88)	2	(12)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	17
	1998-1999	13	(62)	0	(0)	2	(10)	1	(5)	4	(19)	0	(0)	1	(5)	21
	1999-2000	7	(78)	1	(11)	0	(0)	1	(11)	0	(0)	0	(0)	0	(0)	9
	2000-2001	10	(53)	3	(16)	3	(16)	0	(0)	0	(0)	3	(16)	0	(0)	19
6B	1996-1997	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
	1997-1998	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
	1998-1999	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	1999-2000	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	2000-2001	6	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6
6C	1997-1998	1	(6)	1	(6)	2	(13)	0	(0)	0	(0)	11	(69)	1	(6)	16
	1998-1999	0	(0)	0	(0)	1	(5)	0	(0)	0	(0)	17	(89)	1	(5)	19
	1999-2000	0	(0)	3	(20)	4	(27)	0	(0)	1	(7)	7	(47)	0	(0)	15
	2000-2001	0	(0)	2	(12)	1	(6)	0	(0)	1	(6)	13	(76)	0	(0)	17

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*
6D	1996-1997	12	(50)	12	(50)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	24
	1997-1998	22	(30)	47	(64)	0	(0)	0	(0)	1	(1)	0	(0)	3	(4)	73
	1998-1999	42	(46)	50	(54)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	92
	1999-2000	43	(56)	33	(43)	0	(0)	0	(0)	0	(0)	0	(0)	1	(1)	77
	2000-2001	39	(38)	48	(47)	6	(6)	0	(0)	6	(6)	3	(3)	1	(1)	103
UNIT 6	1996-1997	23	(66)	12	(34)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	35
TOTAL	1997-1998	44	(39)	50	(45)	2	(2)	0	(0)	1	(1)	11	(10)	4	(4)	112
	1998-1999	62	(45)	50	(36)	3	(2)	1	(1)	4	(3)	17	(12)	2	(1)	139
	1999-2000	57	(53)	37	(34)	4	(4)	1	(1)	1	(1)	7	(6)	1	(1)	108
	2000-2001	55	(38)	53	(37)	10	(7)	0	(0)	7	(5)	19	(13)	1	(1)	145

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 good accessibility. By the late 1970s wildlife managers recognized that allowing 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 control 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 and could adversely affect goat populations through loss of 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.

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, August and September. Cool temperatures, light wind and a high overcast cloud cover characterize optimum counting conditions. Flights follow drainage contours beginning at the sub alpine 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.

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, the population was expressed as a range reflecting those sightability variations. Three goat population trend areas, each consisting of 2 or 3 contiguous count areas, were established in 3 separate geographic regions of the Kenai (Del Frate (1992). The use of these trend areas was discontinued in 1998 because we felt that a more systematic approach to surveying all hunt areas was more important than focusing our limited budget in one region.

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 observed in each hunt area during the most recent survey. The number of drawing permits issued for each area is limited based on hunter success rates and biologist experience, 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 seven days. 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 achieved.

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 2570 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 3656 (90% observability) to 4671 goats (70% observability) inhabit the Kenai Peninsula. Goat populations have declined approximately 7% during this reporting period.

Population Composition

In 1999 we surveyed 6 count areas and tallied 491 goats with 17% kids (Table 1). In 2000 we counted 892 goats in 15 count areas with 15% kids. It appears that the population may continue to decline because of poor kid production.

MORTALITY

Harvest

Season and Bag Limit. The sport season has remained 10 August to 30 September by drawing permit since 1987 (Table 2). This was followed by a 15 October to 30 November registration permit hunt (Table 3). 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. During the March 1997 Board of Game meeting the board approved the department's plan 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. These hunts have become popular among hunters from across the state.

During March, 2001 the Board approved a change to both the drawing and registration season dates. The new season dates will be 10 August to 15 October and 1-30 November, respectively. This change will become effective in the fall of 2001. A separate proposal to protect nannies accompanied by kids also passed at this meeting.

Registration permit hunts are managed for the remainder of the harvestable quota not taken during the drawing or tier II seasons. When the quotas were reached, emergency orders were issued closing the respective hunt areas. In 1999, one emergency order was issued. On October 28, hunt areas RG331, RG333 and RG345 were closed (Table 5). In 2000, two emergency orders were issued. Hunt areas RG343 and RG347 were closed by emergency order October 20 2000. Hunt areas RG334 and RG365 were closed by emergency order November 1, 2000 (Table 8).

Hunter Harvest. Hunters harvested 84 goats on the Kenai Peninsula in 1999. Drawing permittees killed 69 goats (48 males, 21 females) throughout 27 hunt areas (Table 4). Permittees harvested 10 goats (5 males, 3 females and 2 of unspecified sex) from 7 hunt areas during the registration

permit hunt (Table 5). Subsistence hunters harvested 3 billy and 2 nanny goats in the 2 Tier II subsistence hunts (Table 6).

In 2000, Hunters harvested 111 goats on the Kenai Peninsula. Drawing permittees killed 82 goats (49 males, 33 females) throughout 27 hunt areas (Table 7). Permittees harvested 24 goats (13 males, 9 females and 2 of unspecified sex) from 9 hunt areas during the registration permit hunt (Table 8). Subsistence hunters harvested 5 billy goats in the Tier II hunts (Table 6).

Hunter Residency and Success. Success rates varied between hunt areas and hunt types as well as between years (Tables 9, 10 and 11). Goat distribution, weather, and hunter demographics contributed to these variations. Nonresident hunters composed less than 2% of total hunters in both 1999 and 2000 (Tables 12 & 13). However, nonresidents usually had high success rates because of guiding requirements. The overall success rate of nonresidents was 50% and 25% for 1999 and 2000, respectively. For the years 1992–2000 the average success rate for drawing permit hunters was 36.5%. For registration permit hunters the average success rate was 22.7%. The lower-than-normal success rate for registration permit hunters (9%) in 1999 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 1999, and nearly equal proportions between the first and last parts of the season in 2000 (Table 14). 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 1999 successful hunters in Unit 7 used highway vehicles (42%), boats (24%), aircraft (24%) and 4-wheeler (7%) (Table 15). In Unit 15 successful hunters used aircraft (85%), or boats (15%), (Table 16). Other transportation methods were not reported.

In 2000 the transportation types used were similar to the previous year. Successful hunters in Unit 7 used highway vehicles (46%), boats (22%), aircraft (21%), and 4-wheelers (8%) (Table 15). In Unit 15 successful hunters used aircraft (67%) boats (30%) and horses (3%) (Table 16).

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. comm.). 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 2570 goats on the Kenai Peninsula, excluding KFNP. An estimated 800 to 1000 goats inhabited the KFNP. Excluding KFNP, we estimated between 2855 goats (assuming 90%

observability) and 3671 goats (assuming 70% observability) inhabited the Kenai Peninsula. At the higher observability and assuming 800 goats in KFNP, the population is slightly below objectives. At the lower observability and assuming 1000 goats in KFNP, the population is slightly above objectives. No change in management direction is recommended at this time. Reducing the harvest rate in areas with substantial declines should be sufficient to allow numbers to increase.

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. The Chugach National Forest released an Environmental Assessment for commercial guided helicopter skiing (1999) and has coordinated landing permits to minimize impacts to mountain goats. Technological advancements in snowmachines have allowed backcountry users to encroach into winter goat habitat. It is unclear how these backcountry users affect goat distribution or behavior. We recommend that ADF&G coordinate with federal land managers to study the impacts of winter recreation on mountain goats.

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. 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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PREPARED BY:
Gino Del Frate
Wildlife Biologist II

SUBMITTED BY:
Michael G. McDonald
Assistant Management Coordinator

Table 1. Units 7 & 15 aerial mountain goat composition counts and estimated population size, 1996–2000.

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG331	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	41	8	--	20	49	--	49
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	35	4	--	11	39	--	39
DG332	1996–1997	17	7		41	24		24
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	57	16	--	28	73	--	73
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	50	9	--	18	59	--	59
DG333	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	135	41	--	30	176	--	176
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	78	10	--	13	88	--	88
DG334	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	83	24	--	29	107	--	107
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	84	17	--	20	101	--	101
DG335	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[b]	27	5	--	19	32	--	32
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	65	10	--	15	75	--	75

Table 1. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG336	1996–1997	132	46	--	35	178	--	178
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000	109	26	--	24	135	--	135--
	2000–2001 [a]	--	--	--	--	--	--	--
DG337	1996–1997	16	3	--	19	19	--	19
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001	13	2	--	15	15	--	15
DG338	1996–1997	7	1	--	14	8	--	8
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [c]	21	8	--	38	29	--	29
	2000–2001 [a]	--	--	--	--	--	--	--
DG339	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000	154	20	--	13	174	--	174
	2000–2001 [a]	--	--	--	--	--	--	--
DG340	1996–1997	64	21	--	33	85	--	85
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000	31	6	--	19	37	--	37
	2000–2001	38	7	--	18	45	--	45

Table 1 Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG341	1996–1997	36	17	--	47	53	--	53
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--
DG342	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [b]	57	20	--	35	77	--	77
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001	84	15	--	18	99	--	99
DG343	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001	86	18	--	21	104	--	104
DG344	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--
DG345	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001	85	23	--	27	108	--	108

Table 1. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG346	1996–1997	166	52	--	31	218	--	218
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--
DG347	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000	68	23	34	--	91	--	91
	2000–2001	--	--	--	--	--	--	--
DG348	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--
DG349	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--
DG350	1996–1997 [a]	--	--	--	--	--	--	--
	1997–1998 [a]	--	--	--	--	--	--	--
	1998–1999 [a]	--	--	--	--	--	--	--
	1999–2000 [a]	--	--	--	--	--	--	--
	2000–2001 [a]	--	--	--	--	--	--	--

Table 1. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG351	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[c]	17	10	--	59	27	--	27
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG352	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	137	32	--	23	169	--	169
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG353	1996–1997	0	0	--	--	0	--	0
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	0	0	--	0	0	--	0
DG354	1996–1997	35	8	--	23	43	--	43
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG355	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	21	6	--	29	27	--	27
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--

Table 1. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG356	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	35	17	--	49	52	--	52
	1998–1999	27	9	--	33	36	--	36
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG357	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	37	11	--	30	48	--	48
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG358	1996–1997	40	16	--	40	56	--	56
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000	--	--	--	--	--	--	--
	2000–2001	30	6	--	20	36	--	36
DG359	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	39	7	--	18	46	--	46
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG360	1996–1997[c]	35	14	--	40	49	--	49
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	96	26	--	27	122	--	122
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--

Table 1. Continued

Area	Regulatory year	Adults	Kids	Unk.	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size
DG361	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	48	13	--	27	61	--	61
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	66	13	--	20	79	--	79
DG362	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	88	20	--	23	108	--	108
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG363	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	150	51	--	34	201	--	201
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--
DG364	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998	45	7	--	16	52	--	52
	1998–1999[a]	--	--	--	--	--	--	--
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001	41	3	--	7	44	--	44
DG365	1996–1997[a]	--	--	--	--	--	--	--
	1997–1998[a]	--	--	--	--	--	--	--
	1998–1999	93	26	--	28	119	--	119
	1999–2000[a]	--	--	--	--	--	--	--
	2000–2001[a]	--	--	--	--	--	--	--

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

Table 2. Summary of mountain goat drawing permit season harvest for the Kenai Peninsula, 1984–2000.

