

**Mountain Goat  
Management Report**  
of survey-inventory activities  
1 July 2005–30 June 2007

**Patricia Harper, Editor**  
**Alaska Department of Fish and Game**  
**Division of Wildlife Conservation**



Photo by Phil Mooney, ADF&G

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**October 2008**

# STATE OF ALASKA

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## DEPARTMENT OF FISH AND GAME

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### DIVISION OF WILDLIFE CONSERVATION

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**Cover Photo:** A young billy (center) stands with two nannies on the north end of Baranof Island. It can be hard to tell which goats are male and which are female, so the department recently published a new identification guide to help hunters select billies for harvest. *Photo by Phil Mooney, ADF&G.*

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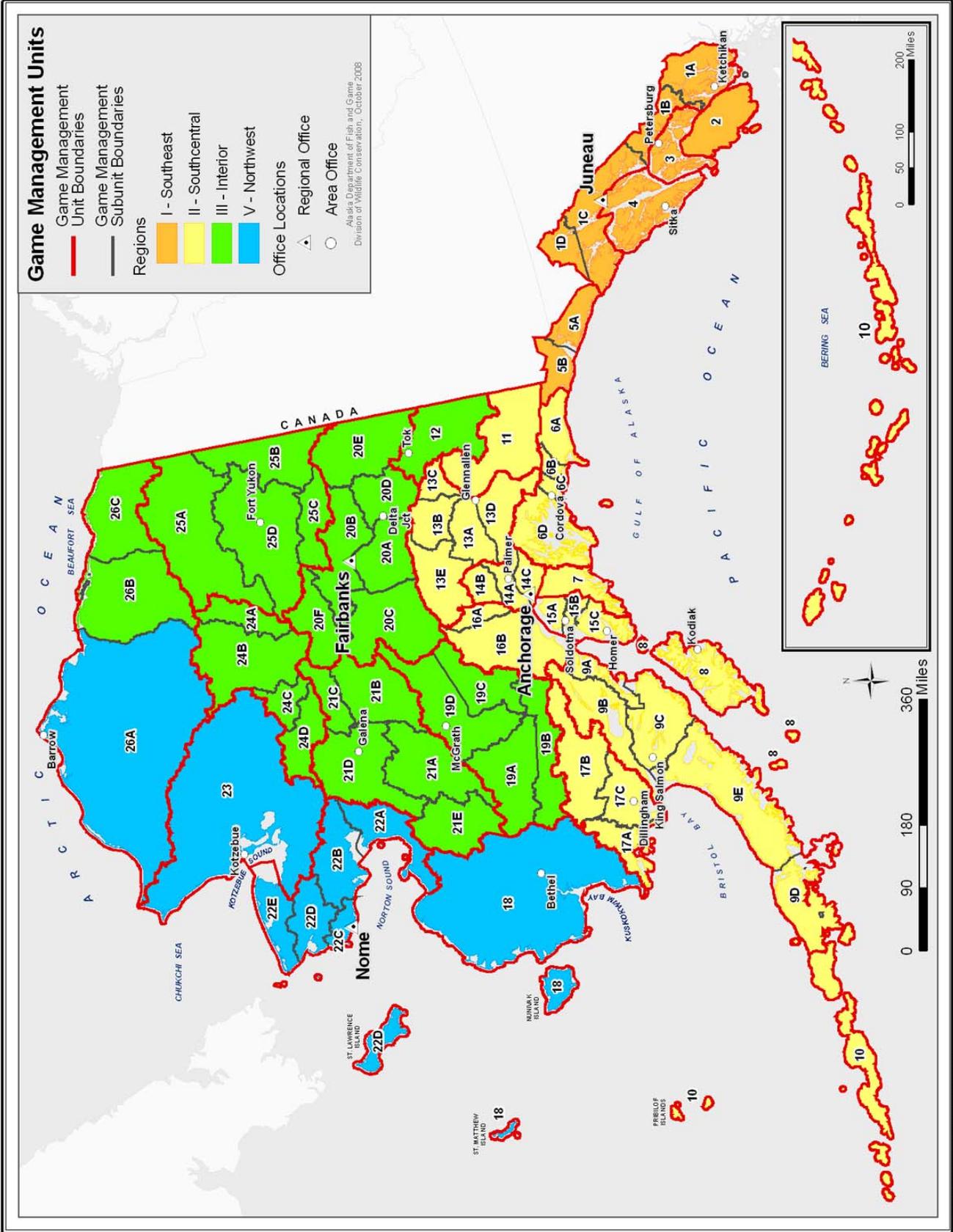
# MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2005

To: 30 June 2007

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**MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

**LOCATION**

**GAME MANAGEMENT UNIT:** 1A (5000 mi<sup>2</sup>)

**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 (*Oreamnos americanus*) 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 unpublished data, Ketchikan).

We estimate that the Upper Mahoney Lake population currently numbers about 100–140 goats. These goats have expanded their range and are currently using most of the suitable goat habitat in this area. This herd is somewhat geographically isolated because access to adjoining suitable habitat would require a substantial move across more than 10 miles of open, low elevation habitat. Recent sightings of goats outside the typical habitat in this area suggest goats are pushing out in search of new territory. The first hunting season was initiated by drawing permit DG003 fall of 2006. Twelve drawing permits were issued during each of 2006 and 2007, with the season running 16 August–31 December. Six goats were harvested during each of the past 2 seasons. In an effort to increase the harvest of goats in this area we have increased the number of drawing permits starting fall of 2008 to 20.

Statewide nonresident hunters must contract with a licensed Big Game Guide to hunt mountain goats. The cost of these guided goat hunts varies from 7 to 15 thousand dollars.

## 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 (TCA) throughout Unit 1A.
3. Monitor sex composition of the harvest and manage for < 6 points per 100 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 14 established TCAs each fall as weather and work schedules allow. TCAs vary in size from 23–200 mi<sup>2</sup>. We generally initiate surveys during late August or September, and begin daily efforts from 0500–0800 or 1700–1900 hours.

We obtain harvest information through a mandatory hunt report that is part of a required registration permit (RG002). Information collected includes the areas and numbers of days hunted, hunter success, dates of hunts and kills, transport methods, and commercial services used. Successful Unit 1A hunters are also asked to voluntarily provide their goat horns to the Ketchikan Fish and Game office for aging. During the sealing process we obtain genetic samples, age the goat by counting growth annuli, and measure horn base circumferences and each annulus length. Genetic samples are shipped frozen to Steve Cote in Alberta, Canada, who is looking at mountain goat genetic variability across North America. We also hope to use this genetic information to look at historical isolation of the Cleveland Peninsula goat population.

A weighted point system is applied to the 3-year running average of 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 per 100 adult goats observed during years with average weather) 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. Average annual recruitment for Alaska goat populations is estimated to be approximately 4 to 6 percent per year. If we sustain a severe winter we would assume that some animals die during the winter and consequently less animals would be available for the following hunting season. Managing harvest using 6 points per 100 goats on a 3-year running average and careful monitoring of environmental conditions throughout the unit ensure we are not overharvesting goats.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

During fall 2005 we completed aerial surveys in the 3 following TCAs: K-6 Cleveland Peninsula, K-7 Yes Bay/Reflection Lake, and K-13 Deer Mountain (Table 1). We observed 215 goats in 3.5 hours of flying. The 61 goats/hour observation rate was similar to recent years. However, the ratio of 17 kids per 100 adults was one of the lowest in the past 10 years.

During fall 2006 we counted four TCAs: K-3 Rudyerd Bay to Smeaton Arm, K-6 Cleveland Peninsula, K-7 Yes Bay to the Bradfield Canal and K-13 Deer Mountain (Table 2). We observed 308 goats in 4.5 hours of survey time. Our observation rate of 68 goats per hour was one of the highest in the past 10 years.

#### *Population Size*

Results of aerial mountain goat surveys can be interpreted only as minimum population values (Ballard 1975). We developed population estimates for goats inhabiting Unit 1A using survey data (ADF&G unpublished report, 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<sup>2</sup> to these areas which resulted in a mainland estimate of 7300–10,200 goats. In the absence of any new information, we believe this is the best estimate available for Unit 1A goat numbers.

#### *Population Composition*

We do not have a hard overall population estimate for Unit 1A, but numbers currently appear to be moderately high and stable. A series of mild winters, moderate bear and wolf predation, and good habitat conditions have all contributed to healthy goat numbers in this unit.

#### *Distribution and Movements*

The most recent goat introduction near Ketchikan (Deer Mountain) appears to be doing very well. Radio collars placed on some of these goats during the translocation effort are no longer transmitting and no new goats have been captured to provide additional movement or distribution data. During the past few years we have received a number of observations of goats near Ketchikan traveling along beaches, crossing roads at low elevation, or moving through residential areas. These observations and aerial surveys indicate goats are moving and colonizing most of the suitable goat habitat in this area.

We are planning to revisit the original Mahoney Peak vegetation plots during summer of 2008. These plots were established near the proposed Mahoney Peak release site prior to the introduction to determine the feasibility of establishing goats to this area and for monitoring (USDA 1991). We want to determine if goats are having any impact on alpine plant communities and, if so, whether those changes are within acceptable levels. This habitat assessment may help guide goat management decisions in the future.

*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, Shrimp Bay, and Gedney Pass:

1 Aug–31 Dec

1 goat by registration permit only

Unit 1A, remainder of Revillagigedo Island:

15 Aug–31 Dec

1 goat by drawing permit only

Board of Game (BOG) Actions and Emergency Orders. With the BOG authority to increase DG003 goat permits as needed, we increased the number of permits for the 2008 season from 12 to 20. Success rates have been lower than expected and goat numbers appear to be high enough to sustain additional harvest. During the 2008 BOG meeting we will ask the board for authority for up to 40 permits to allow us to both maximize the hunting opportunity and insure the animals don't overbrowse the range.

Hunter Harvest. One-hundred six permits and 101 permits were issued for Unit 1A during 2005 and 2006, respectively. Fifty-four hunters killed 27 goats in 2005 and 46 hunters killed 14 goats during the 2006 season. The combined harvest during the past 2 years has been equal to the 10-year average of 23 goats (range 9–36) (Table 3). The 46 hunters in 2006 represented one of the lowest number of hunters in the field on record, well below the 10-year average of 61 (range 42–98; Table 4). There were likely several reasons for lack of hunter participation and lower harvest during the 2006 season, including persistent poor weather conditions for flying into hunting areas, and a slow but steady downturn in the economy that left many hunters with less disposable income.

Successful hunters spent an average of 2.2 days to kill a goat during the 2005 season, and 3.6 days to kill a goat during 2006 (range 1–8 days).

Permit Hunts. Goat hunting in Unit 1A has been regulated by registration permits for the past 23 years. For the first time, drawing permits (DG003) were issued during 2006 for the area on

Revillagigedo Island near Mahoney Peak. Twelve drawing permits were available starting fall of 2006 with the season from 15 August–31 December. Fewer hunters applied for DG003 permits during 2007 (150) than during the previous year (202). Six goats were harvested during each of the past 2 years (Table 7). Ketchikan residents made up an average of 57% of the applicants for this drawing hunt during 2006 and 2007 while nonresidents averaged 8%. The remainder of applications came from nonlocal Alaska residents.

The Cleveland Peninsula portion of Unit 1A remains closed to goat hunting (Porter 2004).

Hunter Residency and Success. Five nonresidents hunted goats successfully in Unit 1A during 2005, while 8 nonresidents killed goats during 2006 (Table 4). Forty eight and 29% of the 2005 and 2006 harvest, respectively, were by hunters residing within the subunit. Alaska residents composed 81% of the 2005 harvest and 43% of the 2006 harvest. Overall hunter success during 2005 was 51%, and in 2006 dropped to 31% (Table 4). Successful nonresident hunters spent more time than residents to kill a goat during both years. This likely represents more trophy selectivity by nonresident hunters accompanied by a registered guide.

All DG003 hunters were Alaska residents during 2006 and one nonresident harvested a goat in the drawing hunt during 2007.

Harvest Chronology. Typically, most of the goat harvest is split between August and September with a few animals taken during October, depending on weather patterns. During 2005 the harvest was higher during August (37%) while hunters during the 2006 season took more goats in October (50%) (Table 5).

Transport Methods. Airplanes accounted for 81% and 86% of the transportation used by successful hunters during the past two seasons, respectively (Table 6). Airplanes accounted for 78% of the transportation used by Unit 1A hunters during the past 10 seasons (range 50–100%). The balance of hunters used boats to access hunting areas.

Horn Growth Rates. We had better response by hunters submitting horns from goats to measure growth annuli during this report period. Observed horn growth, especially during the first 3 years of life, appears to be highest in the 2 introduced populations of goats, including Mahoney Mountain and Reid Mountain herds. We will consider submitting a proposal to the BOG in 2008 to require mandatory horn sealing to increase our samples.

Other Mortality. We found our first confirmed case of the orf virus in the local goat population during the 2004 season. We did not receive hunter reports of new cases of contagious ecthyma (orf) during this report period. This infected goat was harvested from the Little Goat Lake area on the mainland. We will continue to alert hunters to look for and to report cases of infected goats during the upcoming seasons. Better goat hunter education is needed because the orf virus is potentially dangerous to humans.

## CONCLUSIONS AND RECOMMENDATIONS

The 1991 Upper Mahoney Lake goat introduction appears to have been a success. The herd increased from the original 15 to at least 140 goats by fall 2005 and productivity remains high. The new drawing permit hunt DG003 in this area has been successful with about 50% hunter success during 2006 and 2007.

Mountain goat populations appear to be stable throughout most of Unit 1A. We will continue to monitor goat numbers on the Cleveland Peninsula, an area west of Ketchikan that remains closed to hunting because of goat viability concerns. We will survey the Cleveland several times annually during the next few years to monitor changes. Our objective for the remainder of the unit of maintaining goat densities greater than 20 goats per hour of survey time has been met consistently. We will continue to monitor disease outbreaks and educate hunters prior to handling goats during the hunting season. We will propose to the BOG in November 2008 that the number of drawing permits for DG003 be increased to allow up to 40 permits to allow for more hunter opportunity as the population grows.

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TABLE 1 Unit 1A mountain goat survey data, 1996–2006

Survey Dates	Nr Kids	Nr. Adults	Total Goats	Kids-100 Adults	Count Time (hrs.)	Goats/ Hour
Sept. 3–Sept. 30, 1996	112	309	421	36	10.6	40
Sept. 9–Sept. 29, 1997	147	551	698	27	12.0	58
Sept. 13–Sept. 21, 1998	102	450	552	23	10.4	53
Sept. 12–Sept. 27, 1999	56	377	433	15	7.8	56
Aug. 23–Oct. 4, 2000	79	356	435	22	7.1	61
July 24–Oct 11, 2001	130	487	617	27	8.6	72
Aug 24–Oct 10, 2002	116	439	555	26	7.7	72
Aug 5–Sept 22, 2003	134	345	479	39	6.6	73
Sept 10, 2004	7	9	16	78	1.1	15
Aug 16–Aug 25, 2005	31	184	215	17	3.5	61
Aug 16–Oct 3, 2006	60	248	308	38	4.5	68
Average <sup>b</sup>	97	375	476	27	8.0	61

<sup>a</sup> Includes a 48-minute survey of the Deer Mountain/Upper Mahoney Lake introduced population on September 8. Fourteen adults and 4 kids were observed.

<sup>b</sup> Overall average does not include the single count during 2004.