Year	Season Dates	Permits Issued	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
1999	10 Aug.–30 Sept.	437	229	30	48	21		69
2000	10 Aug.–30 Sept.	429	233	35	49	33		82
Total					755	368	7	113

Table 3. Summary of mountain goat registration permit season harvest for the Kenai Peninsula, 1984–2000.

Year	Season Dates	Permits Issued	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
1999	15 Oct.–30 Nov.	277	116	9	5	3	2	10
2000	15 Oct.–30 Nov.	342	160	15	13	9	2	24
Total					586	327	19	932

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

Table 4. Kenai Peninsula mountain goat drawing permit hunt summary, 1999[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			Total
				Male	Female	Unknown	
DG331	3	3	0	0	0		0
DG332	4	3	33	0	1		1
DG333	25	15	20	3	0		3
DG334	8	6	67	3	1		4
DG335	3	3	33	0	1		1
DG336[b]	30	15	0	0	0		0
DG339	18	12	58	4	3		7
DG340	30	4	0	0	0		0
DG341	5	4	50	2	0		2
DG342	14	10	30	0	3		3
DG343	8	8	25	2	0		2
DG344	10	5	20	1	0		1
DG345[b]	40	19	16	2	1		3
DG346	40	22	41	5	4		9
DG347	20	12	42	5	0		5
DG351	4	4	25	1	0		1
DG352	25	14	50	6	1		7
DG354	8	3	0	0	0		0
DG355	4	2	50	1	0		1
DG356[b]	6	3	33	0	1		1
DG357	10	5	20	1	0		1
DG358	10	9	0	0	0		0
DG359	10	6	17	1	0		1
DG360[b]	30	14	21	1	2		3
DG361[b]	20	8	38	3	0		3
DG362[b]	22	12	17	1	1		2
DG363	30	8	100	6	2		8
Totals	437	229	30	48	21	0	69

[a]Season Dates: 10 August–30 September.
[b]One permit report was not returned.

Table 5. Kenai Peninsula mountain goat registration permit hunt summary, 1999[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG331[bc]	13	5	20	0	1		1
RG333[b]	162	77	6%	3	0	2	5
RG336	55	21	5%	0	1		1
RG340	4	2	0%	0	0		0
RG344[c]	5	2	0%	0	0		0
RG345[b]	30	8	38%	2	1		3
RG357[c]	8	1	0%	0	0		0
Totals	277	116	9%	5	3	2	10

[a]Season Dates: 15 October–30 November.
[b]Hunt areas RG331, RG333 and RG345 closed by emergency order October 28, 1999.
[c]Hunt areas RG331, RG344 and RG357 were Archery Only hunts.

Table 6. Kenai Peninsula subsistence harvest, 1986–2000.

Year	Season Dates	Permits Issued	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
1999	1 Aug–30 Sep	46	21	24	3	2		5
2000	1 Aug–30 Sep	46	20	25	5	0		5
Total					88	28	3	123

[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 7. Kenai Peninsula mountain goat drawing permit hunt summary, 2000[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			Total
				Male	Female	Unknown	
DG331	3	2	0%	0	0		0
DG332	4	4	50	1	1		2
DG333	25	14	21%	2	1		3
DG334	10	9	33%	2	1		3
DG335	3	1	100%	1	0		1
DG336	30	11	0%	0	0		0
DG339	25	20	50%	5	5		10
DG340	20	5	20%	0	1		1
DG341	6	3	100%	2	1		3
DG342	12	10	50%	4	1		5
DG343	8	7	14%	1	0		1
DG344	12	8	38%	2	1		3
DG345	40	19	21%	2	2		4
DG346	30	18	39%	6	1		7
DG347	20	9	33%	3	0		3
DG351	5	1	0%	0	0		0
DG352	25	13	62%	4	4		8
DG354	8	3	0%	0	0		0
DG355	4	2	50%	0	1		1
DG356	5	2	50%	0	1		1
DG357	10	5	40%	2	0		2
DG358	12	4	50%	1	1		2
DG359	10	2	50%	1	0		1
DG360	30	17	35%	2	4		6
DG361	20	11	36%	1	3		4
DG362	22	17	41%	5	2		7
DG363	30	16	25%	2	2		4
Totals	429	233	35%	49	33	0	82

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

Table 8. Kenai Peninsula mountain goat registration permit hunt summary, 2000[a].

Hunt area	Permits issued	Number of hunters	Percent success	Harvest			
				Male	Female	Unknown	Total
RG331[d]	19	7	29	1	0		1
RG334[c d]	48	24	8	2	0		2
RG335	54	26	4	1	0		1
RG336	65	26	0	0	0		0
RG343[b]	79	40	25	3	6	1	10
RG347[b]	33	18	39	5	2		7
RG354	18	8	0	0	0		0
RG363	15	1	0	0	0		0
RG365[c e]	11	10	20	1	1		2
Totals	342	160	15	13	9	2	24

[a] Season Dates: 15 October–30 November.
[b]Hunt areas RG343 and RG347 closed by emergency order October 20 2000.
[c]Hunt areas RG334 and RG365 closed by emergency order November 1, 2000.
[d]Hunt areas 331 and RG334 were Archery Only Hunts
[e]imited to residents of Alaska. Only a portion of the hunt area was opened.

Table 9. Units 7 & 15 mountain goat harvest data by drawing permit hunt, 1996–2000.

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG331	1996–1997	3	0	50	50	2	0	--	--	2
	1997–1998	3	0	33	67	1	1	--	--	2
	1998–1999	3	0	0	100	2	1	--	--	3
	1999–2000	3	0	100	0	0	0	--	--	0
	2000–2001	3	33	100	0	0	0	--	--	0
DG332	1996–1997	0	--	--	--	--	--	--	--	--
1997–1998	0	--	--	--	--	--	--	--	--	
1998–1999	0	--	--	--	--	--	--	--	--	
	1999–2000	4	0	75	25	0	1	--	--	1
	2000–2001	4	0	50	50	1	1	--	--	2
DG333	1996–1997	15	33	90	10	0	1	--	--	1
1997–1998	20	45	91	9	1	0	--	--	1	
1998–1999	25	24	68	32	4	2	--	--	6	
	1999–2000	25	40	80	20	3	0	--	--	3
	2000–2001	25	44	79	21	2	1	--	--	3
DG334	1996–1997	8	13	29	71	4	1	--	--	5
1997–1998	8	25	0	100	4	2	--	--	6	
1998–1999	6	33	75	25	1	0	--	--	1	
	1999–2000	8	25	33	67	3	1	--	--	4
	2000–2001	10	10	67	33	2	1	--	--	3
DG335	1996–1997	8	38	80	20	0	1	--	--	1
1997–1998	10	20	50	50	2	2	--	--	4	
1998–1999	10	30	71	29	1	1	--	--	2	
	1999–2000	3	0	67	33	0	1	--	--	1
	2000–2001	3	67	0	100	1	0	--	--	1

Table 9. Continued

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG336	1996–1997	25	36	80	20	1	2	--	--	3
1997–1998	25	36	81	19	2	1	--	--	3	
1998–1999	30	47	69	31	4	1	--	--	5	
	1999–2000	30	48	100	0	0	0	--	--	0
	2000–2001	30	62	100	0	0	0	--	--	0
DG337	1996–1997	--	--	--	--	--	--	--	--	--
1997–1998	--	--	--	--	--	--	--	--	--	
1998–1999	--	--	--	--	--	--	--	--	--	
	1999–2000	--	--	--	--	--	--	--	--	--
	2000–2001	--	--	--	--	--	--	--	--	--
DG338	1996–1997	--	--	--	--	--	--	--	--	--
1997–1998	--	--	--	--	--	--	--	--	--	
1998–1999	--	--	--	--	--	--	--	--	--	
	1999–2000	--	--	--	--	--	--	--	--	--
	2000–2001	--	--	--	--	--	--	--	--	--
DG339	1996–1997	18	22	50	50	4	3	--	--	7
1997–1998	15	0	67	33	4	1	--	--	5	
1998–1999	15	13	85	15	2	0	--	--	2	
	1999–2000	18	33	42	58	4	3	--	--	7
	2000–2001	25	20	50	50	5	5	--	--	10
DG340	1996–1997	25	52	100	0	0	0	--	--	0
1997–1998	25	56	91	9	1	0	--	--	1	
1998–1999	30	57	85	15	1	1	--	--	2	
	1999–2000	30	87	100	0	0	0	--	--	0
	2000–2001	20	74	80	20	0	1	--	--	1

Table 9. Continued

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG341	1996–1997	6	0	33	66	1	1	--	--	2
1997–1998	6	0	17	83	1	4	--	--	5	
1998–1999	4	50	50	50	0	1	--	--	1	
	1999–2000	5	20	50	50	2	0	--	--	2
	2000–2001	6	50	0	100	2	1	--	--	3
DG342	1996–1997	14	21	73	27	3	0	--	--	3
1997–1998	14	21	64	36	2	2	--	--	4	
1998–1999	12	25	89	11	0	1	--	--	1	
	1999–2000	14	29	70	30	0	3	--	--	3
	2000–2001	12	17	50	50	4	1	--	--	5
DG343	1996–1997	8	13	71	29	1	1	--	--	2
1997–1998	8	12	29	71	4	1	--	--	5	
1998–1999	6	17	60	40	2	0	--	--	2	
	1999–2000	8	0	75	25	2	0	--	--	2
	2000–2001	8	13	86	14	1	0	--	--	1
DG344	1996–1997	16	56	57	43	2	1	--	--	3
1997–1998	16	56	71	29	2	0	--	--	2	
1998–1999	16	19	62	38	3	2	--	--	5	
	1999–2000	10	50	80	20	1	0	--	--	1
	2000–2001	12	33	63	37	2	1	--	--	3
DG345	1996–1997	35	51	71	29	4	1	--	--	5
1997–1998	42	52	75	25	4	1	--	--	5	
1998–1999	40	70	67	33	3	1	--	--	4	
	1999–2000	40	51	84	16	2	1	--	--	3
	2000–2001	40	53	79	21	2	2	--	--	2

Table 9. Continued

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG346	1996–1997	35	57	79	21	2	1	--	--	3
1997–1998	42	48	73	27	6	0	--	--	6	
1998–1999	40	58	76	24	3	1	--	--	4	
	1999–2000	40	45	59	41	5	4	--	--	9
	2000–2001	30	38	61	39	6	1	--	--	7
DG347	1996–1997	20	30	54	46	2	4	--	--	6
1997–1998	20	40	42	58	3	4	--	--	7	
1998–1999	20	25	67	33	5	0	--	--	5	
	1999–2000	20	40	58	42	5	0	--	--	5
	2000–2001	20	55	67	33	3	0	--	--	3
DG351	1996–1997	--	--	--	--	--	--	--	--	--
1997–1998	8	100	0	0	0	0	--	--	0	
1998–1999	4	25	67	33	1	0	--	--	1	
	1999–2000	4	0	75	25	1	0	--	--	1
	2000–2001	5	80	100	0	0	0	--	--	0
DG352	1996–1997	25	40	60	40	5	1	--	--	6
1997–1998	25	56	64	36	1	3	--	--	4	
1998–1999	25	48	46	54	2	5	--	--	7	
	1999–2000	25	44	50	50	6	1	--	--	7
	2000–2001	25	48	39	61	4	4	--	--	8
DG354	1996–1997	20	50	78	22	2	0	--	--	2
1997–1998	10	60	50	50	2	0	--	--	2	
1998–1999	10	70	100	0	0	0	--	--	0	
	1999–2000	8	63	100	0	0	0	--	--	0
	2000–2001	8	63	100	0	0	0	--	--	0

Table 9. Continued

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG355	1996–1997	4	75	0	100	1	0	--	--	1
1997–1998	4	75	100	0	0	0	--	--	0	
1998–1999	4	0	75	25	0	1	--	--	1	
	1999–2000	4	50	50	50	1	0	--	--	1
	2000–2001	4	50	50	50	0	1	--	--	1
DG356	1994–95	8	25	67	33	0	2	--	--	2
1997–1998	5	80	0	100	1	0	--	--	1	
1998–1999	6	17	100	0	0	0	--	--	0	
	1999–2000	6	40	67	33	0	1	--	--	1
	2000–2001	5	60	50	50	0	1	--	--	1
DG357	1996–1997	10	50	50	50	2	0	--	--	2
1997–1998	10	50	100	0	0	0	--	--	0	
1998–1999	10	40	67	33	2	0	--	--	2	
	1999–2000	10	50	80	20	1	0	--	--	1
	2000–2001	10	50	60	40	2	0	--	--	2
DG358	1996–1997	25	52	45	55	2	4	--	--	6
1997–1998	12	58	0	100	4	1	--	--	5	
1998–1999	10	80	50	50	1	0	--	--	1	
	1999–2000	10	10	100	0	0	0	--	--	0
	2000–2001	12	67	50	50	1	1	--	--	2
DG359	1996–1997	20	30	64	36	4	1	--	--	5
1997–1998	20	55	33	67	4	2	--	--	6	
1998–1999	16	44	100	0	0	0	--	--	0	
	1999–2000	10	40	83	17	1	0	--	--	1
	2000–2001	10	80	50	50	1	0	--	--	1

Table 9. Continued

Hunt Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males	Females	Unk.	Illegal	Total harvest
DG360	1996–1997	30	43	59	41	4	3	--	--	7
1997–1998	30	63	73	27	3	0	--	--	3	
1998–1999	30	60	67	33	2	2	--	--	4	
	1999–2000	31	53	79	21	1	2	--	--	3
	2000–2001	30	43	65	35	2	4	--	--	6
DG361	1996–1997	20	45	60	40	2	2	--	--	4
1997–1998	20	65	86	14	1	0	--	--	1	
1998–1999	20	70	83	17	1	0	--	--	1	
	1999–2000	20	63	57	43	3	0	--	--	3
	2000–2001	20	42	64	36	1	3	--	--	4
DG362	1996–1997	18	72	100	0	0	0	--	--	0
1997–1998	20	50	60	40	4	0	--	--	4	
1998–1999	22	50	66	44	4	0	--	--	4	
	1999–2000	22	43	83	17	1	1	--	--	2
	2000–2001	22	23	59	41	5	2	--	--	7
DG363	1996–1997	30	57	15	85	9	2	--	--	11
1997–1998	30	63	55	45	2	2	1	--	5	
1998–1999	30	47	44	56	7	2	--	--	9	
	1999–2000	30	73	0	100	6	2	--	--	8
	2000–2001	30	47	75	25	2	2	--	--	4

[a] Subsistence season.

Table 10. Units 7 & 15 mountain goat harvest data by registration permit hunt, 1996–2000.

Hunt Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG331	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[a]	0	--	--	--	--	--	--	--	0	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[c]	13	62	80	20	0	1	--	--	1
	2000–2001[c]	19	63	71	29	1	0	--	--	1
RG333	1996–1997	58	76	86	14	2	0	--	--	2
1997–1998	67	28	87	13	4	2	--	--	6	
1998–1999	81	37	94	6	3	0	--	--	3	
	1999–2000	162	52	94	6	3	0	--	--	3
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG334	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[a]	0	--	--	--	--	--	--	--	0	
1998–1999[b]	80	33	91	9	3	2	--	--	5	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[c]	48	50	92	8	2	0	--	--	2
RG335	1996–1997	52	62	90	10	1	1	--	--	2
1997–1998[a]	0	--	--	--	--	--	--	--	0	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001	54	52	96	4	1	0	--	--	1
RG336	1996–1997	37	70	100	0	0	0	--	--	0
1997–1998	40	65	93	7	1	0	--	--	1	
1998–1999	79	56	94	6	2	0	--	--	2	
	1999–2000	55	62	95	5	0	1	--	--	1
	2000–2001	65	60	100	0	0	0	--	--	0

Table 10. Continued

Hunt Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG339	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[b]	23	39	86	14	0	2	--	--	2	
1998–1999[b]	30	40	100	0	0	0	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG340	1996–1997	8	88	100	0	0	0	--	--	0
1997–1998	11	55	40	60	3	0	--	--	3	
1998–1999	3	33	0	100	2	0	--	--	2	
	1999–2000	4	50	100	0	0	0	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG343	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[a]	0	--	--	--	--	--	--	--	0	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001	79	50	75	25	3	6	--	--	9
RG344	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[d]	1	0	0	100	0	1	--	--	1	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[c]	5	60	100	0	0	0	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG345	1996–1997	19	53	56	44	2	1	1	--	4
1997–1998	7	14	33	67	3	1	--	--	4	
1998–1999	25	72	71	29	1	1	--	--	2	
	1999–2000	30	73	62	38	2	1	--	--	3
	2000–2001[a]	0	--	--	--	--	--	--	--	0

Table 10. Continued

Hunt Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG346	1996–1997	88	60	66	34	8	4	--	--	12
1997–1998	58	40	69	31	8	3	--	--	11	
1998–1999	89	39	76	24	7	5	1	--	13	
	1999–2000 [a]	0	--	--	--	--	--	--	--	0
	2000–2001 [a]	0	--	--	--	--	--	--	--	0
RG347	1996–1997 [a]	0	--	--	--	--	--	--	--	0
1997–1998 [a]	0	--	--	--	--	--	--	--	0	
1998–1999 [a]	0	--	--	--	--	--	--	--	0	
	1999–2000 [a]	0	--	--	--	--	--	--	--	0
	2000–2001	33	45	71	39	5	2	--	--	7
RG352	1996–1997	7	57	66	33	1	0	--	--	1
1997–1998	8	38	40	60	1	2	--	--	3	
1998–1999 [a]	0	--	--	--	--	--	--	--	0	
	1999–2000 [a]	0	--	--	--	--	--	--	--	0
	2000–2001 [a]	0	--	--	--	--	--	--	--	0
RG354	1996–1997 [a]	--	--	--	--	--	--	--	--	--
1997–1998 [a]	0	--	--	--	--	--	--	--	0	
1998–1999	6	50	67	33	1	0	--	--	1	
	1999–2000 [a]	0	--	--	--	--	--	--	--	0
	2000–2001	18	56	100	0	0	0	--	--	0
RG355	1996–1997 [a]	0	--	--	--	--	--	--	--	0
1997–1998 [c]	2	0	100	0	0	0	--	--	0	
1998–1999 [a]	0	--	--	--	--	--	--	--	0	
	1999–2000 [a]	0	--	--	--	--	--	--	--	0
	2000–2001 [a]	0	--	--	--	--	--	--	--	0

Table 10. Continued

Hunt Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG356	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[c]	1	0	100	0	0	0	--	--	0	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG357	1996–1997[a]	0	--	--	--	--	--	--	--	0
1997–1998[c]	1	100	0	0	0	0	--	--	0	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[c]	8	88	100	0	0	0	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG360	1996–1997[a]	--	--	--	--	--	--	--	--	--
1997–1998	22	55	90	10	1	0	--	--	1	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG361	1996–1997	13	46	71	29	2	0	--	--	2
1997–1998	7	43	50	50	1	1	--	--	2	
1998–1999	22	50	91	9	1	0	--	--	1	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0
RG362	1996–1997	25	52	50	50	2	4	--	--	6
1997–1998	35	43	95	5	0	1	--	--	1	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001[a]	0	--	--	--	--	--	--	--	0

Table 10. Continued

Hunt Area	Regulatory year	Permits issued	Percent Did not hunt	Percent Unsuccessful hunters	Percent Successful hunters	Males	Females	Unk.	Illegal	Total harvest
RG363	1996–1997	30	47	69	31	2	3	--	--	5
1997–1998	24	33	81	19	3	0	--	--	3	
1998–1999[a]	0	--	--	--	--	--	--	--	0	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001	15	93	100	0	0	0	--	--	0
RG365	1996–1997	16	31	30	70	4	3	--	--	7
1997–1998	14	21	27	73	5	3	--	--	8	
1998–1999	18	50	22	78	3	4	--	--	7	
	1999–2000[a]	0	--	--	--	--	--	--	--	0
	2000–2001	11	9	80	20	1	1	--	--	2

[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 11. Units 7 & 15 mountain goat harvest data by Tier II subsistence permit hunt, 1996–2000.