∞

TABLE 2 Unit 1A mountain goat trend count area surveys, 1996–2006

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 adults	Sets of twins
K-3	2006	115	28	143	1.5	95	24	0
	2001	86	27	113	1.8	63	31	2
	2000	60	13	73	1.5	48	22	0
	1999	114	13	127	1.5	85	11	0
	1995	105	28	133	2.0	67	27	0
K-4	2000	73	10	83	1.0	83	14	2
	1999	29	6	35	.9	39	21	0
	1998	65	17	82	1.2	68	26	1
	1997	78	24	102	1.1	93	31	1
K-5	2003	101	40	141	1.9	74	40	3
	2002	150	26	176	1.5	117	17	2
	2001	182	45	227	1.9	119	25	1
	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
	1997	283	71	354	1.9	186	25	2

TABLE 2 continued

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 adults	Sets of twins
K-6	2006	30	6	36	0.8	45	20	0
	2005	22	7	29	1.0	29	32	0
	2004	9	7	16	1.1	15	78	0
	2003	10	7	17	1.0	17	70	0
	2001	8	2	10	1.0	10	25	0
	2000	14	3	17	1.0	17	21	0
	1997	18	7	25	1.7	15	39	0
	1996	18	6	24	1.5	16	33	0
K-7	2006	43	10	53	1.5	35	23	0
	2005	67	10	77	1.5	51	15	0
	2003	60	26	86	2.0	43	43	2
	2002	57	15	72	1.5	48	26	1
	2001	58	15	73	1.4	52	26	0
	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
K-8	1999	17	4	21	1.9	11	24	0
	1997	46	15	61	2.2	28	33	0

TABLE 2 continued

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 adults	Sets of twins
K-9								
	2003	19	5	24	0.9	27	26	1
	2002	37	7	44	1.3	34	19	0
	2001	29	6	35	1.0	34	21	2
	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
K-10								
	1998	20	3	23	1.1	21	15	0
	1996	52	14	66	1.2	55	27	0
K-11								
	1997	6	0	6	0.3	20	0	0
	1996	12	2	14	0.3	47	17	0
K-12A								
	2003	54	30	84	0.8	105	56	2
	2002	21	8	29	0.3	97	38	2
	2000	26	7	33	0.8	41	27	0
	1998	27	12	39	0.5	78	44	1
	1996	18	5	23	0.8	29	28	0
K-12B								
	2002	35	16	51	0.5	102	46	0
	2000	76	21	87	1.2	73	28	0
	1998	62	12	74	1.3	57	19	0
	1996	74	35	109	1.6	68	47	6

TABLE 2 continued

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 adults	Sets of twins
K-13								
	2006	60	16	76	0.8	95	27	0
	2005	95	14	109	1.0	109	15	0
	2003	67	19	86	0.5	172	28	1
	2002	46	18	64	0.8	80	39	0
	2001	64	23	87	0.5	174	36	5
	2000	35	14	49	0.4	123	40	0
	1999	22	5	27	0.3	90	23	0
	1998	46	13	59	0.8	74	28	1
	1997	35	13	48	1.1	44	37	1
	1996	26	13	39	1.0	39	50	0

TABLE 3 Unit 1A mountain goat harvest data by permit hunt, regulatory years 1996–2006

Hunt	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Harvest					Total harvest	
						Males (%)	Females (%)	Unk (%)				
RG001												
	1996	171	91	58	22	14	(64)	8	(36)	0	(0)	22
	1997	177	82	95	31 <sup>c</sup>	22	(47)	19	(53)	0	(0)	41
	1998	205 <sup>a</sup>	91	114	29 <sup>d</sup>	20	(61)	13	(39)	0	(0)	33
	1999	174	94	80	9	5	(56)	4	(44)	0	(0)	9
	2000	154	86	68	23 <sup>b</sup>	14	(58)	10	(42)	0	(0)	24
	2001	132	80	52	22	17	(77)	5	(23)	0	(0)	22
	2002 <sup>e</sup>	123	71	52	16	8	(50)	8	(50)	0	(0)	16
	2003	146	74	72	18	10	(56)	8	(44)	0	(0)	18
	2004	120	69	29	22	16	(73)	6	(27)	0	(0)	22
	2005	106	52	27	27	13	(52)	12	(48)	2	(0)	27
	2006	101	55	32	14	11	(79)	3	(21)	0	(0)	14
	Average	146	77	64	21	14	(61)	9	(38)	0	(0)	23

<sup>a</sup> Four permits not returned.

<sup>b</sup> One hunter killed 2 goats (23 hunters killed 24 goats).

<sup>c</sup> Five hunters killed 2 goats (31 hunters killed 41 goats).

<sup>d</sup> Four hunters killed 2 goats (29 hunters killed 33 goats).

<sup>e</sup> Regulation changed; bag limit reduced to 1 goat per season.

TABLE 4 Unit 1A mountain goat hunter residency and success, regulatory years 1996–2006

Regulatory year	Successful					Unsuccessful					Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	
1996	14	8	0	22	(31)	30	15	3	48	(69)	70
1997	24	10	2	36	(41)	40	8	3	51	(59)	87
1998	21	8	4	33	(34)	51	10	4	65	(66)	98
1999	4	3	2	9	(14)	41	6	9	56	(86)	65
2000	9	7	11	27	(47)	24	4	3	31	(53)	58
2001	9	4	9	22	(50)	17	2	3	22	(50)	44
2002	6	3	7	16	(31)	20	7	8	35	(69)	51
2003	10	3	7	20	(36)	26	6	4	36	(64)	56
2004	14	7	1	22	(52)	19	1	0	20	(48)	42
2005	13	9	5	27	(51)	20	4	3	27	(49)	54
2006	4	2	8	14	(31)	22	4	6	32	(69)	46
Average	12	6	5	23	(38)	28	6	4	38	(62)	61

<sup>a</sup> Local resident hunters reside in Unit 1A.

TABLE 5 Unit 1A goat harvest chronology percent by month, 1996 through 2006

Regulatory year	Aug	(%)	Sep	(%)	Oct	(%)	Nov	(%)	Dec	(%)	Unk	(%)	n
1996	5	(23)	15	(68)	2	(9)	0	(0)	0	(0)	0	(0)	22
1997	13	(32)	13	(36)	7	(20)	3	(8)	0	(0)	0	(0)	41
1998	8	(24)	12	(36)	11	(33)	1	(3)	1	(3)	0	(0)	33
1999	5	(56)	2	(22)	2	(22)	0	(0)	0	(0)	0	(0)	9
2000	4	(17)	7	(29)	9	(38)	1	(4)	3	(12)	0	(0)	24
2001	7	(32)	10	(45)	5	(23)	0	(0)	0	(0)	0	(0)	22
2002	3	(19)	8	(50)	3	(19)	2	(13)	0	(0)	0	(0)	16
2003	4	(22)	8	(44)	5	(28)	1	(6)	0	(0)	0	(0)	18
2004	9	(41)	6	(27)	7	(32)	0	(0)	0	(0)	0	(0)	22
2005	10	(37)	7	(19)	7	(19)	2	(7)	1	(<1)	0	(0)	27
2006	3	(21)	3	(21)	7	(50)	0	(0)	0	(0)	1	(<1)	14
Average	7	(30)	8	(36)	6	(27)	1	(4)	<1	(1)	<1	(<1)	22

TABLE 6 Unit 1A mountain goat harvest percent by transport method, regulatory years 1996–2006

Regulatory year	Harvest percent by transport method						
	Airplane	Air (%)	Boat	Boat (%)	Unk	Unk.(%)	n
1996	18	(82)	2	(9)	0	(0)	20
1997	30	(83)	6	(17)	0	(0)	41
1998	24	(73)	9	(27)	0	(0)	33
1999	7	(78)	2	(22)	0	(0)	9
2000	18	(75)	6	(25)	0	(0)	24
2001	16	(73)	6	(27)	0	(0)	22
2002	12	(75)	4	(25)	0	(0)	16
2003	18	(100)	0	(0)	0	(0)	18
2004	11	(50)	10	(45)	1	(5)	22
2005	22	(81)	5	(19)	0	(0)	27
2006	12	(86)	2	(14)	0	(0)	14
Average	17	(78)	5	(21)	<1	(<1)	22

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TABLE 7 DG003 Deer Mountain drawing permit hunt

Regulatory year	Applications	Number permits issued	Harvest male	Harvest female	Hunted	Aerial survey count
2006 <sup>a</sup>	202	12	4	2	11	109
2007	150	12	5	1	10	137
Average	176	12	5	2	11	123

<sup>a</sup> First year drawing permits issued

## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT:** Unit: 1B (3000 mi<sup>2</sup>)

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

### **BACKGROUND**

#### **HABITAT DESCRIPTION**

Mountain goats in Southeast Alaska use alpine, subalpine and some heavily forested habitats (Fox 1983, Schoen and Kirchoff 1982, Smith 1986), 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 1982).

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

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 (Fox 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 (Fox et al. 1989). Forage availability and selection are influenced to a 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 (Fox 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. After statehood in 1959, season dates varied and normally fell between 1 August and 31 January, and the resident and nonresident bag limit was 2 goats. Since 1973, the Unit 1B goat season has remained 1 August to 31 December. 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 2 separate registration hunts. In RG001 (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 subunit north of the North Fork Bradfield River, there is a 1 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 1 male goat. From 1989 to 1991, the bag limit was changed to 1 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 effect 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.

Although Board of Game action was not required, prior to the fall 2000 hunting season ADF&G shortened the period within which successful goat hunters must report their take from 10 to 5 days regionwide, under discretionary permit hunt requirements.

Due to conservation concerns, in fall 2002 the BOG closed the resident and nonresident mountain goat season (RG001) in that portion of Game Management Unit 1(A) and 1(B) on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet. In a separate action, the Board also reduced the bag limit from 2 goats to 1 goat in that portion of Unit 1B south of the Bradfield Canal and the north fork of the Bradfield River. However, federal

subsistence regulations continue to allow rural residents of Units 1B and 3 to harvest a second goat, by federal permit, in that portion of Unit 1B located south of LeConte Bay and north of the North Fork of the Bradfield River.

In fall 2004, an Emergency Order was issued for the early closure of the resident and nonresident mountain goat season (RG004) in that portion of Game Management Unit 1(B) located within the drainages of LeConte Bay and the Wilkes Range. This early season closure was the result of the goat harvest objective having been achieved in those drainages.

#### *Historical harvest patterns*

From 1973 to 2000, the Unit 1B harvest averaged 30 goats per year, ranging from a low of 15 goats in 1975 to a high of 50 goats in 1990. The harvest has remained relatively stable, averaging 23 goats per year for the 10-year period through 2006. The overwhelming majority of the annual harvest occurs in RG004, that portion of the subunit north of the North Fork of the Bradfield River.

#### *Historical hunter residency patterns*

Petersburg and Wrangell residents have historically represented the largest group of hunters and have traditionally harvested the majority of goats taken in the subunit. However, for the first time in 2001, and again in 2002 and 2004, the harvest by nonresidents exceeded that of local residents. In 2004 the number of goats harvested by nonlocal residents also exceeded the number taken by local residents. This represented the first time since 1985 that the harvest by nonlocal residents in Unit 1B had exceeded that of local residents.

### **HARVEST CHRONOLOGY**

Annual differences in fall and winter weather conditions and the number of guided hunts can 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, respectively. More recently, however, we have seen an increase in the percentage of the annual harvest taken during the late season. This appears to be the result of an increasing desire on the part of hunters to harvest goats with prime winter pelage, and/or take advantage of easy hunting opportunities.

In 2000, the proportion of the annual harvest taken in December surpassed that of any other month for the first time. This trend was alleviated somewhat in 2003 and 2004, partly because winter weather conditions were not conducive to late-season goat hunting, but also because of the early season closure within the drainages of LeConte Bay and the Wilkes Range in 2004. In recent years, interagency efforts to limit the number of guided hunts during the late-season have reduced the percentage of the harvest occurring during the late season.

#### *Historical harvest locations*

Since 1985 the largest percentages of the Unit 1B goat harvest have occurred in Le Conte Bay, Stikine River, and Thomas Bay. Hunters have limited access to most goat habitat in the subunit, 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 accessible only during the early season before lakes freeze over.

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

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES:**

Prior to 2002 our preliminary management goals were to maintain population levels to accommodate an annual harvest of 35 goats and a 35% hunter success rate. In January of 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 were adopted for Unit 1B. These include:

- Conduct aerial surveys to establish the minimum number of goats needed to maintain harvest opportunities for the LeConte Bay management area.
- Conduct aerial surveys to establish the minimum number of goats needed to maintain harvest opportunities for the Thomas Bay management area.
- Conduct aerial surveys to establish the minimum number of goats needed to maintain harvest opportunities for the Cleveland Peninsula management area.
- Maintain a guideline harvest not to exceed 6 points per 100 goats observed (where male goats = 1 point, and female goats = 2 points) during at least 2 consecutive surveys in management areas.

## **METHODS**

Aerial surveys were flown within established trend count areas to obtain the number of goats and the percentage of kids in the population. The results of aerial surveys were subsequently used to establish harvest objectives for specific mountain goat populations within each registration hunt area. These objectives allowed for a harvest quota of 5–6 points per 100 goats observed based on the most recent aerial survey and population trend data. To avoid localized depletion of goats, the 5–6 point harvest quota may be applied to small discrete areas within larger registration hunt areas.

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. Until recently, quantitative data on goat movement patterns and winter diet were limited to data obtained from one radiotelemetry study conducted in Unit 1A and the extreme southern portion of Unit 1B

(Smith 1982). Radiotelemetry studies currently underway in subunits 1C and 1D are beginning to provide valuable information on the seasonal movement patterns and survival rates of goats on the Unit 1 mainland (White 2006, White et al. 2007). Although data specific to goats in Unit 1B are scarce, available information indicates Unit 1B goat populations have remained relatively stable with the exception of the late 1960s and early 1970s when severe winters reduced the herd.

The portion of Game Management Unit 1(A) and 1(B) on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet closed to hunting in 2002 will remain closed to until such time as the goat population recovers sufficiently to provide harvest opportunity.

#### *Population Size*

Precise population estimates are not available for goats in the subunit. U.S. Forest Service (USFS) and ADF&G biologists estimated that Unit 1B could support approximately 1219 goats based on the availability of suitable winter habitat indicated by a mountain goat habitat capability model (Suring 1993).

#### *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 August 2005 surveys, kids composed 22% of the goats classified. In the October 2006 surveys, kids composed 17% 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 and may 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 Alaska 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 used north-facing

exposures and inhabited forest, alpine, subalpine, and cliff habitats. Throughout winter goats used 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 use steep, broken terrain throughout the year (Schoen 1979).

**MORTALITY**

*Harvest*

<u>Season and bag limit</u>	<u>Resident and nonresident hunters</u>
Unit 1B, that portion north of Bradfield Canal and the north fork of the Bradfield River	1 Aug–31 Dec (General hunt only)
1 goat by registration permit only	
Units 1(A) and 1(B), that portion on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet	No open season
Remainder of Unit 1B	1 Aug–31 Dec (General hunt only)
1 goat by registration permit only	

Board of Game Actions and Emergency Orders. In fall 2006, the Board of Game adopted a department sponsored proposal prohibiting the taking of nannies accompanied by kids in Units 1–5.

In fall 2005, for the second consecutive year, an EO was issued for the early closure of the resident and nonresident mountain goat season (RG004) in that portion of Game Management Unit 1(B) located within the drainages of LeConte Bay and the Wilkes Range. In this instance, however, the closure was expanded to include the drainages of Horn Cliffs and Thunder Mountain. This early season closure was the result of the goat harvest objective having been achieved in those drainages.

Hunter Harvest. The 2005 and 2006 Unit 1B harvests of 27 and 17 goats, respectively, were above and below the mean harvest of 22 goats annually during the preceding 10-year period (Table 2). The harvest of just 17 goats in 2006 was the second lowest unitwide harvest total since 1985. The low harvest in 2006 was primarily attributed to record snowfall, and we do not believe the low harvest in 2006 is indicative of a significant population decline. It should be noted, however, that the continued season closure in that portion of RG001 on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet, and the late-season EO of the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay and Wilkes Range area in 2005 likely limited the harvest during the report period. Hunter success was 57% in 2005 and 31% in 2006.

In 2005 and 2006 males composed 74% and 88% of the harvest, respectively. The sex of harvested goats was obtained from registration hunt reports and was not verified by checking hunter kills. We distributed literature and made available videotapes designed to help hunters identify male goats in the field and encouraged them to select males.