Hunt Area	Regulatory year	Permit issued	Did not hunt(%)	Unsuccessful hunters (%)	Successful hunters (%)	Males	Females	Unk.	Illegal	Total harvest
TG364	1996–1997	16	25	70	30	3	0	--	--	3
1997–1998	16	25	75	25	2	1	--	--	3	
1998–1999	16	56	71	29	1	1	--	--	2	
	1999–2000	16	57	100	0	0	0	--	--	0
	2000–2001	16	71	100	0	0	0	--	--	0
TG365	1996–1997	30	70	67	33	3	0	--	--	3
1997–1998	30	37	68	32	4	2	--	--	6	
1998–1999	30	57	85	15	2	0	--	--	2	
	1999–2000	30	43	71	29	3	2	--	--	5
	2000–2001	30	53	64	36	5	0	--	--	5

Table 12. Units 7 & 15 mountain goat hunter drawing permit hunt residency and success, 1992–2000.

	Successful				Unsuccessful				
Regulatory year	resident	Nonresident	Unspec.	Total (%)	resident	Nonresident	Unspec.	Total (%)	Total hunters
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
1996–1997	81	6	1	88(36)	152	1	1	154(64)	242
1997–1998	86	1		87(39)	132	2		134(61)	221
1998–1999	69	4		73(31)	163	0		163(69)	236
1999–2000	67	2		69(30)	154	6		160(70)	229
2000–2001	80	2		82(35)	149	2		151(65)	233

Table 13. Units 7 & 15 mountain goat hunter registration permit hunt residency and success, 1992–2000.

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
1996–1997	35	5	41(30)[c]	92	4	96(70)	137
1997–1998	43	3	46(24)	140	4	144(76)	190
1998–1999	34	2	36(15)	204	4	208(85)	244
1999–2000	9	1	10(9)	105	1	106(91)	116
2000–2001	24	0	24(17)	120	0	120(83)[d]	144

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

Table 14. Units 7 & 15 mountain goat harvest chronology for 1990–2000.

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
1996–1997	11	15	28	33	29	7	5	1	129
1997–1998	19	14	24	29	39	4	2	2	133
1998–1999	26	7	25	15	30	5	1	0	109
1999–2000	15	14	12	27	10	0	0	1	79
2000–2001	23	21	14	24	22	0	2	0	106

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

Table 15. Unit 7 mountain goat harvest percent by transport method, 1992–2000. 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
1996–1997	19	0	34	6	0	1	35	4	68
1997–1998	11	1	36	0	0	0	47	4	91
1998–1999	18	0	38	3	0	0	38	1	78
1999–2000	24	0	24	7	0	0	42	3	59
2000–2001	21	0	22	8	0	1	46	1	76

Table 16. Unit 15 mountain goat harvest percent by transport method, 1992–2000. 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
1996–1997	54	2	41	0	0	0	0	3	61
1997–1998	59	2	36	0	0	0	0	2	42
1998–1999	52	3	45	0	0	0	0	0	31
1999–2000	85	0	15	0	0	0	0	0	20
2000–2001	67	3	30	0	0	0	0	0	30

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

LOCATION

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

GEOGRAPHICAL DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

The mountain goat population in Unit 8 originated from 11 females and 7 males, which were transplanted 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 1960 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 Kodiak 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 resurrected.

Throughout the 1990s, goat populations continued to grow and the management scheme remained conservative. Populations were closely monitored and permits were adjusted accordingly. Much of the southern portion of Kodiak 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 opened to hunting in 1995. In

2001 hunt area boundaries were modified to include all of Kodiak and Uganik Islands, and a new hunt area was also created (479 North Road System). There are currently 9 permit hunting areas that encompass Kodiak Island. Based on data from comprehensive aerial surveys, we estimated that the goat population of Unit 8 in 2001 was 1,200 goats. They occupied all available habitat on the island, and there were confirmed reports of a goats as far south as Kaguyak Bay and Akalura Lake.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Maintain a pre-hunting population of 700–1,000 goats islandwide, distributed in a manner that has minimal long-term impact on goat habitat.

METHODS

We complete composition counts annually with fixed-wing aircraft in August and early September. During the surveys, priority is given to the permit hunt areas nearest the original transplant site, 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 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 2001 yielded a minimum population of 1,114 goats. The population continued to increase in the Uyak, Deadman Bay, and Kodiak Road system areas, whereas the population is decreasing slightly in the Kizhuyak and Wild Creek drainages. The estimated island-wide population in 2001 was 1,200 goats, with most of the suitable habitat being utilized.

Population Composition

Within the permit hunt areas, the kid:adult ratio ranged from a high of 24:100 in 1998 to a low of 15:100 in 2001 (Table 1). Kid production declined in 2000 to a ratio of 15.2:100, from an average of 19.2 during the previous 5 years. This decline was precipitated by heavy snowfall that persisted and delayed vegetative development in higher elevations during the spring of 2000. 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 suggest that for males, dispersal may be driven by competition for females, but dispersal of females may have been triggered by reduced 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. In 2000–2001, there were 8 permit hunt areas with a total of 161 permits issued. Regulations authorize the department to issue up to 250 drawing permits per season (5 AAC 85.040[4]).

Game Board Actions and Emergency Orders. There were no Board of Game actions or Emergency Orders during this reporting period. During the 2000–2001 season, the Department administratively increased the number of permits available in hunt area DG 477 from 20 to 25 to take advantage of the increased harvestable surplus in that area. The number of permits in 2 hunt areas decreased due to a decline in the number of goats observed in those hunt areas – DG 473 permits decreased from 30 to 15, and DG 474 permits decreased from 15 to 10.

In 2000, the Federal Subsistence Regional Advisory Committee received a proposal to consider Kodiak Island goats as a "customary and traditional" resource, and to open the entire refuge to subsistence goat hunting by registration permit. Acceptance of this proposal would have significant impacts on our current goat management system, and we intend to work closely with Refuge staff to analyze and address these concerns.

Hunter Harvest. Annual harvests during this reporting period ranged from 54 goats in 2000–2001 to 70 goats in 1998–1999, with a 5-yr average of 62.2 (Table 2). Annual harvest ranged from 2–19 goats for each of the 8 permit hunts. Males continued to comprise the majority of the goats harvested during each year from 1996/97 to 2000/01, with a 5-yr average of 68.7%.

Goat age (horn ring) data were provided by hunters on their report cards beginning in 1994–1995 as regulations mandating horn inspection were rescinded. To better understand horn growth of goats and to investigate if goats have different growth rates in newly colonized areas of Unit 8 versus well established areas, successful hunters were required to submit horns for measuring in the fall of 2000. The mean age of goats harvested from 1991/92 to 1995/96 was 4.4 yrs for males and 5.0 yrs for females. During the next 5-yr period, 1996/97 to 2000/01, mean ages were 4.9 yrs for males and 5.3 yrs for females (Table 3).

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 161–176. Hunters afield ranged from 91–111, with a 5-yr average of 68% of the permittees participating in the hunt (Table 2). Compliance with the permit hunt conditions by hunters was good, however, permittees 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 1996/97 to 2000/01 (57%), followed by nonlocal Alaska residents (36%), and nonresidents (7%) (Table 4). Annual

hunter success ranged 56–65% with a 5-year mean of 60%. Nonresidents were the most successful hunters (86%), followed by local residents (60%) and nonlocal (55%).

Harvest Chronology. During most years, October is the preferred month for Unit 8 goat hunters (Table 5). Weather patterns, which affect hunter success and influence when hunters go into the field, largely determined the chronology of harvest.

Transport Methods. Aircraft (61%) were the predominant transportation method used by hunters from 1996/97 to 2000/01 (Table 6). Boats were also important (19%), and off-road vehicles (12%) were becoming more popular as trails proliferated and machines became 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 suspected to have been 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 1998–1999 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. Kodiak National Wildlife Refuge staff has expressed interest in better understanding goat habitat needs and impacts of goats on refuge habitats.

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

In recent years there has been a proliferation of winter recreation activities around Kodiak Island. Snowmachines are more abundant and efficient than ever before, and the sport of heliskiing is increasingly popular. Kodiak National Wildlife Refuge prohibits helicopter access on the refuge for recreational

purposes, and limits snowmachine access in some areas, however most of the recent activity is near Kodiak city and not within refuge boundaries. There have been no studies on the impacts of winter sports on Kodiak goats, however there is a potential for disturbance.

Nonregulatory Management Problems

Aircraft over flights of goats have occurred since goats were originally introduced to Kodiak. Fixed-winged aircraft seem to have little direct impact on the goats, but helicopters typically solicit flight responses from both individuals and groups. Increasing interest in Kodiak by the cruise ship industry may spawn an increase in aerial wildlife viewing, so we will need to stay abreast of the situation and work with aircraft operators to minimize disturbances to goats.

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 2001 comprehensive aerial survey of goat range in Unit 8, we estimated a total of 1,200 goats. Severe weather during the winter of 1998–1999 resulted in lower kid:adult ratios in all permit areas, and exacerbated population declines in some areas. During this reporting period goat harvest was relatively stable, 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. In the winter of 2000 the majority of the mountain goat hunt boundaries were expanded to encompass the entire island of Kodiak. Before acting on these changes, we discussed them with local air charter operators, the local Advisory Board, and the Kodiak National Wildlife Refuge. Portions of the population, which were previously protected, were hunted for the first time in the fall of 2001.

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:

Explore regulatory innovations within the State system to satisfy the requests of residents of remote villages for increased goat hunting opportunities;

Evaluate current hunt area boundaries and permit allocations to assure that they adequately reflect the recent changes in goat density and distribution;

Revise hunter handouts with emphasis on sex identification, goat anatomy, and ways to avoid wounding and/or losing goats while hunting;

Develop a web page that will assist goat hunters in selecting hunt areas and in being better prepared for their hunt;

Work with hunters and non-consumptive users to explore methods of establishing areas where goats can regularly be seen from the Kodiak road system;

Work closely with staff from Kodiak National Wildlife Refuge to initiate research into goat habitat, and the impacts of goats on that habitat; and,

Work with the U.S. Coast Guard to develop a memorandum of agreement that will minimize low-level over flights of goats.

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PREPARED BY:
Lawrence J. Van Daele
Wildlife Biologist III

and

John R. Crye
Wildlife Technician III

SUBMITTED BY:
Michael G. McDonald
Assistant Management Coordinator

Table 1. Unit 8 Aerial summer mountain goat composition counts and estimated population size within permit hunt areas, 1996/97–2001/02.

Hunt Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
All	1996–1997	405 (85)	72 (15)	18	477	94.1	--
permit	1997–1998	495 (83)	101 (17)	20	596	129.0	--
hunt areas	1998–1999	482 (81)	115 (19)	24	597	81.6	--
	1999–2000	684 (84)	128 (16)	19	812	96.2	900
	2000–2001	511 (87)	78 (13)	15	589	--	--
	2001–2002	760 (86)	123 (14)	16	1114	64.7	1200
DG 471	1996–1997	113 (84)	21 (16)	19	134	--	--
Wild Creek -	1997–1998	154 (79)	40 (21)	26	194	--	--
Center Mtn.	1998–1999	167 (78)	48 (22)	29	215	--	--
	1999–2000	137 (86)	23 (14)	17	160	--	160-180
	2000–2001	134 (92)	12 (8)	9	146	--	--
	2001–2002	113 (86)	18 (14)	16	131	--	130
DG 472	1996–1997	37 (80)	9 (20)	24	46	--	--
Crown Mtn	1997–1998	46 (87)	7 (13)	15	53	--	--
	1998–1999	18 (95)	1 (5)	6	19	--	--
	1999–2000	21 (88)	3 (12)	14	24	--	20-50
	2000–2001	41 (84)	8 (16)	20	49	--	20-50
	2001–2002	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	1996–1997	101 (89)	12 (11)	12	113	--	--
Hidden Basin	1997–1998	97 (85)	17 (15)	18	114	--	--
-							
Terror Lake	1998–1999	63 (81)	15 (19)	24	78	--	--
	1999–2000	28 (90)	3 (10)	11	31	--	40-80
	2000–2001	50 (88)	7 (12)	14	57	--	40-80
	2001–2002[b]	83 (90)	9 (10)	11	92	--	92
DG 474	1996–1997	36 (97)	1 (3)	3	37	--	--
Uganik River	1997–1998	65 (83)	13 (17)	20	78	--	--
	1998–1999	33 (85)	6 (15)	18	39	--	--
	1999–2000	44 (92)	4 (8)	9	48	--	40-60
	2000–2001[a]	51 (96)	2 (4)	4	53	--	40-60
	2001–2002[ab]	53 (88)	7 (12)	13	60	--	40-60
DG 475	1996–1997[a]	24 (71)	10 (29)	42	34	--	--
Zachar River	1997–1998[a]	23 (100)	0	0	23	--	--
	1998–1999	--	--	--	--	--	--
	1999–2000	257 (90)	30 (10)	12	287	--	300
	2000–2001[a]	32 (89)	4 (11)	11	36	--	300
	2001–2002[ab]	236 (85)	41 (15)	17	277	--	300

Table 1. (continued).

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
DG 476	1996–1997	--	--	--	--	--	--
Kiliuda Bay	1997–1998	--	--	--	--	--	--
	1998–1999	42 (84)	8 (16)	19	50	--	--
	1999–2000[a]	11 (85)	2 (15)	18	13	--	50–60
	2000–2001	--	--	--	--	--	--
	2001–2002[ab]	52 (87)	8 (13)	15	60	--	100–110
DG 477	1996–1997	--	--	--	--	--	--
Southwest	1997–1998	--	--	--	--	--	--
Kodiak	1998–1999[a]	50 (83)	10 (17)	20	60	--	--
	1999–2000[a]	92 (83)	19 (17)	21	111	--	130–160
	2000–2001	--	--	--	--	--	--
	2001–2002[ab]	--	--	--	231	--	250
DG 478	1996–1997	66 (81)	15 (19)	23	81	--	81
South Road	1997–1998	110 (79)	24 (21)	22	134	--	134
System	1998–1999	109 (81)	26 (19)	23	135	--	135
	1999–2000	94 (80)	24 (20)	26	118	--	118
	2000–2001	118 (81)	28 (19)	24	146	--	146
	2001–2002[b]	129 (82)	28 (18)	22	157	--	157
DG 479	1999–2000[a]	43 (86)	7 (14)	16	50	--	50–60
North Road	2000–2001[a]	68 (84)	13 (16)	20	81	--	81
System	2001–2002	59 (89)	7 (11)	12	66	--	60–80

a–partial survey
b–2001 hunt area boundary change

Table 2. Unit 8 mountain goat harvest data by permit hunt, 1996/97–2000/01.

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
All permit hunts	1996–1997	176	44	40	60	37 (62)	20 (34)	2	0	59
	1997–1998	168	35	40	60	47 (72)	17 (28)	1	0	65
	1998–1999	168	36	35	65	49 (70)	21 (30)	0	0	70
	1999–2000	176	35	44	56	44 (71)	18 (29)	0	1	63
	2000–2001	161	41	41	59	34 (63)	21 (37)	0	0	54
DG 471 Wild Creek	1996–1997	30	47	37	63	6 (60)	4 (40)	0	0	10
	1997–1998	30	34	63	37	6 (86)	1 (14)	0	0	7
	1998–1999	30	50	27	73	8 (73)	2 (27)	0	0	11
	1999–2000	30	64	61	39	1 (14)	6 (86)	0	1	8
	2000–2001	30	41	65	35	2 (33)	4 (67)	0	0	6
DG 472 Crown Mtn	1996–1997	10	20	37	63	2 (40)	2 (40)	1	0	5
	1997–1998	10	30	57	43	0 (--)	2 (67)	1	0	3
	1998–1999	10	50	40	60	1 (33)	2 (67)	0	0	3
	1999–2000	10	40	33	67	4 (100)	0 (--)	0	0	4
	2000–2001	10	40	67	33	2 (100)	0 (--)	0	0	2
DG 473 Hidden Basin	1996–1997	31	39	37	63	9 (75)	3 (25)	0	0	12
	1997–1998	30	13	27	73	14 (74)	5 (26)	0	0	19
	1998–1999	30	17	36	64	13 (81)	3 (19)	0	0	16
	1999–2000	30	47	50	50	5 (63)	3 (37)	0	0	8
	2000–2001	15	27	36	64	3 (43)	4 (57)	0	0	7
DG 474 W. Terror Lake	1996–1997	30	50	53	47	4 (57)	3 (43)	0	0	7
	1997–1998	15	53	14	86	6 (100)	0 (--)	0	0	6
	1998–1999	15	53	14	86	2 (33)	4 (67)	0	0	6
	1999–2000	15	53	57	43	3 (100)	0 (--)	0	0	3
	2000–2001	10	33	33	67	3 (75)	1 (25)	0	0	4

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 475	1996–1997	35	60	50	50	1 (14)	6 (86)	0	0	7
Uyak	1997–1998	35	51	53	47	5 (63)	3 (37)	0	0	8
Bay	1998–1999	35	46	68	32	4 (67)	2 (33)	0	0	6
	1999–2000	36	24	38	62	12 (75)	4 (25)	0	0	16
	2000–2001	35	59	29	71	3 (30)	7 (70)	0	0	10
DG 476	1996–1997	20	35	38	62	8 (100)	0 (--)	0	0	8
Kiliuda	1997–1998	20	25	27	73	9 (82)	2 (18)	0	0	11
Bay	1998–1999	20	45	27	73	6 (75)	2 (25)	0	0	8
	1999–2000	20	40	33	67	8 (100)	0 (--)	0	0	8
	2000–2001	20	41	10	90	7 (78)	2 (22)	0	0	9
DG 477	1996–1997	12	50	17	83	3 (60)	2 (40)	0	0	5
Deadman	1997–1998	20	40	33	67	6 (75)	2 (25)	0	0	8
Bay	1998–1999	20	20	17	83	11 (73)	4 (27)	0	0	15
	1999–2000	20	30	50	50	6 (86)	1 (14)	0	0	7
	2000–2001	25	46	38	62	6 (75)	2 (25)	0	0	8
DG 478	1996–1997	8	13	29	71	3 (60)	2 (40)	0	0	5
Chiniak	1997–1998	8	33	50	50	1 (33)	2 (67)	0	0	3
Bay	1998–1999	8	13	29	71	4 (80)	1 (20)	0	0	5
	1999–2000	15	20	25	75	5 (56)	4 (44)	0	0	9
	2000–2001	16	7	43	57	8 (100)	0 (--)	0	0	8

Table 3. Unit 8 mountain goat harvest mean age data from horn rings, 1991/92–2000/01.

Regulatory Year	Males	(n)	Females	(n)
1991–1992 [a]	3.8	(17)	4.0	(15)
1992–1993 [a]	3.8	(21)	4.7	(14)
1993–1994 [a]	3.8	(31)	3.7	(16)
1994–1995 [b]	4.7	(21)	5.7	(19)
1995–1996 [b]	5.9	(18)	6.7	(7)
1996–1997 [b]	5.2	(17)	6.2	(9)
1997–1998 [b]	5.5	(42)	5.6	(12)
1998–1999 [b]	5.3	(40)	5.5	(14)
1999–2000 [b]	4.5	(36)	4.6	(14)
2000–2001 [a]	4.0	(24)	4.5	(15)

a–horn inspections required.
b–hunters report goat age with report card.

Table 4. Unit 8 mountain goat hunter residence and success, 1996/97–2000/01.

	Successful					Unsuccessful					
Regulatory year	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
1996–1997	36	18	5	59	(60)	21	16	2	39	(40)	98
1997–1998	41	21	3	65	(60)	24	20	0	44	(40)	109
1998–1999	35	26	9	70	(65)	23	12	2	37	(35)	107
1999–2000	36	21	5	62	(56)	25	22	1	48	(44)	110
2000–2001	30	14	10	54	(59)	24	13	--	37	(41)	91

Table 5. Unit 8 mountain goat harvest chronology percent by time period, 1996/97–2000/01.

		Harvest periods		
Area	Regulatory year	September	October	n
All permit hunts	1996–1997	46 %	54 %	59
	1997–1998	52 %	48 %	65
	1998–1999	37 %	63 %	70
	1999–2000	52 %	48 %	62
	2000–2001	39 %	61 %	54

Table 6. Unit 8 mountain goat hunter transport method (percent in parentheses), 1996/97–2000/01.

Regulatory year	Transportation method							Total
	Aircraft	Boat	3 or 4 Wheeler	ORV	Highway vehicle	Snow-machine	Unknown	
1996–1997	56 (57)	31 (32)	7 (7)	0 (--)	3 (3)	1 (1)	0 (--)	98
1997–1998	70 (64)	18 (17)	13 (12)	0 (--)	7 (6)	0 (--)	1 (1)	109
1998–1999	66 (62)	22 (21)	9 (8)	1 (1)	5 (5)	0 (--)	4 (3)	107
1999–2000	72 (65)	15 (14)	14 (13)	2 (2)	6 (5)	0 (--)	1 (1)	110
2000–2001	51 (56)	12 (13)	17 (19)	2 (2)	8 (9)	0 (--)	1 (1)	91

SPECIES
MANAGEMENT REPORT

Alaska Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

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 hunts in GMU 11 have been administered via a state registration hunt since 1980. A subsistence goat registration hunt for local residents in the park-only portion ("pure park") of the Wrangell St. Elias National Park and Preserve was established and is administered by the National Park Service.