During the last decade, interest in Southeast Alaska goat hunting by nonresident hunters has increased, and because of the guide requirement, Unit 1B experienced an associated increase in both the number of guided hunts and the number of goats harvest by nonresident hunters. Cooperative efforts by big game guides, USFS permitting staff and the local ADF&G area biologist to reduce and stabilize the number of guided hunts occurring in Guide Use Areas (GUA) 01-06 reversed the steady upward trend in the number of guided goat hunts in this area. After reaching a high of 23 guided hunts in 2001, the number of nonresident goat hunters in Unit 1B has since decreased and stabilized. In 2005 a total of 17 nonresidents hunted goats in Unit 1B, all of whom employed the services of a big game guide. In 2006 15 nonresidents hunted goats, of which 13 employed big game guides and 2 were accompanied by next of kin. Stabilization of the number of guided hunts during the report period is also attributable, at least in part, to the closure of the goat hunting season in that portion of RG001 on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet in 2003. The number of goats harvested by guided hunters during the report period was 12 in 2005 and 5 in 2006.

While the number of guided nonresident goat hunters has steadily increased over the last decade, we have witnessed a declining trend in the number of local resident goat hunters taking to the field each year. The 23 local residents who pursued goats in 2005 represent the lowest local resident participation since at least 1984, well below the 10-year average of 37 local resident hunters in Unit 1B. Local participation in goat hunting remained low in 2006 with 29 local residents taking to the field in Unit 1B.

In 2005, three federal subsistence permits were issued to harvest a second goat south of LeConte Bay and north of the North Fork of the Bradfield River. One of those permittees hunted and successfully harvested a second goat. In 2006 one federal permit was issued for the harvest of a second goat, but that person did not hunt.

Hunter Residency and Success. Petersburg and Wrangell residents typically represent the largest group of hunters and have traditionally harvested the majority of goats taken in the subunit (Table 3). However, those trends have weakened in recent years. For the first time in 2001 the harvest by nonresident hunters exceeded that of local residents. Such was also the case in 2002 and 2003. In 2004 the majority of goats were harvested by nonresident and nonlocal residents, respectively. This represented the first time since 1985 that the nonlocal resident goat harvest in Unit 1B had exceeded that of local residents.

In 2005, the harvest by nonresidents once again exceeded that of local residents by a small margin. In 2006, the harvest by local residents once again exceeded that of both nonresidents and nonlocal residents.

Local residents traditionally represent the largest group of unsuccessful hunters, and this remained the case during this report period. During this report period, local and nonlocal residents each had 38% success, and guided nonresidents 53% success. Many local residents

hunt primarily from the beach during the late season, hoping for an easy opportunity to harvest a goat. During the report period, the overall success rate for those permittees who hunted was 57% in 2005 and 30% in 2006. The hunter success rate in 2005 was the highest success rate going back to at least 1984.

From 1995 to 2004, the average success rate for guided hunters in Unit 1B was 56% and ranged from 13 to 75%. During this report period the success rate for guided nonresident hunters was 71% in 2005 and 33%, in 2006. Because of the guide requirement, nonresident hunters typically enjoy the highest success rate, and this was the case during the report period.

Geographical locations of harvest. Goat harvest occurred in 10 Unit 1B Wildlife Analysis Areas (WAAs) during this report period. In 2005 harvest occurred in 9 WAAs, with #1602, #1708, and #1605, providing 22, 19, and 15%, respectively, followed by #1603, #1706, and #1708, each with 11% of the subunit's total annual harvest. The remainder of the harvest was evenly distributed across the remaining 3 WAAs. In 2006, harvest occurred in 8 WAAs with #1706 and #1708 each providing 24% of the total harvest, followed by #1602 with 18%, and #1707 with 12% of the total harvest. The remainder of the harvest was evenly distributed across the remaining 4 WAAs.

Harvest Chronology. Winter weather, particularly during the late season, can have a profound influence on harvest chronology. The greatest proportion of the 2005 harvest occurred in August, followed by September and November, respectively. The largest percentage of the 2006 harvest occurred in September, followed by November, and lastly by identical harvests in August and October (Table 4).

Transport Methods. In recent years, the majority of successful hunters have reported using boats to access their hunt areas, and this was also the case during the report period. In 2005, 67% of hunters reported using boats, while 33% reported using airplanes to access their hunting area. In 2006, 76% of hunters reported using boats, and 24% reported using airplanes to access their hunting area. During the report period, no hunter reported using another transportation method (Table 5).

#### *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.

Periodic outbreaks of contagious ecthyma, commonly called “orf,” have been documented in Unit 1B. 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 subunit 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.

Following several consecutive years with mild winter weather, much of Southeast Alaska experienced record snowfall during the winter of 2006–2007. In Petersburg, approximately 6

miles west of the Unit 1B Mainland, the National Weather Service recorded 228 inches of snowfall. The previous 5-year average annual snowfall in Petersburg was 69-inches. The city of Wrangell, located less than 3 miles west of the Unit 1B mainland, experienced 141 inches of snowfall during the winter of 2006–2007, compared to the previous 5-year average annual snowfall of 20 inches (Western Regional Climate Center 2007).

Fifteen of 58 goats radiocollared in Unit 1C and 1D died during the winter of 2006–2007, with 12 of those deaths thought to be either directly or indirectly attributable to winter weather conditions. By comparison, during 2005–2006, 3 of 22 collared goats died during winter (White et al. 2007). It is possible, therefore, that mountain goats in Unit 1B also experienced increased mortality as a result of heavy snowfall in the central panhandle region of Southeast Alaska during the winter of 2006–2007.

## **HABITAT**

### *Assessment*

The loss of winter range resulting from timber harvest continues to pose the most serious threat to goat habitat in the subunit. 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.

During the report period, the Federal Energy Regulatory Commission issued a preliminary permit to Cascade Creek, LLC of Bellingham, Washington to study the feasibility of its proposed hydroelectric development at Thomas Bay. Because Cascade Creek, LLC's proposed development would involve construction of hydroelectric facilities and infrastructure amid prime goat habitat at Swan, Scenery, and Ruth lakes, the potential impacts of proposed hydroelectric development on mountain goat populations in the Thomas Bay area is of great concern to Unit 1B goat managers.

### *Enhancement*

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

## **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

Currently the results of aerial goat surveys can be interpreted only 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.

USFS moratoriums imposed on the number of brown bear big game guides and hunters in Units 1 and 4 have created increased interest in goat guiding regionwide. Over the last decade we have witnessed a significant increase in the number of USFS guide use requests for goat hunting on the 1B mainland, particularly in GUA 01-06. Area management staff has worked closely with USFS permitting authorities and local big game guides to stabilize the number of guided hunts occurring annually in GUA 01-06. Of particular concern are the potential for localized overharvest and potential conflicts between guided nonresident hunters and federally qualified

subsistence hunters. We will continue to closely monitor the goat harvest by guided nonresident hunters.

Recent increases in the percentage of goats killed annually by guided nonresidents have resulted in concerns about maintaining sufficient harvest opportunity for federally qualified subsistence hunters. In an effort to halt the steady increase in the number of goats harvested annually by guided nonresidents in the GUA 01-06 portion of Unit 1B, action was recently taken to both reduce and stabilize the number of guided hunts occurring annually.

In 2006, a cooperative agreement was reached between local big game guides, USFS permitting staff and the local ADF&G area biologist, restricting the number of goat hunts each permitted guide was authorized to conduct annually in GUA 01-06. As part of this arrangement, each of 3 currently active guides was limited to the average number of hunts each had conducted during the preceding 5-year period. In the case of 2 out of 3 active guides this resulted in a slight reduction in the total number of hunts each was authorized, while a third was held to preexisting levels.

To ensure adequate goat hunting opportunity for local residents the USFS also modified GUA 01-06 guide use permits to exclude guided goat hunts within the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay and the Wilkes Range unless specifically authorized by USFS and ADF&G managers. As part of this arrangement guides were informed that their permits could be amended in-season to allow limited guide use activity in this area if it appeared the goat population was likely to be underutilized by resident hunters. This was the case late in the 2006 season when 3 permitted guides were each given authority to conduct 1 late-season goat hunt within the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay and the Wilkes Range.

Since the 2002 closure of the resident and nonresident mountain goat season in that portion of Game Management Unit 1(A) and 1(B) on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet, there had been no guided goat hunting activity in the GUA 01-07 portion of Unit 1B. In 2006, one big game guide requested authorization to conduct up to 6 guided goat hunts in the Bradfield Canal portion of GUA 01-07. Although authorized to conduct up to 4 guided goat hunts in GUA 01-07, our records indicate that this guide conducted just one hunt in 2006, which was unsuccessful.

Wounding loss and nonreporting of goats mortally struck by hunters but unrecovered due to inaccessible terrain remains a management concern.

## **CONCLUSIONS AND RECOMMENDATIONS**

Variation in fall and winter weather conditions can have a profound influence on the annual goat harvest in Southeast Alaska. During the report period Unit 1B experienced both mild and severe winter weather extremes. Favorable fall and winter weather conditions and below average snowfall contributed to a relatively high harvest and success rate in 2005. However, record snowfall beginning in November during winter 2006–2007 severely hampered late-season hunting and is thought to be primarily responsible for the relatively low goat harvest in 2006.

The 2005 and 2006 Unit 1B harvest of 27 and 17 goats, respectively, were above and below the mean harvest of 22 goats annually during the preceding 10-year period. The harvest of just 17

goats in 2006 was the second lowest unitwide harvest total since 1985, however, the low harvest that year was attributed to record fall and winter snowfall which hampered hunter effort and success. We do not believe the low harvest in 2006 is indicative of a significant population decline.

While nonresident participation in Unit 1B goat hunting has increased in recent years, since 2004 effort by local residents has fallen well below the preceding 10-year average. The Board of Game's closure of the goat hunting season on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet in 2003, and the 2005 emergency closure of the goat season in the LeConte Bay and Wilkes Range drainages, limited the Unit 1B harvest to some extent during the report period. We believe that the aforementioned factors, not a population decline, are largely responsible for the below average goat harvest during the report period.

Between 1994 and 2001, the number of guided hunts conducted in Unit 1B increased dramatically. As a result, the increasing percentage of Unit 1B goats harvested by guided nonresidents and nonlocal residents has led to concerns about maintaining adequate opportunity for local subsistence hunters. In spring 2006 a cooperative agreement was reached between big game guides, the USFS, and the local ADF&G area biologist which reduced the number of guided hunts authorized in the GUA 01-06 portion of Unit 1B. This action was taken to ensure adequate opportunity was maintained for local residents to harvest goats.

After reaching a high of 23 in 2001, between 2002 and 2006 the number of guided goat hunts in Unit 1B decreased and stabilized at an average of 15 guided hunts annually. We will continue to work with local big game guides and USFS permitting authorities to maintain the number of guided hunts at levels that ensure adequate harvest opportunity for local residents.

Strict implementation of harvest guideline levels based on the results of aerial surveys was largely responsible for the emergency order issued for the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay and Wilkes Range in 2005. Uncertainty about the sightability of goats during aerial surveys remains a primary concern with regard to establishing harvest guidelines for individual goat populations. Research currently underway in Units 1C and 1D may provide a reliable sightability correction factor for use in estimating the total number of goats present based on the number observed during aerial census flights.

Although outside the State of Alaska's jurisdiction, we feel that the 2-goat bag limit allowed under federal hunting regulations should to be reduced in at least that portion of the subunit located north of the Stikine River drainage. Such a regulatory change would ensure a more equitable distribution of the available goat harvest among federally qualified hunters.

Wounding loss and nonreporting of goats mortally struck by hunters but not recovered due to inaccessible terrain remains a management concern. 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 within the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay and Wilkes Range. Based on aerial survey data and hunter reports, goat populations appear stable in most of Unit 1B. Unitwide, hunting pressure is generally low, and tends to be concentrated close to communities in areas with easy access. We will continue to monitor the goat population and harvest closely.

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TABLE 1 Unit 1B summer aerial mountain goat composition counts, regulatory years 1996–2006

Regulatory year <sup>a</sup>	Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
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
2001 (Aug. 2001)	66	(73)	25	(27)	0	38	91	106
2002 (Aug. 2002)	89	(73)	33	(27)	0	37	122	81
2003 (Aug. 2003)	132	(78)	37	(22)	0	28	169	56
(Sept. 2003)	84	(83)	17	(17)	0	20	101	53
2004 (Aug. 2004)	446	(79)	120	(21)	0	27	566	33
2005 (Aug. 2005)	480	(78)	135	(22)	0	28	615	70
2006 (Oct. 2006)	343	(83)	68	(17)	0	20	411	62

<sup>a</sup> 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 1997 through 2006

Hunt	Year	Permits <sup>a</sup> issued	Nr hunted	(%) Did not hunt	Nr successful hunters	(%) successful hunters	Nr males	(%) males	Nr females	Total harvest
RG001	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
	2001		4		3	(75)	3	(100)	0	3
	2002		5		0	(0)	0	(0)	0	0
	2003		5		1	(20)	0	(0)	1	1
	2004		5		2	(40)	1	(50)	1	2
	2005		0		0	(0)	0	(0)	0	0
	2006		1		0	(0)	0	(0)	0	0
RG004	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
	2001	130	64	(51)	21	(33)	16	(76)	5	21
	2002	135	67	(50)	14	(21)	9	(64)	5	14
	2003	115	64	(44)	20	(31)	17	(85)	3	20
	2004	103	46	(55)	21	(46)	15	(71)	6	21
	2005	92	47	(49)	27	(57)	20	(74)	7	27
	2006	100	52	(48)	16 <sup>b</sup>	(31)	15	(88)	2	17

TABLE 2 continued

Hunt	Year	Permits <sup>a</sup> issued	Nr hunted	(%) Did not hunt	Nr successful hunters	(%) successful hunters	Nr males	(%) males	Nr females	Total harvest
Combined	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
	2001		68		24	(35)	19	(79)	5	24
	2002		72		14	(19)	9	(64)	5	14
	2003		69		21	(30)	17	(81)	4	21
	2004		51		23	(45)	16	(70)	7	23
	2005		47		27	(57)	20	(74)	7	27
	2006		53		16 <sup>b</sup>	(30)	15	(88)	2	17

<sup>a</sup> Number of permits issued for 1B in hunt number RG001 is unknown because this hunt includes part of Unit 1A.

<sup>b</sup> One hunter killed 2 goats, second goat via federal subsistence permit.

Table 3 Unit 1B mountain goat hunter residency and success, regulatory years 1997 through 2006

Year	Successful					Unsuccessful					Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	
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
2001	7	4	13	24	(35)	32	2	10	44	(65)	68
2002	5	1	8	14	(19)	40	9	9	58	(81)	72
2003	11	8	2	21	(31)	26	7	14	47	(69)	68
2004	6	8	9	23	(45)	20	3	5	28	(55)	51
2005	11	4	12	27	(57)	12	3	5	20	(43)	47
2006	9	2	5	16	(30)	20	7	10	37	(70)	53

<sup>a</sup> Residents of Petersburg, Wrangell, and Kake.