The MacColl Ridge trend count area was established in 1970 to obtain sex and age composition data and to 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 fewer than 10% of the estimated mountain goat population within the hunt area.

METHODS

Department personnel conduct aerial surveys to determine sex and age composition and population trends on MacColl Ridge. MacColl Ridge is located north of the Chitina River in the southeastern portion of Unit 11. Additional mountain goat data are collected periodically during aerial surveys of sheep trend count areas. Harvest and hunting pressure are controlled by registration permit.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The 2001 MacColl Ridge survey resulted in a count of 64 goats (Table 1). This survey is down 14% from the record high surveys in both 1998 and 1999 when 74 goats were observed. The current count on MacColl Ridge is 23% 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 2001 was 16:100; kids composed 14% of goats observed (Table 1). Kids observed declined 36% in 2001 – the lowest observed in eight years. Recruitment was especially high between 1995 and 1998, and again in 2000, averaging 14 kids observed per year compared to an average of 8 kids per year between 1991 and 1993.

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 no subsistence hunting of mountain goats occurring in Unit 11 and subsequently closed the "pure 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 combined was established.

Hunter Harvest. Hunters killed 12 mountain goats during the 1999 season and 6 in 2000 for the state registration hunt (RG 580). The average yearly take since 1980 was 16 goats (range = 6–30). The 2000 harvest was comprised of all males, while 9 (75%) billies and 3 (25%) nannies were reported in 1999. 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, and harvest in 2000 was 2 goats (1 male, 1 female).

Hunter Residency and Success. We issued 39 state registration hunt permits in 2000. This is the lowest number of permits issued since 1982, when only 29 were issued. Usually 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 36% in 1999 and 33% in 2000. The hunter success rate declined during this reporting period (Table 2). Successful hunters reported spending 4.2 days in the field compared with 7.9 days for unsuccessful hunters in 2000. This represents a 40% increase in overall hunting effort this year. Usually the hunting effort reported by Unit 11 goat hunters changes little each year. One reason for the increase in effort and decline in harvest may be the weather, as poor weather persisted throughout the fall season. Nonresident hunters took 4 goats in 2000, accounting for 67% of the harvest compared with 33% of the harvest taken by non-local Alaskan residents and none taken by local rural residents (Table 3). Since 1986, nonresidents have taken 61% of goats harvested and have had a higher success rate (74%) than residents (36%).

Harvest Chronology. In both 1999 and 2000, 83% 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. Residents hunting only mountain goats usually take goats later in the season.

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, followed by fourwheelers.

Other Mortality

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

HABITAT

Assessment

The Wrangell Mountains and northern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. Goat habitat in these areas is limited. A substantial number of goats live 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. Overall, mountain goat densities in Unit 11 are much lower than in areas with more favorable habitat such as the Kenai Peninsula.

CONCLUSIONS AND RECOMMENDATIONS

The number of mountain goats observed in the MacColl Ridge trend area during the last two years was down from the all-time high population levels observed two years ago. However, the current count remains well above the long term average and no population trends are evident. Kid production and/or survival has been lower in two of the last three years of this reporting period. 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 annual 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.

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 non-subsistence 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 one 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 impact of the new federal subsistence hunt is to allow hunting of mountain goats in portions of Unit 11 that have been protected for over ten years. Harvests are expected to be low under the federal hunt as the number of individuals eligible for subsistence permits is very limited. Hunt areas are, for the most part, very remote and federal regulations prohibiting the use of aircraft for subsistence hunting will greatly limit access.

Harvest rates on mountain goats in more popular hunting areas of Unit 11 are, on occasion, as high as 10% of the observed population. This rate of harvest is probably sustainable because observed counts represent a minimum population estimate. However, heavy harvests from MacColl Ridge and Bernard and Hawkins Glaciers during periods with low kid recruitment or increased predation could result in a decline in the goat population in those areas. In addition to the yearly trend count on MacColl Ridge, 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.

PREPARED BY:
Robert W. Tobey
Wildlife Biologist III

SUBMITTED BY:
Michael G. McDonald
Assistant Management Coordinator

Table 1 Unit 11 MacColl Ridge trend count area mountain goat composition counts and estimated population size, 1996-2001

Area	Regulatory Year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
MacColl Ridge	1996–1997	47 (78)	13 (22)	0	28	60	60
	1997–1998	50 (76)	16 (24)	0	32	66	66
	1998–1999	59 (80)	15 (20)	0	25	74	74
	1999–2000	64 (86)	10 (14)	0	16	74	74
	2000–2001	46 (77)	14 (23)	0	30	60	60
	2001–2002	55 (86)	9 (14)	0	16	64	64

[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, 1996-2001

Hunt Nr. /Area	Regulatory Year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent Successful Hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
RG580	1996–1997	68	35	31	34	16 (70)	7 (30)	0	0	23
RG580	1997–1998	53	48	17	35	14 (78)	4 (22)	0	0	18
RG580	1998–1999	48	37	26	37	12 (71)	5 (29)	0	0	17
RG580	1999–2000	54	37	40	23	9 (75)	3 (25)	0	0	12
RG580	2000–2001	39	54	31	15	6 (100)	0	0	0	6

Table 3 Unit 11 mountain goat hunter residency and success, 1996-2001

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] Resident	Nonlocal resident	Non-resident	Total (%)	
1996–1997	2	3	18	23 (52)	2	14	5	21 (48)	44
1997–1998	2	8	8	18 (67)	2	5	2	9 (33)	27
1998–1999	4	5	8	17 (59)	2	7	3	12 (41)	29
1999–2000	0	8	4	12 (36)	10	9	2	21 (64)	33
2000–2001	0	2	4	6 (33)	2	7	3	12 (67)	18

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

Table 4 Unit 11 mountain goat harvest chronology percent by time period, 1996-2001

Regulatory year	September				October					
	1–7	8–15	16–23	24–30	1–7	8–15	16–23	24–31	1–30	*n*
1996–1997	22	30	13	9	17	9	--	--	--	23
1997–1998	61	17	11	5	5	--	--	--	--	18
1998–1999	44	12	19	12	12	--	--	--	--	16
19992000	8	42	33	8	--	--	--	8	--	12
2000–2001	33	33	17	17	--	--	--	--	--	6

Table 5 Unit 11 mountain goat harvest percent by transport method, 1996-2001

Regulatory year	Percent of harvest							
	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1996–1997	92	4	4	--	--	--	--	23
1997–1998	78	5	5	--	--	11	--	18
1998–1999	100	--	--	--	--	--	--	17
1999–2000	100	--	--	--	--	--	--	12
2000–2001	100	--	--	--	--	--	--	6

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 1999
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: Units 13D and 14 (12,370 mi2)

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) remains chronically low.

Seasons and bag limits for goats in Units 14 and 13D have varied since statehood. Regulations for Units 13 and 14 were the most liberal during the mid-1960s, with a 144-day goat hunting season (10 August through 31 December) and a 2-goat bag limit. In 1967 the bag limit for Unit 14 was lowered to one goat; however, hunters in Unit 13D could harvest two 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 regulated by a registration permit season. In 1987 Unit 13D opened to goat hunting 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).

Most of Unit 14C has been closed to goat hunting since the early 1960s, except for 1969–1972 when all of 14C was open to hunting. 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 and drawing permit hunts have been established in drainages with a harvestable surplus of goats.

Winter recreation activities in the Chugach Mountains (Unit 14C) have increased during this reporting period. Heli-skiing activities operate within mountain goat range and potential winter habitat. During 2000, 2001, and 2002, the Glacier Ranger District of the Chugach National Forest contracted the Alaska Department of Fish and Game, Division of Wildlife Conservation to conduct winter surveys for goats in areas potentially affected by heli-ski operations. The purpose of these surveys was to identify habitat areas repeatedly used by mountain goats during winter. The information gathered during these surveys have enabled biologists to designate "no-fly zones" in winter use areas for mountain goats, to help reduce potential impacts to the goat population.

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 goat sex and age composition and population trends through aerial surveys. We monitored harvests by requiring successful hunters to report harvests within five or ten days of a kill depending on hunt location. In addition, all hunters were required to return hunt reports, whether they successfully harvested a goat or not. Winter aerial surveys were conducted to determine areas repeatedly used by mountain goats in Unit 14C.

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 (Talkeetna Mountains) in 1998 and 1999. Partial surveys were also conducted in 1999 in Unit 14A (Chugach Mountains) and during 2001 in 13D. Partial surveys were conducted in 14C in 1998, 1999, 2000, and 2001.

Goat populations remain high in the western Chugach Mountains. Aerial survey data collected over the past several years indicate that at least 1000 goats inhabit the western Chugach and Talkeetna Mountains (Tables 1–4).

Variations in count conditions and goat movement may partially account for annual fluctuations in the numbers of goats observed. Goats were observed in greater numbers during late evening surveys, compared to surveys conducted during the early morning or mid-day.

Age Distribution

Goats observed were categorized as kids or adults. Kids comprised 23% of observed goats in Unit 13D (Table 1), 22% in Unit 14A (Chugach Mountains; Table 2), 12–18% in Unit 14A and 14B (Talkeetna Mountains; Table 3), and 13–23% in Unit 14C (Table 4).

Distribution and Movements

Throughout both summer and winter surveys, goats were seldom observed far from escape terrain, which includes broken, rocky, and 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 distribution of goats in select areas of Unit 14C were surveyed. The survey included six areas between Girdwood and Portage, and north to Twentymile Glacier (Figure 1). Because of snow and ice, sightability of goats was low. Most goats, However, were observed in close proximity to escape terrain. Designated "no-fly zones", to reduce the impact of heli-ski operations on goats during the winter months, were created based on the results of these surveys (Figure 1).

In Unit 13, mountain goats are primarily found in the Chugach Mountains of Unit 13D; however, occasionally goats are observed in the Talkeetna Mountains in Unit 13, and a small population inhabits the Chulitna Mountains near Cantwell, at the northernmost edge of their range. It is suspected that the number of mountain goats in Unit 13 is primarily regulated by winter weather and secondarily by predation. Greatly reduced goat numbers in Unit 13 have been attributed to deep snowfall.

Mountain goats in Unit 14 are found primarily in the Chugach Mountains, with only small numbers in the Talkeetna Mountains. The Talkeetna Mountains are the northern limit of

mountain goat range and may provide only marginal habitat and therefore may be unable to support a large goat population.