TABLE 4 Unit 1B mountain goat harvest chronology, percent by month, regulatory years 1997 through 2006

Year	Month										Total harvest
	August		September		October		November		December		
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
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
2001	5	(21)	5	(21)	4	(17)	9	(37)	1	(4)	24
2002	4	(29)	2	(14)	5	(36)	1	(7)	2	(14)	14
2003	6	(29)	6	(29)	8	(38)	1	(4)	0	0	21
2004	8	(35)	1	(4)	5	(22)	7	(30)	2	(9)	23
2005	11	(41)	6	(22)	3	(11)	5	(19)	2	(7)	27
2006	3	(18)	5	(29)	3	(18)	4	(24)	2	(12)	17

TABLE 5 Unit 1B mountain goat harvest, percent by transport methods, regulatory years 1997 through 2006

Year	Percent of harvest						Total harvest
	Airplane		Boat		Other		
	n	(%)	n	(%)	n	(%)	
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
2001	11	(46)	12	(50)	1	(4)	24
2002	4	(29)	10	(71)	0	(0)	14
2003	13	(62)	8	(38)	0	(0)	21
2004	10	(44)	12	(52)	1	(4)	23
2005	9	(33)	18	(67)	0	(0)	27
2006	4	(24)	13	(76)	0	(0)	17

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## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT UNIT:** 1C (7600 mi<sup>2</sup>)

**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**

There are four main issues of concern regarding mountain goat management in Unit 1C: guided hunting, commercial helicopter tourism, construction activity, and a resurgence of symptoms that are similar to contagious ecthyma (orf) in a few goats. 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 can 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 the Alaska Department of Fish and Game (ADF&G) to deal with this high nonresident harvest by shortening the season, changing to a drawing hunt, or implementing some other system to keep the nonresident harvest within acceptable limits. At present, a short-term solution to this problem has been reached through limits on commercial service permitting by the U.S. Forest Service.

Since their origin in the early 1980s, 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 1990s. The effects these overflights have on mountain goat populations are unknown, but concerns about negative influences of this industry on goats are an issue of concern.

Construction activities associated with the Kensington Mine as well as the road infrastructure associated with the mine and the Juneau Access project have raised some concerns about the disturbance of goats on low elevation winter habitats. Funding has recently been acquired by ADF&G from Kensington Mine and the Department of Transportation to begin a mountain goat radio collaring project to investigate these concerns.

Contagious ecthyma (also referred to as orf) has again begun to show up in goats near Juneau. During the late 1970s through the early 1990s this viral infection was routinely discovered in goats and was thought to be at least partly responsible for a decline in local goat numbers. During the 1990s through 2003 only 2 cases were reported by hunters harvesting goats in the Tracy Arm area of Unit 1C. Since 2004 however, there have been 5 cases reported in the Juneau area, 3 that led to the deaths of affected kid goats and 2 others in adult goats that were taken by hunters.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

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

- Maintain goat densities so at least 30 goats per hour are seen during fall surveys.
- Use pamphlets, videos, and other educational materials to assure a male:female harvest of at least 2:1.
- Maintain goat viewing opportunities along the Juneau road system.
- Identify discrete geographic areas and manage within these areas.
- Maintain a guideline harvest not to exceed 6 points (billie = 1 pt., nannie = 2 pt.) per 100 goats observed.
- Conduct aerial surveys at least every 3 years in areas of high harvest.

## **METHODS**

Harvest data were obtained from registration permit hunt reports for the 2005 and 2006 fall hunts. Population surveys were conducted in several areas 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. Mountain goat populations seem to be at medium to high densities when compared to historical data over most of the 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 during this report period: Lions Head Mountain to the Katzehin River in the RG013 permit area, Mount Juneau to Antler Lake in the RG012 permit area, and the Endicott River to Pt. Couverdon in the RG015 permit area.

Although these surveys represent a small portion of Unit 1C, hunter effort and harvest information as well as anecdotal information from hunters, pilots, commercial guides, and ADF&G personnel also suggest that goat populations are healthy throughout the unit.

## **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

1 Oct–30 Nov

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

1 Oct–30 Nov  
(General hunt only)

1 goat by registration permit by bow and arrow only

Remainder of Unit 1C

1 Aug–30 Nov

1 goat by registration permit only

Board of Game Actions and Emergency Orders. During the fall 2006 Board of Game meeting there were 12 proposals from the public that targeted mountain goat management in Unit 1C. One proposal requested that the board open mountain goat hunting in that area between Mount McGinnis and Eagle River, while another requested that area between Herbert River and Eagle River be opened. In both cases the department recommended against the proposals due mostly to our lack of long-term survey data in these areas. The board voted against each proposal based on the department's concerns. Several other proposals recommended drawing permit hunts be established where we presently have registration permit hunts. Again the department as well as the board opposed these proposals. Most of the remainder of the 12 proposals were recommending changes that the department already had authority to make with discretionary permit conditions, and the board voted to take no action on these proposals at the department's request.

In 2005 an emergency order was issued to close that portion of the RG012 hunt area south of the Gilkey River and north of Eagle River. A second emergency order was issued to close hunt area RG015, which lies between the Endicott River and Pt. Couverdon on the west side of Lynn Canal. No emergency orders were issued in 2006.

Hunter Harvest. Ninety-one goats were taken during this report period, 49 in 2005 and 42 in 2006 (Table 2). This is the exact number harvested during the previous report period, with nonresidents again taking the majority of the goats (Table 4).

Males again made up a large part of the harvest (81%), which is slightly lower than the previous report period of 88%. 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, there is the potential that the reported harvest of male goats is inflated, as hunters are sometimes reluctant to admit to killing a nanny.

As has been the case during the previous report periods, much of the harvest took place in 3–4 wildlife analysis areas (WAA's) (Table 7). One of these, 2518, is in the upper Taku River, and access to the area is by floatplane to an alpine lake or hiking up from the upper Taku River homesteads. The other two areas, 2824 and 2825, are in Tracy and Endicott arms. Both of these areas are accessible by boat and receive significant commercial guiding harvest. An area near Pt. Couverdon (2305 and 2306) on the west side of Lynn Canal has experienced an erratic harvest trend in recent years. During this report period 5 goats were taken, but all in 2006. During the previous report period 3 goats were taken, yet in 2001–2002 the harvest was 13 goats. The high harvest in 2001–2002 can be explained by the presence of commercial guiding activity, and the lower harvest since is partly due to the lack of that activity. However, the take of 5 goats in 2006 while zero were taken in 2005 isn't understood by managers.

Permit Hunts. Registration permit hunts RG012, RG013, and RG014 are incorporated under a single permit. The number of permits issued decreased from a mean of 233 in the 2 years of the previous report period to a mean of 196 in 2005–2006 (Table 3). The mean annual number of hunters during this report period was 84, noticeably lower than the 99 during the previous report period. The reasons for this are probably due to weather more than anything else. The fall of 2006 was noticeably cloudier and rainier than any of the previous 3–4 years. Compliance with reporting requirements has been good, but we continue to resort to reminder letters and certified reminder letters to attain information from some hunters.

Hunter Residency and Success. The success rate of all hunters averaged 55% during this report period, which is the highest success rate since the 1997–1998 report period. Alaska resident hunters harvested nearly as many goats during this report period as nonresidents (44 versus 47 respectively), however their success rate was only 39% compared to 84% for nonresident 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 (52%) decreased slightly from the previous report period (53%). Successful hunters expended an average of 2.3 days per goat during the report

period, slightly lower than the mean of 2.4 days per goat during 2003–2004 (Table 3). Unsuccessful hunters expended an average of 2.5 days in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4-month season, accounting for 35% of the take in 2005 and 50% in 2006. The preponderance of late season kills reflects the availability of goats at lower elevations and hunter desire to take an animal in winter pelage. In addition, the majority of the commercial harvest, which accounts for more than half the goats harvested, takes place during this time period.

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 76% of successful hunters using them (Table 5). Other means of transportation included airplanes, highway vehicles, and 4-wheelers. Highway vehicles were used along the Juneau road system and 4-wheelers were used on logging roads near Pt. Couverdon and Homeshore.

Commercial Services. The use of commercial services increased from the previous report period, with 45% of hunters using a commercial service versus 35% during 2003–2004 (Table 6). Seventy-one percent of hunters who used commercial services used a guide, and 27% 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 (almost entirely air charter), whereas all nonresidents used a registered guide, which is required by law unless accompanied by a second degree blood relative who is a resident of Alaska.

#### *Other Mortality*

We have some data from natural mortality during this report period. Following the severe winter of 2006–07, an old billy was discovered dead in a yard off of Evergreen Street near downtown Juneau. Additionally, during the report period, 2 kid goats died in yards at the base of Mount Juneau, both with ORF. Both were shipped up to the Fish and Game wildlife veterinarian in Fairbanks for verification of the disease.

There is little other 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 goats appear to be occupying most of this range. 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 heli-skiing 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.

## CONCLUSIONS AND RECOMMENDATIONS

Aerial surveys were completed in several areas we considered most important due to hunting pressure, but inclement weather prevented additional surveys. Management objectives were met or surpassed in most areas, except for the need for aerial surveys. The most glaring omission for surveys was the Tracy-Endicott Arm area that accounts for a high percent of the harvest in the unit year to year. However, we have not been able to survey in this area since 2001. As weather and funding permit, aerial surveys should be continued to determine population trends throughout the unit, especially in areas that receive the brunt of the hunting pressure. If possible, these areas should be surveyed on a 3- to 4-year cycle, and more often if anecdotal information suggests the populations have declined.

During the report period we accomplished part of our goal of dividing Unit 1C into goat aerial survey units that also serve as management units. By managing goats in these smaller units we will be able to track harvest and survey data for each of these discrete areas more easily. This will prevent hunters from concentrating their harvest in easily accessible areas and potentially compromising the health of goat herds in those areas.

Hunter effort was lower and success was higher than the preceding report period, although the number of goats taken was exactly the same. In both years of the report period hunters predominantly killed male goats. Although the percentage of nannies in the kill was low, 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. We may soon implement a sealing requirement for goats. With the guideline harvest being approached in several areas in the past few years, this requirement may be necessary to assure accurate reporting of male and female goats.

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TABLE 1 Unit 1C mountain goat composition counts, regulatory years 1995 through 2006

Year	Number adults	Number kids	Total goats	Kids:100 adults	Percent kids	Goats per hour
1995			No survey			
1996 <sup>1</sup>	215	78	293	36	27	52
1997			No survey			
1998 <sup>2</sup>	225	38	263	17	14	77
	71	19	90	27	21	39
1999 <sup>3</sup>	54	12	66	22	18	33
2000 <sup>4</sup>	57	3	60	5	5	47
2000	143	30	173	21	17	36
2001 <sup>5</sup>	464	113	577	24	20	132
<sup>6</sup>	174	57	231	33	25	139
<sup>7</sup>	20	7	27	35	26	20
<sup>8</sup>	18	1	19	6	5	27
2002 <sup>9</sup>	163	47	213	29	22	82
<sup>10</sup>	152	26	178	17	15	85
2003 <sup>11</sup>	52	12	64	23	19	213
<sup>12</sup>	98	14	112	14	13	170
2004			No survey			
2005 <sup>13</sup>	226	39	265	16	15	101
<sup>14</sup>	15	1	16	7	6	15
2006 <sup>15</sup>	203	33	236	16	14	<sup>16</sup>

<sup>1</sup> 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.

<sup>2</sup> 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).

<sup>3</sup> Registration hunt area RG014.

<sup>4</sup> 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.

<sup>5</sup> 27 Nov survey between Tracy and Endicott Arms.

<sup>6</sup> 27 Nov survey of area north of Tracy Arm.

<sup>7</sup> 1 Sep survey of area between Whiting and Speel Rivers.

<sup>8</sup> 1 Sep survey of area from Sharp Pt. to Bart Lake (poor conditions due to sun glare).

<sup>9</sup> 19 Oct survey of area south of Endicott Arm and north of Port Houghton (3 yearlings in count).

<sup>10</sup> 3 Nov survey of Chilkat Range.

<sup>11</sup> 8 Oct survey of Berners Bay, Lions Head Mountain.

<sup>12</sup> 8 Oct Survey of Berners Bay, Antler Lake.

<sup>13</sup> 3 Oct. 3, Berners Bay to Katzehin River.

<sup>14</sup> 11 Aug, Border Lake in upper Taku, poor survey conditions.

<sup>15</sup> Chilkat Mtns, Endicott River to Couverdon: partial due to fog in 20% of survey area.

<sup>16</sup> Data are not available for this calculation.

TABLE 2 Unit 1C annual goat harvest, regulatory years 1997–2006

Year	Males	Females	Unknown	Total
1997	30	14	2	46
1998	30	6	2	38
1999	28	10	0	38
2000	35	3	1	39
2001	51	8	1	60
2002	34	3	0	37
2003	40	4	0	44
2004	40	7	0	47
2005	39	10	0	49
2006	35	7	0	42

TABLE 3 Unit 1C goat hunter effort and success, regulatory years 1997–2006

Year	Permits issued	<u>Successful hunters</u>			<u>Unsuccessful hunters</u>			<u>Total hunters</u>		
		Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
1997	164	46	118	2.6	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	2.4	76	211	2.8
2001	198	60	182	3.0	41	114	2.8	101	296	2.9
2002	213	37	108	2.9	54	137	2.5	91	245	2.7
2003	248	44	102	2.3	72	192	2.7	116	294	2.5
2004	217	47	113	2.4	35	89	2.5	82	202	2.5
2005	201	49	102	2.1	47	113	2.4	96	215	2.2
2006	191	42	103	2.5	30	80	2.7	72	183	2.5

TABLE 4 Unit 1C goat hunter success by community of residence, regulatory years 1997–2006

Year	Percent success	Successful hunters			Unsuccessful hunters		
		Unit resident	Other AK	Non resident	Unit resident	Other AK	Non resident
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
2001	59	27	3	30	24	13	4
2002	41	12	5	20	38	13	3
2003	38	19	4	21	55	12	5
2004	57	18	2	27	27	3	5
2005	51	20	6	23	32	10	5
2006	58	13	5	24	21	5	4

TABLE 5 Unit 1C transport methods used by successful goat hunters, regulatory years 1997–2006

Year	Airplane		Boat		Foot		Hwy. vehicle		Other	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
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)
2001	5	(8)	55	(92)	0	(0)	0	(0)	0	(0)
2002	1	(3)	31	(84)	0	(0)	2	(5)	3	(8)
2003	6	(14)	36	(82)	1	(2)	1	(2)	0	(0)
2004	12	(26)	33	(70)	1	(2)	1	(2)	0	(0)
2005	8	(16)	38	(78)	0	(0)	3	(6)	0	(0)
2006	5	(12)	31	(74)	0	(0)	4	(9)	2	(5)

TABLE 6 Commercial services used by Unit 1C goat hunters, regulatory years 1997–2006<sup>1</sup>

Year	Unit residents		Other AK residents		Nonresidents		Total use		Registered guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
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
2001	41	10	16	0	1	33	58	43	34	9	0
2002	44	5	15	3	0	23	59	31	23	7	1
2003	72	2	15	0	1	25	88	27	25	2	0
2004	34	11	5	0	1	31	40	42	30	12	0
2005	43	8	10	6	2	26	55	40	26	12	2
2006	27	7	9	0	0	28	36	35	27	8	0

<sup>1</sup> Not all hunters report the type of commercial services used

TABLE 7 Unit 1C mountain goat harvest from all Wildlife Analysis Areas (WAAs), regulatory years 1997–2006

WAA	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
2202											-
2203	3	1					1				5
2304										1	1
2305		1			1	2		1		1	6
2306					6	4	1	1		4	16
2307											-
2408	1		1		1		1		2		6
2409	2			1	1	3	2	1	2		12
2410	3				1		1				5
2411	3		1		1						5
2412											-
2413	2	3						2		3	10
2514	1	2			1		5	2	1	3	15
2515	1									1	2
2517				1	1	3	1		5		11
2518	4	2	2	6	5	2	5	5	4	2	37
2519		2	1				1	5	3		12
2722											-
2823									1		1
2824	15	19	20	18	26	11	15	16	17	13	170
2825	8	8	13	11	10	10	10	13	11	13	107
2926					2						2
2927	3			2	4	2	1	1	3	1	17
Unkn											-
TOTAL	46	38	38	39	60	37	44	47	49	42	440

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## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT UNIT:** 1D (2700 mi<sup>2</sup>)

**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). There is also an area referred to as the Skagway Pie that has been closed to goat hunting since 1985 because of conservation concerns. It is bounded by the Taiya River on the west, the Yukon and White Pass Railroad on the east, and the Canadian border. Periodic aerial composition counts of the Pie conducted between 1983 and 2001 indicate this population has not rebounded to a level that would sustain hunting. However, the mountain goat populations appear to be fairly healthy in the remainder of the subunit, based on our aerial survey information.

### **MANAGEMENT DIRECTION**

#### **REGION 1 MANAGEMENT GOAL**

- Manage Southeast Alaska goat populations to provide for sustained annual use by hunters and wildlife viewers.

#### **MANAGEMENT OBJECTIVES**

Population management objectives for Unit 1D are as follows:

- Continue working towards identifying discrete geographic areas for use as goat trend count and management areas;
- Maintain a guideline harvest within management areas not to exceed 6 points (male = 1 pt., female = 2 pt.) per 100 goats observed during aerial surveys;
- Conduct aerial surveys to establish the minimum number of goats needed to provide harvest opportunities for the Skagway Pie management area;
- Maintain goat-viewing opportunities along the Haines and Skagway road systems.

## METHODS

Alaska Department of Fish and Game (ADF&G, the department) did not conduct aerial surveys during the reporting period. In prior reports, both ADF&G and Bureau of Land Management (BLM) staff conducted surveys and contributed to survey data (Tables 1a, 1b, and 1c). Results from BLM surveys, though not directly comparable to ADF&G data due to different survey aircraft and methodology, are still useful. A single registration permit was used to administer hunts RG023, RG024, and RG026. Harvest parameters, including hunter success, effort, access and transportation were determined for each hunt.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

Given that we survey only a portion of Unit 1D in any one year, it is difficult to evaluate the population on a unitwide basis. We generally use available time and money to target areas of greatest concern due to human use and/or disturbance. Survey results vary to some degree from year to year for most areas (Tables 1a, 1b, and 1c). Some of these variations are undoubtedly due to the intensity and scope of the surveys, but can also be affected by survey conditions and survey timing. The degree to which any one survey is influenced by these variables is unknown.

In fall 2005, department research staff began a project to monitor and assess development activities as they relate to mountain goats in the areas of the Kensington Mine on the north side of Berners Bay and the eastern shore of Lynn Canal (White et al. 2007). Mine development activity is limited to Unit 1C but the Juneau Access Road will start in Unit 1C at Echo Cove, continue through Berners Bay and up the east shoreline of Lynn Canal, terminating at the Katzehin River Delta in Unit 1D. In anticipation of the mine and road, the department, with funding provided by the Alaska Department of Transportation and Coeur Alaska, captured and radio/GPS collared 59 mountain goats in order to learn more about spatial and temporal habitat use and seasonal mountain goat movements in the development areas. In addition, mountain goat reproduction, survival and sightability data gathered through aerial surveys for collared goats will provide invaluable information concerning mountain goat populations in the study area.

Information on Unit 1D mountain goat populations was gathered from aerial surveys during this report period, as well as other report periods in previous years. Mountain goat populations seem to be at medium to high densities in those areas we routinely survey, based on the number of goats seen per hour as well as the general numbers seen during aerial 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 indicators of population status.

#### *Population Composition*

We used aerial surveys to monitor population trends and kid-to-adult ratios in certain areas within the unit during this report period. We concentrated our effort in the most heavily hunted areas (Taiya Inlet and Takshanuk Mountains). A growing helicopter skiing and summer tourist industry has increased concerns about potential lethal and sublethal effects of human activity on mountain goats in the unit. 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 overall at this time (Tables 1a, 1b, and 1c).

Beginning in 2003, a local helicopter company contracted with a biologist to conduct aerial goat surveys in areas that experience high volume helicopter traffic during the summer tourist season. Data collected during surveys will provide information concerning the impacts of helicopter traffic to mountain goats. The survey transects are located near Skagway, AK and east of Haines, AK in the vicinity of the Katzehin River and Meade Glacier. Mountain goat numbers (adults, yearlings and kids) are collected, as are activity, locations and behavior in response to the presence of a helicopter. Data from each year's survey will be summarized in a final comprehensive report currently in preparation (Frank Galea, Galea Wildlife Consulting, pers. comm.).

## **MORTALITY**

### *Harvest*

#### Season and bag limits

Unit 1D, that portion between 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

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

Remainder of Unit 1D

1 goat by registration permit only

#### Resident and nonresident hunters

No open season

15 Sep–15 Nov  
(General hunt only)

1 Sep–30 Nov  
(General hunt only)

1 Aug–31 Dec  
(General hunt only)

Board of Game action and Emergency Orders (EO). Several mountain goat proposals were submitted to the board for consideration at its fall 2006 meeting. Most proposals focused on changing current registrations permit hunts to drawing hunts. Specifically, the RG023 hunt (Haines Highway and Takshanuk Mountains) was proposed to be changed to a drawing hunt.

Both the department and the local advisory committees opposed the change because the current hunt management system allows for more hunting opportunity than would a limited number of drawing hunt permits. The proposal was not adopted by the board.

In 2005 the entire RG023 hunt area was closed by Emergency Order (EO) once guideline harvest levels were reached. Mountain goats in the area are more accessible than other locations due to the proximity to the Haines Highway. In 2006 the lower portion of the RG023 hunt area (Tukgahgo Mountain) was closed by EO. Three additional portions of hunt area RG024 between the Ferebee River/Glacier and Taiya Inlet were closed by EO during the report period.

Hunter Harvest. There was very little difference in the number of goats taken during each of the two hunting seasons during the report period. A total of 61 goats were harvested during the report period, 30 in 2005 and 31 in 2006 (Table 2). The 2005 harvest consisted of 20 male (67%) and 10 (33%) female goats. In 2006 20 male (65%) and 11 female (35%) goats were taken. The harvest during 2005 and 2006 represents a slight decrease from the last report period (Table 2). Unit 1D hunters continue to do a good job in selecting male goats; this selection of male goats is important for successful management of local goat populations. Department staff is developing additional sex identification material and a quiz to assist hunters in selecting male goats.

Permit Hunts. Unit 1D mountain goat hunting is regulated under three registration permit hunts administered by a common hunt report. The main reason for maintaining three hunts in the subunit is to allow different opening and closing dates while attempting to adjust for relative differences in hunting pressure. These three hunt areas are then divided into smaller management units that are assigned guideline harvest levels using point values (billies = 1 point, nannies=2 points) based on aerial survey information. This finer scale of management accomplishes several goals: 1) it protects goats in easily accessible areas from being overharvested, and 2) it provides hunters with the maximum amount of opportunity by closing only the small accessible area but allowing other portions of the unit to remain open. An average of 158 permits were issued during each year of the report period, slightly below the 10-year mean of 162 permits (Table 3).

Hunter Residency and Success. Local residents continue to compose the majority of Unit 1D goat hunters. In 2005 and 2006, residents of the subunit took 15 (50%) and 20 (65%) of harvested goats, respectively, while nonlocal residents took 7 (23%) goats during each year of the reporting period. Unit 1D is a popular hunting destination for nonlocal Alaska residents because it is accessible by road. Twelve nonresident hunters participated in a Unit 1D goat hunt during each year of the reporting period. The number of nonresident hunters did not change from the last report and remains higher than the 10-year mean of 6 nonresident hunters per year. Nonresident hunters took 8 (27%) and 4 (13%) goats in 2005 and 2006, respectively.

Thirty-seven percent of all Unit 1D goat hunters were successful during the report period (Table 4). Fifty percent of nonresident hunters were successful compared to 35% of all Alaska resident hunters (unit and nonlocal). The higher rate of success for nonresident hunters is likely due to Alaska law requiring nonresidents to hunt with a licensed big game guide.

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

November, 33% in September, 23% in October, 7% in August, and 3% in December. It is important to note that while the percentages listed above represent the harvest chronology for this reporting period, harvests by month vary year to year and are influenced by many factors such as weather and snow conditions.

Transport Methods. Highway vehicles and boats continue to be the transport methods used most often by successful hunters, amounting to 39% and 38% respectively during the report period (Table 5). The higher percentage of successful hunters using highway vehicles is due to the close proximity of hunting areas to the Haines Highway and other developed roads. Boats are used in both fresh and marine environments to access goat hunting areas. Several rivers provide good access to hunting areas and mountain goat hunting opportunities adjacent to saltwater bodies are available along Lynn Canal and Taiya Inlet, where goats can be found during late fall and early winter.

Commercial Services. Because most Unit 1D goat hunters are local residents and have access to either a vehicle or boat to provide their own transportation there is little use of commercial services (Table 6). During the report period only nonresident hunters (n=22) reported using commercial services, mainly registered guides. The number of guides offering mountain goat hunts has remained the same for a number of years. Due to the large tracts of state managed land, and the lack of a guide use area system on state land, there is potential for the number of guides to increase in Unit 1D. Additional guiding pressure must be monitored to ensure guideline harvest levels are not exceeded when combined with harvests from other user groups (local and nonlocal Alaska residents).

Location of Harvest. Goat harvest by Wildlife Analysis Area (WAA) is provided in Table 7. Accessibility of mountain goat haunts is likely the most important factor in determining vulnerability of goats to hunters. The Takshanuk Mountains, which are skirted by the Haines Highway, have consistently borne much of the goat harvest in the unit. Also, the east side of Taiya Inlet that is readily accessible by boat can also experience a high level of harvest depending on weather conditions. By establishing point values that discourage the taking of females, we are able to more precisely manage areas that are used intensively.

## **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 permit and report for the three 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 at least every three years in high use areas. The Skagway closed area should be surveyed when possible to assess the possibility of reopening the area to hunting; if opened it 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 heli-skiing companies based in Haines, and the area is gaining some renown among aficionados 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. Over the two years of this report period, staff spent increasing time working on ways in which to address agency and public concerns about effects of these increasing activities on goats in the area. 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.

Finally, the increase in activity by commercial hunting guides will continue to shape goat management. It has become essential for our management preparedness for us to work with guides to account for their hunting activity and anticipated harvest. Unit 1D is unique in Southeast Alaska in that there is a large amount of nonfederal land where guides are not limited by the number of hunts they can book.

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TABLE 1A Unit 1D mountain goat composition counts, Skagway closed area, regulatory years 1981–2006

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 <sup>1</sup>	11	5	16	45	31	20
1995 <sup>2</sup>	21	7	28	33	25	N/A
1996			No survey			
1997			No survey			
1998			No survey			
1999			No survey			
2000			No survey			
2001	32	7	39	22	25	93
2002-2006			No survey			

<sup>1</sup> Skagway Pass side only, goats/hour is for the entire survey that included a portion of hunt area RG023.

<sup>2</sup> 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 1989–2006.

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
<u>Klukwah Mt. (K) and Ferebee Glacier/River (F) to Chilkoot Inlet</u>						
1989 (K)	26	9	35	35	(26)	60
1993				No survey		
1994 (K,F) <sup>1</sup>	111	21	132	19	(16)	45
1995 <sup>2</sup>	52	15	67	29	(22)	89
1996–1997				No survey		
1998	69	23	92	33	(25)	58
1999–2000				No survey		
2001–2002				No survey		
2003	140	44	184	31	(24)	141
2004–2006				No survey		
<u>Takshanuk Mtns. (E, W)</u>						
1989 (E,W)	40	16	56	40	(29)	34
1993 (W)	27	7	34	26	(21)	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		
2001	150	39	189	26	(21)	122
2002				No survey		
2003–2006				No survey		
<u>North of the Klehini River and West of the Chilkat River</u>						
1989	23	6	29	26	(21)	70
1993				No survey		
1994	58	4	62	7	(6)	69
1995	55	9	64	16	(14)	116
1996–2003				No survey		
2004	34	8	42	24	(19)	84
2005–2006				No survey		
<u>East of Ferebee Glacier/River (F), Chilkoot/Taiya Inlet</u>						
1989 (F,C)	39	17	56	44	(30)	40
1992 (F,C)	30	10	40	33	(25)	19
1993				No survey		
1994 (F,C)	119/130	21/33	140/163	18/25	(15/20)	46/59
1995–2004				No survey		
<u>Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass</u>						
1995	64	9	73	14	(12)	50.5
1996–2006				No survey		
<u>Twin Dewey Peaks, Skagway Pass, Warm Pass</u>						
1995	20	6	26	30	(23)	20
1996–2006				No survey		

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
<u>Katzehin River north to Twin Dewey Peaks</u>						
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	118	22	(19)	83
2001 <sup>3</sup>	60	13	73	22	(18)	77
2002-2006			No survey			

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

<sup>2</sup> Includes only the Chilkoot River side of the mountain range from Klukwah Mt. to Chilkoot Inlet.

<sup>3</sup> Partial survey from Kasidaya Creek north.

TABLE 1C Unit 1D mountain goat composition counts, hunt area RG026, regulatory years 1974-2006

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
<u>Tsirku River (T) and Takhin Ridge (N,S)</u>						
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) <sup>1,2</sup>	129	29	158	22	(18)	48
1995-2001	No survey					
2002 (N,S)	79	17	96	22	(18)	87
2003 (T)	34	15	49	44	(31)	58
2003 (N,S)	104	27	131	26	(21)	95
2004 (T)	55	17	72	31	(24)	81
2004 (N,S)	97	23	120	24	(19)	114
2005-2006	No survey					
<u>Remainder of Area West of Chilkat Inlet</u>						
1974	39	3	42	8	(7)	72
1975	20	9	29	45	(31)	--- <sup>3</sup>
1993	No survey					
1994	184	32	216	17	(15)	49
1995-2006	No survey					
<u>East of Chilkoot Inlet-Katzehin River South</u>						
1993	No survey					
1994	32	10	42	31	(24)	98
1995-1996	No survey					
1997	5	2	7	40	(29)	N/A
1998-2006	No survey					

<sup>1</sup> First survey listed conducted by the BLM in a PA-18 aircraft.

<sup>2</sup> Survey consisted of a significantly larger area than previous surveys represented.

TABLE 2 Unit 1D annual mountain goat harvest, regulatory years 1997–2006

Year	Males	Females	Unknown	Total
1997	15	12	0	27
1998	20	6	1	27
1999	10	15	0	25
2000	13	9	0	22
2001	17	7	0	24
2002	15	6	1	22
2003	27	7	1	35
2004	32	6	1	39
2005	20	10	0	30
2006	20	11	0	31

TABLE 3 Unit 1D mountain goat hunter effort and success, regulatory years 1997-2006

Year	Successful hunters				Unsuccessful hunters			Total hunters		
	Permits issued	Nr hunters	Total days	Avg. Nr days	Nr. hunters	Total Nr days	Avg. Nr days	Nr hunters	Total Nr days	Ave. Nr days
1997	149	27	46	1.7	60	125	2.1	87	171	2.0
1998	157	27	64	2.4	69	168	2.4	96	232	2.4
1999	170	25	40	1.6	60	175	2.9	85	215	2.5
2000	161	22	48	2.2	73	172	2.4	95	220	2.3
2001	157	24	53	2.2	77	189	2.5	101	242	2.4
2002	160	22	52	2.4	65	218	3.4	87	270	3.1
2003	170	35	76	2.2	69	223	3.2	104	299	2.9
2004	147	39	83	2.1	45	115	2.6	84	198	2.4
2005	150	30	68	2.3	48	115	2.4	78	183	2.4
2006	165	31	52	1.7	57	145	2.5	88	197	2.2

TABLE 4 Unit 1D goat hunter success by community of residence, regulatory years 1997-2006

Year	Percent success	Successful hunters			Unsuccessful hunters		
		Unit resident	Non-local	Non-resident	Unit resident	Non-local	Non-resident
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
2001	24	15	5	4	54	19	4
2002	25	16	2	4	43	17	5
2003	34	24	4	7	45	20	4
2004	46	24	5	10	39	4	2
2005	39	15	7	8	40	4	4
2006	35	20	7	4	42	7	8

TABLE 5 Unit 1D transport methods used by successful goat hunters, regulatory years 1997-2006

Year	Airplane		Boat		Foot		Hwy vehicle		Other <sup>1</sup>	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
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	(36)	3	(14)	10	(45)	1	(5)
2001	0	(0)	15	(63)	2	(8)	4	(17)	3	(12)
2002	1	(4)	5	(23)	3	(14)	11	(50)	2	(9)
2003	0	(0)	15	(43)	0	(0)	12	(34)	8	(23)
2004	1	(3)	15	(38)	1	(3)	15	(38)	7	(18)
2005	1	(3)	12	(40)	3	(10)	9	(30)	5	(17)
2006	3	(10)	11	(35)	0	(0)	15	(48)	2	(7)

<sup>1</sup> Includes 3&4 wheelers and unknown transportation

TABLE 6 Unit 1D commercial services reported by goat hunters, regulatory years 1997-2006

Year	Unit residents		Other AK residents		Non-residents		Total use		Registered Guide	Trans-porter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
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 <sup>1</sup>	56	2	21	1	0	0	77	3	1	1	1
2000 <sup>2</sup>	69	0	19	0	1	4	89	4	4	0	0
2001	69	0	24	0	0	8	93	8	8	0	0
2002	58	0	19	0	0	9	77	9	9	0	0
2003	69	0	24	0	1	10	94	10	10	0	0
2004	64	0	9	0	0	12	73	12	11	0	1
2005	69	0	24	0	1	10	94	10	10	0	0
2006	64	0	9	0	0	12	73	12	11	0	1

<sup>1</sup> Six percent of hunters did not report whether they used commercial services in 1999.