MORTALITY

Harvest

Seasons and Bag Limits. From 1997 to 2001, in Unit 13D the goat hunting season for residents and nonresidents was 10 August–20 September, and the bag limit was one goat of either sex by drawing permit. The taking of kids and nannies accompanied by kids was prohibited.

In Unit 14A (south of the Matanuska River) the hunting season for residents and nonresidents was 1 September–31 October and was one goat by permit only. From 1997 to 2000 there were two 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. In 2001, two additional drawing hunts in Unit 14C were added. These hunts included Bird Creek drainage, including Penguin Creek, and the upper Eagle River drainage, including Icicle Creek but excluding Raven Creek drainage. These hunts were open from the day after Labor Day to October 15, with a bag limit of one goat.

In Unit 14C, one goat by registration permit only could be taken from 1 September to 15 October, or one goat by registration permit and by archery only could be taken from 16 October to 31 October.

Board of Game Actions and Emergency Orders. In 2001 the Board of Game authorized two additional drawing permit hunts for goats in Unit 14C, one in Bird Creek drainage, including Penguin Creek, and the other in the upper Eagle River drainage, upstream from and including Icicle Creek, but excluding Raven Creek drainage. Because the harvest quota was attained early, Emergency Orders were issued for the Unit 14A goat hunt (RG866) closing it on 29 and 25 September in 2000 and 2001 respectively.

Hunter Harvest. A hunting season was initiated in Unit 13D in 1987 after having been closed since 1978. Harvests have been low, ranging from 4–10 goats per season, from 1997–2001 (Table 5). Portions of Unit 14 open to goat hunting were changed from a drawing permit hunt to a registration permit hunt in 1984. This action resulted in a substantial increase in the Unit 14C harvest. Most of this increase was in the Lake George drainage, because the area supports a high density of goats and is easily accessible by aircraft. The last two weeks of October (16–31 October) were restricted to archery hunting (RG875); however, few archers participate in this late archery-only season (Table 6). Likewise, the Twentymile River goat registration hunt (RG878) is also archery only from 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 21 permits (Table 6). Thirty-five drawing permits were issued for the eastern portion of Unit 13D each year (Table 7).

Hunter Residency and Success. The majority of goat hunters in Unit 13 are nonlocal residents (Table 8), whereas, the majority of goat hunters in Unit 14 are typically local residents (Table 9).

Success rates from 1997 to 2001 ranged from 20 to 59% in Unit 13D (Table 8) and 25 to 48% in Unit 14 (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 are typically more successful than unguided hunters.

Harvest Chronology. Season dates for Unit 14 registration hunts occur from 1 September–31 October. The percent of harvest occurring in September increased from 46% to 92% during the reporting period (Table 10). In September 2001, only 8% of the goats in Unit 14 were harvested in October. 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. 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. In Unit 13D, the majority of successful hunters used airplanes (17–67%) and highway vehicles (17–60%; Table 11). In Unit 14A and the Lake George portion of Unit 14C, aircraft were the primary mode of transport for successful hunters (67–90% in 14A and 96–100% in 14C; Table 12). In the Twentymile River drainage of Unit 14C, airplanes, highway vehicles, and boats are the most common mode of transport, except in years with low water levels when boat access is difficult.

HABITAT

Assessment

Summer habitat quality and availability have not been assessed in Units 13D and 14. High reproductive productivity in the western Chugach goat population and increasing numbers of goats in Unit 14C suggest 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.

Winter surveys have provided some insight on winter habitat and goat distribution in the survey areas in Unit 14C. However, the data are limited. No direct winter habitat assessments have been conducted.

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 16 goats were harvested in Unit 14C annually during this reporting period, and goat harvests averaged 72% 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.

No complete surveys were conducted during this reporting period; 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 high goat population, surveys should continue to be conducted at least biennially, unless there is severe winter weather or increased hunting pressure.

The Talkeetna Mountains portions of Units 14A and 14B appear to be marginal goat habitat. 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.

PREPARED BY:
Jessy Coltrane
Wildlife Biologist II

REVIEWED BY:
Michael G. McDonald
Assistant Management Coordinator

Table 1 Unit 13D aerial mountain goat composition counts, 1997–2001

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Goats Observed	Goats /hour
1997–1998[a]					
1998–1999[a]					
1999–2000[a]					
2000–2001[a]					
2001–2002[b]	92 (77)	28 (23)	30	120	11.8

[a]No surveys conducted.
[b]Partial survey (count areas 2, 3, and 5).

Table 2 Unit 14A, Chugach Mountains, aerial mountain goat composition counts, 1997–2001

Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour
1997–1998[a]					
1998–1999	90 (78)	25 (22)	28	115	8.4
1999–2000[a]					
2000–2001[a]					
2001–2002[a]					

[a] No surveys conducted.

Table 3 Unit 14A and 14B, Talkeetna Mountains, aerial mountain goat composition counts, 1997–2001

Regulatory Year	Adults (%)	Kids (%)	Kids: 100 adults	Total Goats Observed	Goats /hour
1997–1998[a]					
1998–1999[b]	14 (82)	3 (18)	21	17	
1999–2000[c]	14 (88)	2 (12)	14	16	
2000–2001[a]					
2001–2002[a]					

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

Table 4 Unit 14C aerial mountain goat composition counts and estimated population size, 1997–2001[a]

Regulatory Year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats /hour	Estimated population size[b]
1997–1998[c]	112 (77)	34 (23)	30	146		
1998–1999[c]	95 (77)	29 (23)	31	124		
1999–2000						
2000–2001[d]	687 (87)	88 (13)	15	687		
2001–2002[c]	204 (83)	42 (17)	21	246		

[a] Data include all goats observed in Unit 14C; S&I reports prior to 1984 included only goats in registration hunt areas.
[b] Based on 80–85% sightability (snow conditions).
[c] Partial survey (goats counted incidental to sheep surveys; Lake George and Twentymile River not counted).
[d] Partial survey (goats counted incidental to sheep surveys; Complete survey of Lake George; Twentymile River not counted).

Table 5 Annual mountain goat harvest by unit, 1997–2001

Regulatory Year	Unit				Total
	13D[a]	14A[b]	14B[c]	14C[d]	
1997–1998	6	10		38	54
1998–1999	5	7		26	38
1999–2000	10	10		16	36
2000–2001	4	10		22	36
2001–2002	6	2		23	31

[a] Drawing permit only.
[b] Registration permit only.
[c] Closed to mountain goat hunting.
[d] Registration permit only (1994–1995); both registration and drawing permits (1997–1998 to 2001–2002).

Table 6 Unit 14 mountain goat harvest data by permit hunt, 1997–2001.

Area[a]	Regulatory Year	Permits Issued	Percent did not hunt[b]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)	Females (%)	Total harvest
	1997–1998	38	26	64	36	9 (90)	1 (10)	10
RG866	1998–1999	72	50	81	19	6 (86)	1 (14)	7
Unit 14A	1999–2000	71	52	71	29	8 (80)	2 (20)	10
	2000–2001	54	50	63	37	7 (70)	3 (30)	10
	2001–2002	30	63	73	27	0 (0)	3 (100)	3
	1997–1998	3	0	100	0	0 (0)	0 (0)	0
DG852	1998–1999	5	33	50	50	2 (100)	0 (0)	2
Unit 14C	1999–2000	5	0	60	40	0 (0)	2 (100)	2
East Eklutna	2000–2001	5	20	25	75	0 (0)	3 (100)	3
	2001–2002	5	0	60	40	2 (100)	0 (0)	2
DG854[c] Unit 14C	2001–2002	3	0	67	33	0 (0)	1 (100)	1
	1997–1998	5	0	0	100	1 (20)	4 (80)	5
DG856	1998–1999	8	38	80	20	0 (0)	1 (100)	1
Unit 14C	1999–2000	8	13	71	29	1 (50)	1 (50)	2
Glacier Ck.	2000–2001	8	0	87	13	1 (100)	0 (0)	1
	2001–2002	8	25	67	33	2 (100)	0 (0)	2
DG858[c] Unit 14C	2001–2002	5	20	75	25	1 (100)	0 (0)	1
	1997–1998	82	43	81	19	6 (67)	3 (33)	9
RG868	1998–1999	73	52	80	20	4 (57)	3 (43)	7
Unit 14C	1999–2000	71	52	80	20	7 (100)	0 (0)	7
Twentymile	2000–2001	63	62	87	13	1 (33)	2 (67)	3
River	2001–2002	49	76	92	8	1 (100)	0 (0)	1

Table 6 Continued

Area[a]	Regulatory Year	Permits Issued	Percent did not hunt[b]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total harvest
	1997–1998	71	41	43	57	19	(79)	5	(21)	24
RG869	1998–1999	75	52	56	44	11	(69)	5	(31)	16
Unit 14C	1999–2000	40	48	76	24	3	(60)	2	(40)	5
Lake	2000–2001	82	52	62	38	14	(93)	1	(7)	15
George	2001–2002	61	54	46	54	12	(80)	3	(20)	15
RG878	1997–1998	0								
Unit 14C	1998–1999	1	100	0	0	0	(0)	0	(0)	0
Twentymile	1999–2000	2	50	100	0	0	(0)	0	(0)	0
River	2000–2001	2	50	100	0	0	(0)	0	(0)	0
(archery)	2001–2002	0								
RG879	1997–1998	0								
Unit 14C	1998–1999	1	100	0	0	0	(0)	0	(0)	0
Lake	1999–2000	0								
George	2000–2001	0								
(archery)	2001–2002	0								
Totals	1997–1998	161	40	61	39	26	(68)	12	(32)	38
for all	1998–1999	163	51	67	33	17	(65)	9	(35)	26
Unit 14C	1999–2000	152	55	76	23	11	(69)	5	(31)	16
	2000–2001	160	53	71	29	17	(77)	5	(23)	22
	2001–2002	131	56	62	38	18	(82)	4	(18)	22

Area[a]	Regulatory Year	Permits Issued	Percent did not hunt[b]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total harvest
Totals	1997–1998	199	37	62	38	35	(73)	13	(27)	48
for all	1998–1999	235	51	72	28	23	(70)	10	(30)	33
Unit 14	1999–2000	223	54	75	25	19	(73)	7	(27)	26
	2000–2001	214	52	68	31	24	(75)	8	(25)	32
	2001–2002	161	57	64	36	18	(72)	7	(28)	25

[a] Previous hunt number in parentheses.
[b] Includes permittees who did not report.
[c] New hunt added in 2001–2002.