<sup>2</sup> 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 1997-2006

Regulatory year	WAA					<i>Total</i>
	4302	4303	4405	4407	4408	
1997	16	5	1	5	0	27
1998	17	2	0	5	3	27
1999	7	0	2	12	4	25
2000	10	2	1	9	0	22
2001	12	0	1	9	2	24
2002	13	3	1	3	2	22
2003	11	1	11	10	2	35
2004	19	5	5	9	1	39
2005	13	3	5	8	1	30
2006	10	2	10	6	3	31

---

**MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

**LOCATION**

**GAME MANAGEMENT UNIT:** Unit 4 (5800 mi<sup>2</sup>)

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

**BACKGROUND**

Mountain goat populations were established on Baranof Island (~1865 square miles) 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 implemented in 1949 and seasons have continued to the present time. In 1976 a registration permit system was initiated. Since that time the harvest has ranged from 28 to 75 goats per year. In March 2004, the Federal Subsistence Board (FSB) issued permits through the U.S. Forest Service to the Sitka Tribe of Alaska to allow the spring harvest of 3 goats. The goats will be used for obtaining goat hair for spinning and weaving ceremonial robes as a cultural/education project. The FSB authorized renewal permits good for 5 years.

In the mid 1950s goats were transplanted to Chichagof Island (~2218 square miles) (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 (~1693 square miles) 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 limited and difficult. Weather patterns and hunter access during open goat seasons play important roles in regulating the harvest.

**MANAGEMENT DIRECTION**

**MANAGEMENT GOAL**

Manage Baranof Island goat populations to provide for maximum sustained annual use by hunters and wildlife viewers.

## MANAGEMENT OBJECTIVES

- Maintain an island-wide population in excess of 1000 goats.
- Monitor sex composition of the harvest and manage for 6 points per hundred goats observed during aerial surveys, using a weighted harvest point system (males = 1 point, females = 2 points).

In February 2002 discussions took place to examine goat management objectives as a regional strategy. At that time, Unit 4 biologists believed the maintenance of a population sufficient to provide an annual harvest of at least 60 goats, and maintenance of a population sufficient to provide an annual hunter success rate of at least 25%, achieved the best objectives for the unit. Overall hunter harvest was low and reflected mostly resident hunters hunting for meat and the hide. Trophy horns were uncommon and few guided nonresidents were drawn to the area. The amount of predation by brown bears is unknown. It is not believed to be a significant factor island-wide, especially since goats winter in forested areas when the majority of the bears are still in hibernation. Although the ratio of young to females varies considerably during surveys of segments of the population, the overall combined ratio has consistently been above 20%.

Discussions since 2002 have looked at the consistency of methods used regionally to monitor the sex composition of the harvest and manage the population. The system widely used sets a maximum allowable harvest of 6% of an observed (surveyed) population (i.e., no more than 6 males, 3 females, or any combination of points not exceeding 6 per 100 goats).

There is a 5-year trend which shows increases in the number of guided nonresident hunters as well as an increasing trend in the use of aircraft as the primary transport method. Although harvest of males is encouraged, females averaged 42% of the total in the last 3 seasons. Further use of the 6-point system will provide a better mechanism to manage hunter harvest if females are heavily targeted. This system was implemented with the fall 2006 registration hunt.

## METHODS

Unit 4 goat hunting is administered through a registration permit (RG150). Hunters obtain permits without charge, but successful hunters are required to report within 5 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. Prior to the 2006 and 2007 seasons the percentage of hunters bringing in the horns for measurement dropped to 72%. With the point system now in place, the percentage has climbed to 91% of successful hunters. However, given the tendency for a surge in harvest during December, it is likely that horn measurement will become mandatory as part of the registration permit conditions.

Mid to late summer aerial surveys are conducted periodically island-wide or in selected trend count areas. Survey platforms have ranged from larger fixed-wing aircraft using multiple observers to smaller fixed-wing aircraft with a pilot and observer, and helicopters. The island has been divided into trend count areas that can be used when island-wide surveys are not possible due to budget constraints, aircraft availability, and poor weather conditions. During August 2004

an extensive survey of the island was conducted to estimate total goat numbers, number of kids, and distribution island-wide. A follow-up survey was conducted in August 2005 with the primary purpose of looking at the expansion of goats on the southern one-third of the island. Since 2005 only partial surveys have been completed due to weather and aircraft availability.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

#### *Population Size*

An extensive aerial survey of goat distribution on Baranof Island was conducted during August 2004, resulting in a tally of 1300 goats. The survey platform was a Hughes 500 helicopter and observations occurred during optimal conditions. However, this number should be viewed as a minimum number of goats inhabiting the island, as sightability data have not been established. Because observers believe that survey conditions were optimal, it is estimated that approximately 85% of all goats were seen. Under this assumption the goat population on the island may exceed 1529 animals. The previous extensive survey was conducted during September 1998; resulting in a tally of 1013 goats. The survey platform was a Cessna 185 fixed-wing aircraft using multiple observers. This number was viewed as a minimum number of goats inhabiting the island because sightability data had not been established. During those surveys, observers suspected that conditions were near optimal and resulted in at least 65% of all goats being seen. Under this assumption the goat population on the island may have exceeded 1350 animals at that time (Whitman 2002). Between 1998 and 2003, only select portions (trend count areas) of Baranof Island were surveyed. Since the 2004 island-wide survey only partial surveys have been completed due to budget, weather, and aircraft availability limitations. For example, in August 2005, a Piper Super Cub was used as the survey platform and the priority was to look at the southern one-third of the island (south of the Great Arm of Whale Bay) for expansion of the population. In 2007, following a record snowfall, poor weather prevented extensive surveys, so one did not occur during this report period. Additional survey effort should be expended in future years to determine sightability, which should lead 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 difficult 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. Areas on the north one-third of Baranof Island (where it is estimated that 70% of the goat population resides) do show an extensive network of trails and dig-outs (dig-outs are areas of soft, damp ground where goats dig up the ground to lie on and cool off). A habitat assessment project related to determining the impact of goats on the alpine summer range has been discussed with the U.S. Forest Service as a potential cooperative agency effort. As of this report date, funding for this assessment project has not been realized.

A population estimate for Baranof Island was made in 1991 by E. L. Young, who estimated 1000 goats (cited by Faro 1994). Whitman (2002) estimated the population at 1350, and the latest estimate from the 2004 surveys is 1529 goats.

### *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%. Surveys conducted in 2004–05 produced combined results with an average of 22%. These data should be viewed cautiously because of differences in observers, pilots, type of aircraft used, and timing of surveys. Hunters are encouraged to select males, so harvest sex ratios do not reflect population-wide sex ratios.

From 1976 to 2006, 1069 harvested goats have been aged based on discreet annuli in horns (Brandborg 1955). With the exception of kids and yearlings, it is probable that hunters are not selecting against any age class of goat. Generally, males are selected over females; however the 2005 harvest resulted in 20 females taken versus 30 males (3 unknown). The mean ages by sex of harvested goats were 5.1 years for males and 4.9 years for females.

In 2005–06, 0 harvested females were > 10 years of age, while 6% of males were > 10 years. Approximately 55% of harvested females and 74% of harvested males were between the ages of 2.5 and 5 years. The oldest female killed was 8.6 years and the oldest male was 11.5 years.

With a goal of encouraging hunters to select billies over nannies, a series of close-up photographs of goats on Baranof Island are provided to hunters at the Sitka office to identify characteristics of the sexes in the field. This effort has supplemented a regionwide effort to produce a brochure that can be distributed to hunters. A draft version of the regionwide brochure was produced for limited distribution in September 2007 with a final version to be issued in the summer of 2008.

### *Distribution and Movements*

Mountain goats inhabit all available summer range on Baranof Island north of Port Herbert and Snipe Bay. Goat densities in the various alpine areas are unknown, but recent surveys indicate that at least some goat habitats are densely occupied, especially areas north of Blue Lake and south/southeast of Rodman Creek. There are increasing goat observations south of Whale and Gut bays reported by the public and as populations increase those areas will support additional goats. Limitations in contiguous goat habitat exist south of Whale and Gut bays and will play a role in slowing the expansion of the population and the numbers of the goats in this area. Winter habitat is more difficult to define, but south-facing cliffs are generally preferred. The extreme winter of 2006–07 most likely affected goats in less than optimal habitat. An island-wide survey is an important priority for the next reporting period since management harvest guidelines are derived from population numbers.

### *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 357 goats from the 1998–2006 seasons yielded data on horn growth.

It is probable 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 very difficult.

Despite earlier indications that incremental horn growth may reflect winter severity (Whitman 2002), addition of horn growth data from the 1999–2006 seasons has led to the conclusion that there is no correlation between horn growth and winter severity.

## **MORTALITY**

### *Harvest*

#### Season and bag limit

#### Resident and nonresident hunters

1 goat by registration permit only

1 Aug–31 Dec  
(General hunt only)

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

Board of Game Actions and Emergency Orders. During the report period, the board adopted a proposal to prohibit the taking of a nanny with kids.

Hunter Harvest. During 2005 and 2006, 285 and 309 registration permits were issued, respectively (Table 1). This resulted in 53 (2005) and 54 (2006) goats being legally harvested. The percent of permittees who actually hunted was 49% in 2005 and 47% in 2006. For those hunters going afield, the success rate was 38% in 2005 and 37% in 2006. Five-year averages for the period 2002–2006 were: permits issued=320; hunters afield= 167; and reported goat harvest=53. Hunters reported the sex of goats in the harvest as 57% male in both 2005 and 2006 (Table 1). With the current population estimate for goats in Unit 4 at 1529 animals, documented harvest accounts for near 4% mortality 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 (78% of hunters were local residents during 2005, a number that dropped to 68% in 2006) (Table 2). The proportion of nonresident guided hunters was 16% in 2005 and rose to 27% in 2006. Although these percentages are still low, the trend is increasing.

Harvest Chronology. Weather and hunter access appear to be the primary factors controlling hunter effort and chronology of the goat harvest in Unit 4. Historically, few goats were harvested during November and December, when frequent low-pressure systems bombard Southeast Alaska with rain and/or snow. More recently, however, hunters elect to hunt after early-season snows drive goats to lower elevations. The 2005 season saw a swing back to what has been a more traditional trend, with 19 (36%) goats harvested in August and 10 (19%) in September. During 2005, 11 goats (21%) were harvested during December, while 9 (17%) were harvested in November and only 4 (8%) taken in October (Table 3). Some of the early season effort in 2005 is attributable to increases in guided nonresident hunter effort. During 2006 hunters took the largest monthly total during December, when 15 (28%) goats were taken. September recorded 14 goats (26%) taken while October saw 13 goats (24%) harvested.

Transport Methods. Boats continue to be the main mode of transportation for Unit 4 goat hunters. During 2005, 57% of the successful hunters used boats for primary access. In 2006, successful hunters used boats for primary access 63% of the time (Table 4). The use of airplanes climbed to 37% in 2005, then dropped to 30% in 2006.

Other Mortality. No estimates of extent or causes of other goat mortality have been made. Brown bear-caused mortality occurs, but its significance is unknown. Aerial surveys have noted bears at elevations between 3000-4200 feet lying prone in the rocks above goats, waiting in apparent ambush. Baranof Island's abundant deer and goat populations found on summer alpine range would appear to provide a plentiful resource to opportunistic bears. Bald eagles have been observed hazing young goats and kids as they cross over narrow ridges, similar to behavior golden eagles exhibit in other locales. 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, but in 2004 three sites were selected for an initial sampling effort. All 3 sites (within a few air miles of each other) were located in a trend count area known for a high density of goats. Elevations ranged from 2300-3400 feet and were selected based on observation of bands of goats in the area, trail networks, and dig-outs. Dig-outs are often near the melting fringe of snow banks or in saddles where deep snow melts out slowly during the early summer. Although each of the sites had a different composition of plant species, dwarf blueberry (*Vaccinium caespitosum*), fireweed (*Epilobium sp.*), and oatgrass (*Trisetum sp.*) were found to have been grazed at each location. Relatively high numbers of kids (22% of all counted goats) observed during late summer aerial surveys, some observations of twin kids, and good body condition of harvested goats suggest that the habitat is in relatively good shape.

### *Enhancement*

No habitat enhancement activities were conducted on goat range during this report period. Discussions with U.S. Forest Service – Sitka Ranger District biologists continue to try and develop projects to examine the potential for goat habitat assessment and enhancement work..

## **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

Efforts should continue to monitor timber extraction activities and additional road building associated with logging and hydroelectric projects. On Baranof Island, habitat degradation activities are currently of minor concern; however, the proposed Lake Diana hydroelectric project by the City and Borough of Sitka would have some negative impacts to goats in its current design.

## **CONCLUSIONS AND RECOMMENDATIONS**

Unit 4 mountain goat populations appear to be secure at this time. It is recommended 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. Voluntary hunter effort to target males will be reviewed if the proportion of harvested females continues an upward trend. The development of a brochure to assist hunters in sex identification of goats and photo templates of goats as seen on the island should help to

educate hunters. Wounding loss of goats is always a management concern due to the terrain and conditions inherent to hunting mountain goats. . Although hunters are to be commended for their willingness to voluntarily submit horn sets for evaluation, it is likely that mandatory horn measurement will become a permit requirement. 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. Habitat assessment work may help to define an upper limit of goats without degradation to the habitat as part of a long term management strategy.

Effort continues at the regional level to review existing goat management objectives. As a result of that effort, revised objectives may be put into place for the region.