Table 7 Unit 13D mountain goat harvest data by permit hunt, 1997–2001

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
DG718	1997–1998	10	20	75	25	1 (50)	1 (50)	2
Unit 13D	1998–1999	10	70	67	33	1 (100)	0 (0)	1
West	1999–2000	10	30	57	43	3 (100)	0 (0)	7
	2000–2001	10	10	89	11	1 (100)	0 (0)	1
	2001–2002	10	60	50	50	2 (100)	0 (0)	2
DG719	1997–1998	25	60	60	40	4 (100)	0 (0)	4
Unit 13D	1998–1999	25	48	69	31	3 (75)	1 (25)	4
East	1999–2000	25	60	30	70	7 (100)	0 (0)	7
	2000–2001	25	14	73	27	2 (67)	1 (33)	3
	2001–2002	25	28	78	22	3 (75)	1 (25)	4
Totals	1997–1998	35	49	67	33	5 (83)	1 (17)	6
For all	1998–1999	35	54	69	31	4 (80)	1 (20)	5
Unit 13D	1999–2000	35	51	41	59	10 (100)	0 (0)	10
	2000–2001	35	43	80	20	3 (75)	1 (25)	4
	2001–2002	35	37	72	27	5 (83)	1 (17)	6

[a] Includes permittees who did not report.

Table 8 Unit 13D mountain goat hunter residency and success, 1997–2001

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local Resident	Nonlocal resident	Nonresident	Total (%)[a]	Local resident	Nonlocal resident	Nonresident	Total (%)[a]	
DG718	1997–1998	0	2	0	2 (25)	2	4	0	6 (75)	8
Unit 13D	1998–1999	0	1	0	1 (33)	0	2	0	2 (60)	3
West	1999–2000	0	3	0	3 (43)	0	4	0	4 (57)	7
	2000–2001	0	0	1	1 (50)	1	0	0	1 (50)	2
	2001–2002	0	1	1	2 (50)	0	2	0	2 (50)	4
DG719	1997–1998	3	0	1	4 (36)	0	5	1	6 (55)	11
Unit 13D	1998–1999	1	2	1	4 (31)	0	9	0	9 (69)	13
East	1999–2000	1	5	1	7 (70)	1	2	0	3 (30)	10
	2000–2001	0	3	0	3 (27)	1	6	1	8 (73)	11
	2001–2002	0	0	4	4 (22)	2	10	2	14 (78)	18
Totals	1997–1998	3	2	1	6 (33)	2	9	1	12 (67)	18
For all	1998–1999	1	3	1	5 (31)	0	11	0	11 (69)	16
Unit 13D	1999–2000	1	8	1	10 (59)	1	6	0	7 (41)	17
	2000–2001	0	3	1	4 (20)	2	6	1	16 (80)	20
	2001–2002	0	1	5	6 (27)	2	12	2	16 (73)	22

[a] Includes hunters with unspecified residency and/or hunters that did not submit a report.

Table 9 Unit 14 mountain goat hunter residency and success, 1997–2001

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local resident	Nonlocal resident	Nonresident	Total (%)[a]	Local resident	Nonlocal resident	Nonresident	Total (%)[a]	
RG866	1997–1998	1	0	3	10 (36)	10	0	1	18 (64)	28
Unit 14A	1998–1999	3	0	4	7 (19)	24	1	4	29 (81)	36
	1999–2000	3	2	5	10 (29)	19	3	2	24 (71)	34
	2000–2001	2	1	7	10 (37)	16	1	0	17 (63)	27
	2001–2002	2	1	0	3 (27)	7	0	1	8 (73)	11
DG852	1997–1998	0	0	0	0 (0)	2	1	0	3 (100)	3
Unit 14C	1998–1999	2	0	0	2 (50)	2	0	0	2 (50)	4
East Eklutna	1999–2000	2	0	0	2 (40)	3	0	0	3 (60)	5
	2000–2001	3	0	0	3 (75)	1	0	0	1 (25)	4
	2001–2002	2	0	0	2 (40)	3	0	0	3 (60)	5
DG854 Unit 14C	2001–2002	1	0	0	1 (33)	2	0	0	2 (67)	3
DG856	1997–1998	5	0	0	5 (100)	0	0	0	0 (0)	5
Unit 14C	1998–1999	1	0	0	1 (20)	4	0	0	4 (80)	5
Glacier Ck.	1999–2000	2	0	0	2 (29)	5	0	0	5 (71)	7
	2000–2001	1	0	0	1 (13)	5	2	0	7 (87)	8
	2001–2002	2	0	0	2 (33)	3	1	0	4 (67)	7
DG858 Unit 14C	2001–2002	0	0	0	1 (25)	0	0	0	3 (75)	4
RG868	1997–1998	9	0	0	9 (19)	36	1	1	38 (81)	47
Unit 14C	1998–1999	6	1	0	7 (20)	25	1	0	28 (80)	35
Twentymile	1999–2000	7	0	0	7 (21)	27	0	0	27 (79)	34
River	2000–2001	3	0	0	3 (13)	21	0	0	21 (87)	24
	2001–2002	1	0	0	1 (8)	11	0	0	11 (92)	12

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local resident	Nonlocal resident	Nonresident	Total (%)[a]	Local resident	Nonlocal resident	Nonresident	Total (%)[a]	
RG869	1997–1998	18	1	5	24 (57)	12	2	4	18 (43)	42
Unit 14C	1998–1999	7	1	7	16 (44)	15	1	2	20 (56)	36
Lake	1999–2000	3	1	1	5 (24)	11	0	4	16 (76)	21
George	2000–2001	4	0	11	15 (38)	23	0	1	24 (62)	39
	2001–2002	2	1	12	15 (54)	10	1	2	13 (13)	28
RG878	1997–1998	0	0	0	0 (0)	0	0	0	0 (0)	0
Twentymile	1998–1999	0	0	0	0 (0)	0	0	0	0 (0)	0
River	1999–2000	0	0	0	0 (0)	1	0	0	1 (100)	1
(archery)	2000–2001	0	0	0	0 (0)	1	0	0	1 (100)	1
	2001–2002	0	0	0	0 (0)	0	0	0	0 (0)	0
RG879	1997–1998	0	0	0	0 (0)	0	0	0	0 (0)	0
Lake	1998–1999	0	0	0	0 (0)	0	0	0	0 (0)	0
George	1999–2000	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	2000–2001	0	0	0	0 (0)	0	0	0	0 (0)	0
	2001–2002	0	0	0	0 (0)	0	0	0	0 (0)	0
Totals	1997–1998	32	1	5	38 (39)	50	4	5	59 (61)	97
for all	1998–1999	16	2	7	26 (32)	46	2	2	54 (68)	80
Unit 14C	1999–2000	14	1	1	16 (23)	21	0	4	52 (76)	68
	2000–2001	11	0	11	22 (29)	51	2	1	54 (71)	76
	2001–2002	8	1	12	22 (37)	29	2	2	36 (61)	59
Totals	1997–1998	33	1	8	48 (38)	60	4	6	77 (62)	125
for all	1998–1999	19	2	11	33 (28)	70	3	6	83 (72)	116
Unit 14	1999–2000	17	3	6	25 (25)	40	3	2	76 (74)	102
	2000–2001	13	1	18	32 (31)	67	3	1	71 (69)	103
	2001–2002	10	2	12	25 (35)	36	2	3	44 (63)	70

[a] Includes hunters with unspecified residency.

Table 10 Unit 14 mountain goat harvest chronology percent by month, 1997–2001

Area	Regulatory year	Harvest period						
		August	September	October	November	December	Unknown (*n*)	*n*
Unit 14A	1997–1998	0	56	44	0	0	1	10
	1998–1999	0	57	43	0	0	0	7
	1999–2000	0	70	30	0	0	0	10
	2000–2001	0	100	0	0	0	0	10
	2001–2002	0	100	0	0	0	0	3
Unit 14C	1997–1998	0	44	57	0	0	1	38
	1998–1999	0	6	40	0	0	1	26
	1999–2000	0	63	37	0	0	0	16
	2000–2001	0	77	23	0	0	0	22
	2001–2002	0	91	9	0	0	0	22
Totals for all Unit 14	1997–1998	0	46	54	0	0	2	48
	1998–1999	0	59	41	0	0	1	33
	1999–2000	0	65	35	0	0	0	26
	2000–2001	0	84	16	0	0	0	32
	2001–2002	0	92	8	0	0	0	25

Table 11 Unit 13D successful mountain goat hunter transport methods, 1997–2001

Regulatory year	Percent of harvest							
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	*n*
1997–1998	17	17	33	0	0	0	33	6
1998–1999	40	0	0	0	0	0	60	5
1999–2000	60	0	10	10	0	0	20	10
2000–2001	50	25	0	0	0	0	25	4
2001–2002	67	17	0	0	0	0	17	6

Table 12 Unit 14 successful mountain goat hunter transport methods (registration hunts only), 1997–2001

Area[a]	Regulatory Year	Percent of harvest								
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
RG866	1997–1998	90	0	0	10	0	0	0	0	10
Unit 14A	1998–1999	71	0	14	14	0	0	0	0	7
	1999–2000	80	0	0	20	0	0	0	0	10
	2000–2001	80	0	10	10	0	0	0	0	10
	2001–2002	67	0	0	33	0	0	0	0	3
RG868	1997–1998	44	0	44	0	0	0	0	11	9
Unit 14C	1998–1999	14	0	43	0	0	0	29	14	7
Twentymile	1999–2000	14	0	57	0	0	0	14	14	7
River	2000–2001	67	0	0	0	0	0	33	0	3
	2001–2002	0	0	0	0	0	0	0	100	1
RG869	1997–1998	96	0	0	0	0	0	0	4	24
Unit 14C	1998–1999	100	0	0	0	0	0	0	0	16
Lake	1999–2000	100	0	0	0	0	0	0	0	5
George	2000–2001	100	0	0	0	0	0	0	0	15
	2001–2002	100	0	0	0	0	0	0	0	15
Totals	1997–1998	82	12	0	0	0	0	0	6	33
for all	1998–1999	74	13	0	0	0	0	9	4	23
Unit 14C	1999–2000	50	0	33	0	0	0	8	8	12
	2000–2001	94	0	0	0	0	0	6	0	18
	2001–2002	94	0	0	0	0	0	0	6	16
Totals	1997–1998	84	0	9	2	0	0	0	5	43
for all	1998–1999	73	0	13	3	0	0	7	3	30
Unit 14	1999–2000	64	0	18	9	0	0	5	0	22
	2000–2001	88	0	4	4	0	0	4	0	28
	2001–2002	90	0	0	5	0	0	0	5	19

[a] Archery-only registration hunts 878 and 879 (Twentymile River and Lake George, formerly 881 and 882) had no successful hunters.

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.

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