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TABLE 1 Unit 4 mountain goat harvest data for registration permit hunt RG150, regulatory years 1998–2006

Year	Permits issued	Did not report	Did not hunt	Unsuccessful hunters	Successful hunters	Males	Females	Sex unk.	Illegal	Total Harvest
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
2001	322	2	171	95	54	33	21	0	0	54
2002	322	0	178	95	49	36	12	1	0	49
2003	331	1	152	91	61	29	32	0	0	61
2004	352	0	162	104	47	27	19	1	0	47
2005	285	2	142	88	53	30	20	3	0	53
2006	309	5	164	91	54	31	22	1	0	54

TABLE 2 Unit 4 mountain goat hunter residency and success for registration permit hunt RG150, regulatory years 1998–2005

Year	Successful				Unsuccessful				Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonres	Total	Local <sup>a</sup> resident	Nonlocal resident	Nonres	Total	
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
2001	45	0	9	54	74	9	12	95	149
2002	39	4	6	49	82	9	4	95	144
2003	46	3	12	61	94	11	12	117	178
2004	38	1	8	47	109	16	15	140	187
2005	30	4	18	53	90	4	7	101	154
2006	32	2	20	54	80	6	25	111	165

<sup>a</sup>Residents of Baranof Island

TABLE 3 Unit 4 mountain goat harvest chronology by month for registration permit hunt RG150, regulatory years 1998–2005

Year	Month					Total
	August	September	October	November	December	
1998	11	12	18	13	9	63
1999	8	8	4	11	5	36
2000	9	10	12	10	19	60
2001	12	9	7	17	9	54
2002	7	5	21	11	5	49
2003	10	6	17	7	21	61
2004	14	9	10	3	11	47
2005	19	10	4	9	11	53*
2006	3	14	13	9	15	54

TABLE 4 Unit 4 mountain goat harvest by transport method used by successful hunters for registration permit hunt RG150, regulatory years 1998–2005

Year	Snow		Off-road		Walked	Total	
	Airplane	Boat	machine	vehicle			
1998	8	50	0	1	3	1	63
1999	4	28	0	0	3	1	36
2000	9	46	0	0	1	4	60
2001	7	41	0	0	3	3	54
2002	15	32	0	0	1	1	49
2003	11	47	0	0	2	1	61
2004	16	24	0	2	1	4	47
2005	19	29	0	0	1	2	51*
2006	16	34	0	1	0	1	54*

\*2 goats taken in each of these years were unspecified by transport method

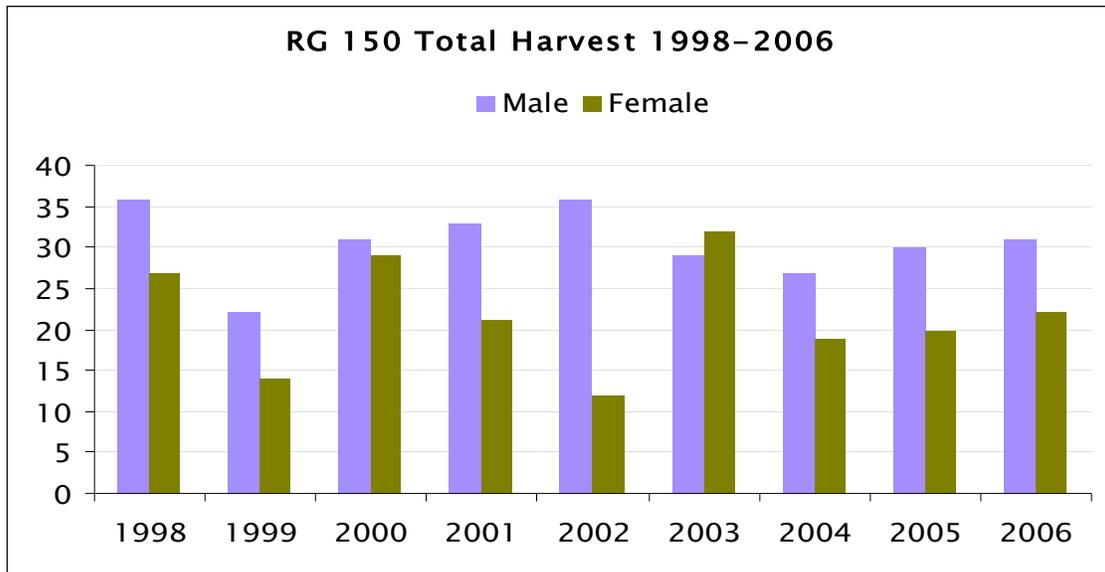


FIGURE 1 RG 150 registration hunt total harvest 1998-2006

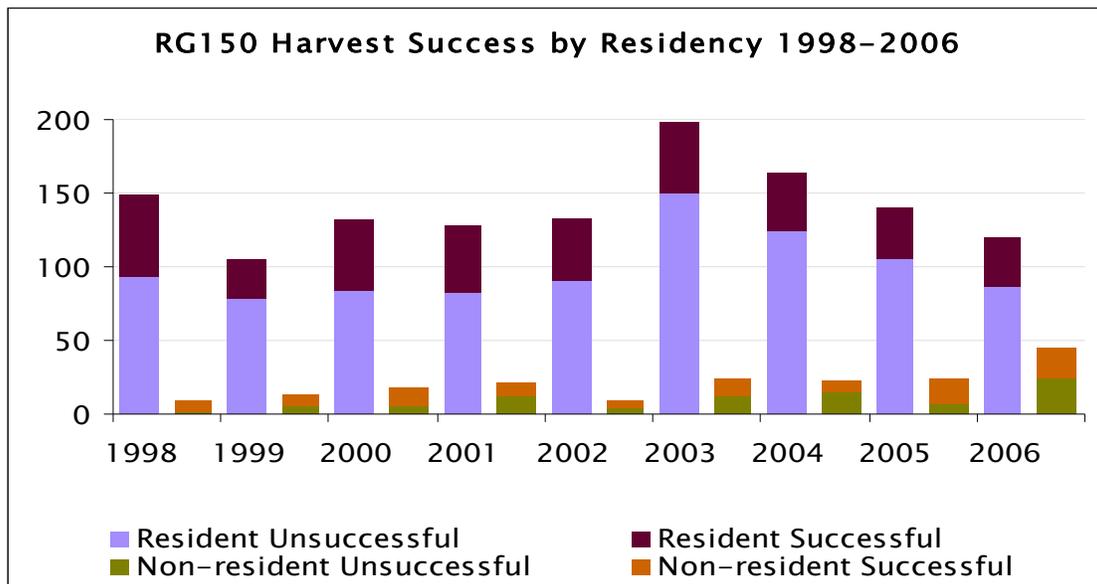


FIGURE 2 RG150 registration hunt harvest success by residency 1998-2006

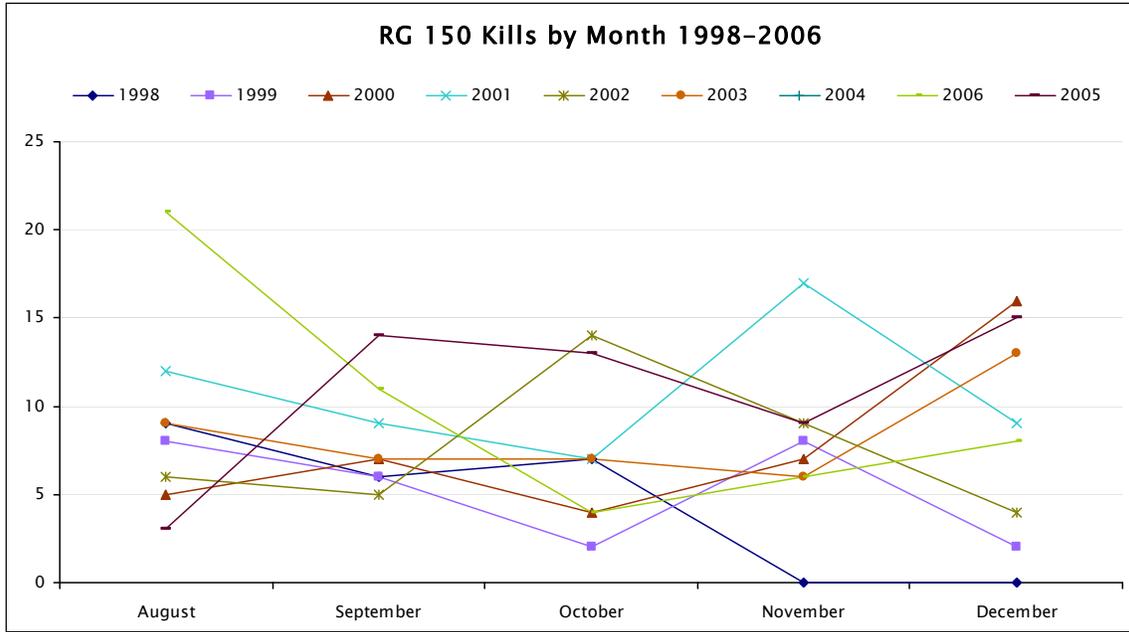


FIGURE 3 RG 150 registration hunt kills by month 1998-2006

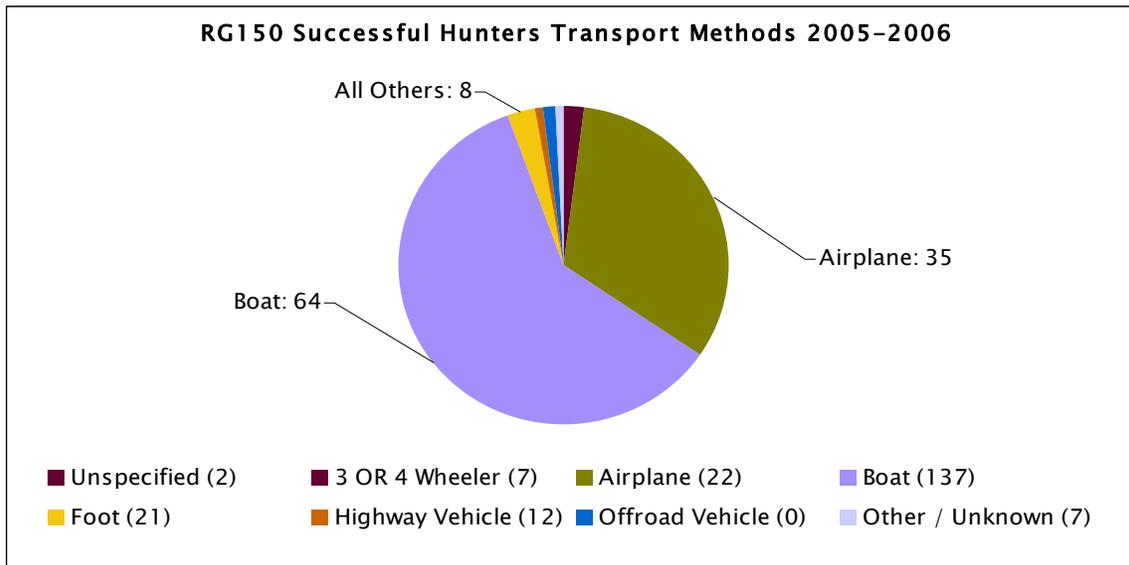


FIGURE 4 RG150 registration hunt successful hunters transport methods 2005-2006

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 \_\_\_\_\_

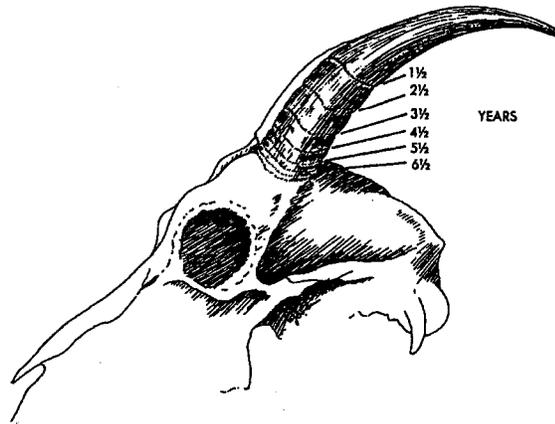
5.5-6.5 years \_\_\_\_\_

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 \_\_\_\_\_

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**MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005  
To: 30 June 2007

**LOCATION**

**GAME MANAGEMENT UNIT:** 5 (5800 mi<sup>2</sup>)

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

**BACKGROUND**

The Alaska Department of Fish and Game (ADF&G) first conducted aerial goat surveys in this unit in 1971. By 1973 Division of Game biologists had documented a significant decline in goat numbers in the area, attributed primarily to severe winter weather. This was a common occurrence throughout Southeast Alaska during the early 1970s. 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 suggested goats were relatively abundant throughout the area. However, during the late 1990s an illegal guiding operation for mountain goats at Nunatak Bench appears to have precipitated a dramatic decline in goat numbers that prompted both ADF&G and the United States Forest Service (USFS) to close their respective hunting seasons in this area each year since 2000. At present this population remains at a low level and likely will not support a hunt for many years to come.

Nearly all Unit 5 hunting effort is concentrated in Unit 5A for several reasons. 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). The primary goat habitat open to hunting is at Icy Bay and is difficult to access. Also, private property at Icy Bay belongs to a Native corporation and is not open for hunting to the general public, though a commercial guide does have permission to operate there.

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 and unsuccessful hunters in the state hunt, but information from unsuccessful federal permittees is often difficult to attain; as the U.S. Fish and Wildlife Service, the data manager, does not strictly enforce reporting requirements.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

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

1. Maintain goat densities so at least 30 goats per hour are seen during fall surveys.
2. Use pamphlets, videos, and other educational materials to assure a male:female harvest of at least 2:1.
3. Identify discrete geographic areas and manage within these areas.
4. Maintain a guideline harvest not to exceed 6 points (males = 1 pt. and females = 2 pts.) per 100 goats observed.
5. Conduct aerial surveys at least every 3 years in areas of high harvest.
6. Continue to monitor the Nunatak Bench goat population through aerial surveys.

### METHODS

Several aerial surveys were conducted within the unit during this report period. Because of our concern with low goat numbers at Nunatak Bench, we made it a priority to survey this area during the report period, and accomplished this in both years. We also surveyed the area from Nunatak Fiord to Harlequin Lake in 2006.

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 U.S. Forest Service (USFS) personnel stationed in Yakutat.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

Table 1 shows the results from aerial surveys of the Nunatak Bench and that area from Nunatak Fiord to Harlequin Lake in Unit 5A, and of the Chaix Hills in Unit 5B. Based on this survey data, it appears the goat population at Nunatak Bench is continuing to decline in spite of the hunting closure that has been implemented during 2000. We will continue to monitor this population over the foreseeable future to keep abreast of its status. The other areas surveyed in Unit 5A and 5B appear to have healthy goat populations when comparing the goats seen per hour of surveying with historical surveys.

### MORTALITY

#### *Harvest*

#### Season and bag limits

1 goat by registration permit only

#### Resident and nonresident hunters

1 Aug–31 Dec  
(General hunt only)

Board of Game Actions and Emergency Orders (EO). A proposal by ADF&G to officially define that area commonly known as Nunatak Bench was passed by the Board of Game in 2004. An emergency order was issued in fall 2003 to close goat hunting at Nunatak Bench when fall surveys revealed too few goats to warrant any harvest. Rather than continue to issue EO's for

Nunatak Bench each year for the near future, ADF&G eliminated Nunatak Bench from the state registration permit (RG170) hunt area, thereby assuring a closure until further survey data warrants reopening goat hunting.

Federal Subsistence Board Actions and Emergency Orders (EO). During each year of the report period, the USFS issued an emergency order to close the Nunatak Bench to goat hunting prior to any harvest taking place. At present, the USFS continues to address our interests for no harvest in this area by using EOs to close the federal season.

Hunter Harvest. Nine goats (all males) were harvested during the report period (6 in 2005 and 3 in 2006), and all were taken under state registration permits (Table 2). Seven were harvested in Unit 5A, and 2 were from 5B. The percentage of male goats was 100%, which is far above our previous 10-year mean of 62%. The relatively low harvest during 2005 and 2006 is consistent with that seen during the previous 2 report periods (Table 4). The closure at Nunatak Bench is at least partly responsible for this trend. The Nunatak Bench hunt had consistently been the favorite by locals as well as guided hunters because of the ease of attaining goats from the cliffs above salt water. There were no goats harvested in Unit 5B during the report period.

Goat hunting has never attracted a lot of outside 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 harvest in 1998–1999 of 16 and 19 goats respectively was due in large part to an illegal guiding operation, and should be looked at as an anomaly. After this poaching problem was taken care of, the harvest of 10 goats in 2000 was again closer to the long-term annual harvest. During the past 6 years, the harvest has been just 4 goats per year.

Permit Hunts. A total of 29 and 35 registration permits were issued during 2005 and 2006, respectively, nearly the same as during the previous report period (Table 4). Hunting effort was minimal with only 11 and 9 people hunting, respectively, during 2005 and 2005. During each year only 5 residents actually hunted, but none were successful. The mean of 10 hunters per year during the report period is similar to the last two report periods (2003–2004 and 2001–2002) of 11 and 12 respectively. During the period of 1990–2000, the number of hunters ranged from as few as 12 to as high as 33.

Hunter Residency and Success. Goat hunter success was 55% during the first year of this report period, and dropped to 33% during year two. This was substantially higher than the previous report period success rates of 30 and 14% during 2003 and 2004, respectively (Table 3). Once again, all successful goat hunters were nonresidents during this report period, with 9 of 10 being successful. Alaska residents meanwhile accounted for 10 hunters, none of whom harvested a goat.

Harvest Chronology. During the report period 5 goats were harvested in November, 3 in September, and 1 in October. The Unit 5 goat harvest is traditionally spread throughout the season, with the greatest number of goats typically taken during September and October.

Transport Methods. In both years of the report period, boats were the transportation method used by the majority of successful hunters (Table 5). Local residents continued to favor boats as their

preferred mode of transportation. The single hunter using aircraft for access was a nonresident on a guided hunt in Unit 5B.

#### *Other Mortality*

The decline in goat numbers at Nunatak Bench suggests something not related to hunting is limiting goat numbers there. The past few winters have been relatively mild, so mortality associated with severe weather doesn't seem likely. Predation or disease could certainly be a factor, but why this would suddenly crop up and almost exclusively at Nunatak Bench doesn't make sense.

## **CONCLUSIONS AND RECOMMENDATIONS**

Obtaining mountain goat population information through aerial sex and age composition counts was a priority during this report period. These data, along with data collected since 1999, have allowed us to get a decent grasp on goat population levels, as well as herd composition and distribution. These efforts should continue, especially at Nunatak Bench, where the population appears to be floundering.

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TABLE 1 Unit 5 mountain goat composition counts, regulatory years 1986–2006<sup>1</sup>

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	<u>No survey</u>					
<u>Nunatak Bench</u>						
2000 <sup>2</sup>	69	13	82	19	16	91
	40	6	46	15	13	52
2001 <sup>3</sup>	37	11	48	30	23	20
	37	2	39	5	5	54
2002 <sup>4</sup>	25	4	29	16	14	19
2003 <sup>4</sup>	29	14	43	48	33	40
2004	<u>No Survey</u>					
<u>East Harlequin Lake</u>						
2000	103	20	123	19	16	41
2001	119	31	150	26	21	52
2002	<u>No survey</u>					
2003	<u>No survey</u>					
2004	<u>No survey</u>					
<u>West Harlequin Lake</u>						
2003 <sup>4</sup>	63	21	84	33	25	126
2004	<u>No Survey</u>					
2005 <sup>5</sup>	19					
<sup>6</sup>	122	28	150	23	19	75
2006 <sup>7</sup>	26	7	33	27	21	48
<sup>8</sup>	103	13	116	13	11	82

<sup>1</sup> Beginning in 2000, aerial survey data is listed for specific areas of Unit 5A and 5B.

<sup>2</sup> Both surveys conducted with a Hughes 500 helicopter

<sup>3</sup> Survey # 1 (Hughes 500 helicopter), survey # 2 (Cessna 185)

<sup>4</sup> Survey conducted with a Helio-Courier fixed wing aircraft.

<sup>5</sup> Survey of Nuntak Bench with Super-Cub

<sup>6</sup> Survey of the Chaix Hills in Unit 5B with a Super-Cub.

<sup>7</sup> Survey of Nunatak Bench with a Cessna-185.

<sup>8</sup> Survey of area from Nunatak Fiord, south to Miller Creek in Cessna-185.

TABLE 2 Unit 5 annual goat harvest, regulatory years 1997–2006

Year	Males	Females	Unknown	Total
1997	3	2	0	5
1998	9	6	1	16
1999	10	6	3	19
2000	7	2	1	10
2001	5	0	0	5
2002	3	1	0	4
2003	2	1	0	3
2004	1	1	0	2
2005	6	0	0	6
2006	3	0	0	3

TABLE 3 Unit 5 goat hunter success by community of residence, regulatory years 1997–2006

Year	Percent success	Successful hunters			Unsuccessful hunters		
		Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1997	29	4	1	0	6	4	2
1998	48	5	4	7	8	4	5
1999 <sup>1</sup>	73	8	3	5	2	3	2
2000	48	0	6	4	3	3	5
2001	50	2	0	3	1	2	2
2002	33	1	1	2	4	1	3
2003	30	0	0	3	5	0	2
2004	14	0	0	2	0	8	4
2005	55	0	0	6	1	4	0
2006	33	0	0	3	3	2	1

<sup>1</sup> Three goats were taken illegally by hunters of unknown residency.

TABLE 4 Unit 5 goat hunter effort and success, regulatory years 1997 through 2006

Year	<u>Successful hunters</u>				<u>Unsuccessful hunters</u>			<u>Total hunters</u>		
	Permits Issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days
1997	53	5	8	1.6	12	26	2.2	17	34	2.0
1998	56	16	55	3.4	17	59	3.5	33	114	3.5
1999	44	19	31	1.6	7 <sup>1</sup>	15	3.0	26	46	1.8
2000	45	10	31	3.1	11	16	1.5	21	47	2.2
2001	25	5	10	2.0	5	13	2.6	10	23	2.3
2002	43	4	10	2.5	8	22	2.8	12	32	2.7
2003	33	3	4	1.3	7	21	3.0	10	25	2.5
2004	37	2	11	5.5	12	62	5.2	14	73	5.2
2005	29	6	17	2.8	5	15	3.0	11	32	2.9
2006	35	3	3	1.0	6	19	3.2	9	22	2.4

<sup>1</sup> Days per hunt data only available for 5 of these hunters.

TABLE 5 Unit 5 transport methods used by successful goat hunters, regulatory years 1997–2006

Year	<u>Airplane</u>		<u>Boat</u>		<u>Snowmachine</u>		<u>Highway vehicle</u>		<u>Foot</u>	
	Total	%	Total	%	Total	%	Total	%	Total	%
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
2001	3	60	2	40	0	0	0	0	0	0
2002	1	25	3	75	0	0	0	0	0	0
2003	0	0	3	100	0	0	0	0	0	0
2004	0	0	2	100	0	0	0	0	0	0
2005	1	17	5	83	0	0	0	0	0	0
2006	0	0	2	67	0	0	0	0	1	33

TABLE 6 Unit 5 commercial services used by goat hunters, regulatory years 1997–2006

Year	<u>Unit residents</u>		<u>Other AK residents</u>		<u>Nonresidents</u>		<u>Total use</u>	
	No	Yes	No	Yes	No	Yes	No	Yes
1997	7	2	4	1	0	2	11	5
1998	12	0	4	3	0	12	16	15
1999	11	0	5	0	0	7	16	7
2000	3	0	3	6	0	8	6	14
2001	3	0	2	0	0	5	5	5
2002	5	0	1	1	0	5	6	6
2003	5	0	0	0	0	5	5	5
2004	0	0	3	5	0	6	3	11
2005	1	0	0	4	0	6	1	10
2006	3	0	0	2	0	4	3	6

## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT UNIT:** 6 (10,140 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Prince William Sound and North Gulf Coast

### **BACKGROUND**

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

Mountain goat populations in Unit 6 have fluctuated widely over the last 60 years. Art Sheets (ADF&G biologist) reported 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 1988a) and predation (Reynolds 1981, Griese 1988b). By 1987 the estimated population was 3400. It declined to 3000 by 1994. In response to declining populations and low recruitment, Nowlin (1996) reduced harvest and prohibited hunting of small groups of goats (<60) during the early and mid 1990s. The population rebounded to approximately 4000 goats by 1999, as a result of conservative harvest and mild winters, and has been relatively stable to increasing since then.

Aerial surveys to determine population size and composition began in 1969. Griese (1988a) improved and standardized methods in 1986 by establishing count areas that were systematically searched. 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 1–2 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.

Nowlin (1998) established a tracking harvest strategy (Caughley 1977, Smith 1984) to guide goat management decisions. The three elements 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) a formalized minimum population objective of 2400 goats for Unit 6.

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 a historic high of 182 animals in 1983–1984 and declined to a historic low of 35 goats in 1996–1997. During 2000–2004 the annual harvest averaged 77 goats.

## **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 (Crowley 2004). I summarized survey results by hunt area and unit. I also summarized data from Unit 6D into western and eastern portions. 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. 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. During years when surveys were not completed, we estimated the population by modeling most recent surveys, harvest, and probable productivity and survival (Crowley 2004).

We monitored harvest through permit hunt reports required from all hunters. Hunters who failed to report were sent up to two reminder letters. 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.

We established a maximum allowable harvest (MAH) for each year 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 on population trend, estimated mortality, and elapsed time since the last survey. 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 1 of 18 permit hunt areas during this reporting period (Table 1). This was far fewer surveys than normal. Poor survey conditions during August and September and lack of pilots hindered the effort. Based on surveys from previous years and reported harvest, the population was approximately 4100 goats (Table 1). Unit 6D East had the highest number of goats, followed by Unit 6D West. Goat populations in Unit 6A were probably stable, although we lack survey data in the more remote hunt areas in eastern 6A.

### MORTALITY

#### *Harvest*

**Seasons and Bag Limits.** The mountain goat season in Units 6A and 6B was 20 August–31 January and in Unit 6D was 15 September–31 January. Hunts in 6C were previously split into 2 periods, 1 week during October and 8 November–31 January. These were joined into 1 season beginning 7 October during the reporting period. The bag limit was 1 goat by registration permit only. Permit hunts were opened in all areas, including RG248, a hunt in the Valdez area that had been closed since 1986.

Unweighted and weighted harvests were 86 and 106 during 2005–06 and 75 and 94 in 2006–07, respectively (Table 2). The 2005-06 harvest included 23% females and the 2006-07 harvest included 25% females.

The maximum allowable harvest was 149 goat units during 2005–06 and 154 during 2006–07. Weighted harvest exceeded the maximum allowable harvest in 2 of the 36 hunts held during this reporting period. Overall, there were no significant events of overharvest that could affect populations.

**Board of Game Actions and Emergency Orders.** Ten emergency orders were issued closing registration permit hunts when MAH was reached. During 2005–06, hunts RG231, RG232, RG242, RG248, RG252, and RG266 were closed. During 2006–07, hunts RG226, RG230, RG52 and RG266 were closed. These were routine management actions.

**Permit Hunts.** The number of registration permits issued was 331 in RY05 and 429 in RY06 (Table 2). The number issued has increased each year since 2001. A regulatory year runs from 1 July through 30 June: e.g., RY 05 was 1 July 2005–30 June 2006.

**Hunter Residency and Success.** Most successful goat hunters during this reporting period were nonresidents (Table 3). Hunter success during the reporting period was 48%, which was slightly lower than the previous 3 years.

**Harvest Chronology.** September and October were the most productive months overall for goat harvest during the reporting period (Table 4). This pattern was normal.

**Transport Methods.** Transportation to hunt areas was similar to previous years. 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.

#### *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 (2004) found little evidence of significant wolf predation in Unit 6 during the early to mid 1990s. He reported the wolf population probably peaked during the early to late 1980s and then declined during the following decade to a stable, relatively low density.

## **CONCLUSIONS AND RECOMMENDATIONS**

We achieved our objectives to maintain a minimum population size of 2400 goats and achieve 70% or more males in the harvest. The estimated number of goats at the end of this reporting period was approximately 4100. The population was probably stable during the reporting period, indicating 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%.

Recruitment of survey pilots is an important aspect of goat management in Unit 6, as experienced pilots retire or move out of the area. Pilots must be available locally because weather windows are brief and unpredictable. We recruited 1 pilot late in the reporting period but require at least 1 more to effectively cover the area.

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TABLE 1 Unit 6 summer/fall mountain goat composition counts and estimated population size, 2002–2006

Unit	Hunt nr or area	Year(s)	Survey coverage	Older goats	(%)	Kids (%)	Kids:100 older goats	Total goats observed	Estimated population size	
6A	RG202	2002–2006	None	--	--	--	--	--	90	
	Brower Ridge	2002–2006	None	--	--	--	--	--	43	
	RG204	2002–2006	None	--	--	--	--	--	195	
	RG206	2002–2006	None	--	--	--	--	--	225	
	RG212	2002	Full	67	(84)	13	(16)	19	80	96
		2003–2006	None	--	--	--	--	--	--	96
	RG214	2002	Partial	1	(100)	0			1	2
		2003–2006	None	--	--	--	--	--	--	2
	RG215	2002	Full	44	(88)	6	(12)	14	50	60
		2003–2006	None	--	--	--	--	--	--	55
	Suckling Hills	2002–2006	None	--	--	--	--	--	--	29
6A TOTAL		2002	Partial	112	(85)	19	(15)	17	131	740
		2003–2006	None	--	--	--	--	--	--	735
6B	RG220	2002–2006	None	--	--	--	--	--	--	200
	RG226	2002	Full	111	(79)	30	(21)	27	141	169
		2003	Full	126	(77)	38	(23)	30	164	197
		2005	Full	78	(80)	19	(20)	24	97	116
		2006	None	--	--	--	--	--	--	116
6B TOTAL		2002	Partial	111	(79)	30	(21)	27	141	369
		2003	Partial	126	(77)	38	(23)	30	164	397
		2004	None	--	--	--	--	--	--	397
		2005	Partial	78	(80)	19	(20)	24	97	316
		2006	None	--	--	--	--	--	--	316
6C	RG230	2002	Full	135	(83)	27	(17)	20	162	180
		2003	None	--	--	--	--	--	--	178
		2004	Full	109	(86)	18	(14)	17	127	168
		2005–2006	None	--	--	--	--	--	--	168
	RG231	2002	Full	122	(84)	23	(16)	19	145	174
		2003–2006	None	--	--	--	--	--	--	174

TABLE 1 continued

Unit	Hunt nr. or area	Regulatory year	Survey coverage	Olde rgoats	(%) Kids	(%) Kids	Kids:100 older goats	Total goats observed	Estimated population size
	RG232	2002	None	--	--	--	--	--	204
		2003	Full	152	(78)	42	(22)	28	194
		2004–2006	None	--	--	--	--	--	252
6C TOTAL		2002	Partial	257	(54)	50	(10)	19	477
		2003	Partial	152	(31)	42	(9)	28	487
		2004	Partial	109	(23)	18	(4)	17	482
		2005–2006	None	--	--	--	--	--	594
6D	RG242	2002	None	--	--	--	--	--	585
		2003	Full	437	(78)	121	(22)	28	558
		2004–2006	None	--	--	--	--	--	669–682
	RG243	2002–2006	None	--	--	--	--	--	166–174
	RG244	2002	Partial	95	(44)	20	(17)	21	215
		2003–2006	None	--	--	--	--	--	243–257
	RG245	2002	None	--	--	--	--	--	119
		2003	Partial	61	(53)	16	(21)	26	115
		2004–2006	None	--	--	--	--	--	134
	RG248	2002–2004	None	--	--	--	--	--	63–71
		2005	Partial	66		0			66
		2006	None	--	--	--	--	--	78
	Heiden	2002–2006	None	--	--	--	--	--	53–56
6D EAST TOTAL		2002	Partial	95	(83)	20	(2)	21	115
East of Valdez		2003	Partial	498	(78)	137	(13)	28	635
Port, Narrows, and Arm		2004	None	--	--	--	--	--	1349
		2005	Partial	66	--	--	--	--	66
		2006	None	--	--	--	--	--	1382
6D	RG249	2002	Partial	113	(84)	22	(16)	19	135
		2003	None	--	--	--	--	--	310
		2004	Full	279	(84)	55	(16)	20	334
		2005–2006	None	--	--	--	--	--	367
	RG252	2002	Full	178	(88)	25	(12)	14	203
		2003	None	--	--	--	--	--	260
		2004	Full	192	(83)	39	(17)	20	231
		2005–2006	None	--	--	--	--	--	277
6D	RG266	2002	Partial	165	(79)	43	(21)	26	208
		2005–2006	None	--	--	--	--	--	319
6D West Remainder		2002–2006	None	--	--	--	--	--	133
Sargent Icefield, Mt. Castner, Whittier, and College Fiord									

TABLE 1 continued

Unit	Hunt nr. or area	Regulatory year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100o lder goats	Total goats observed	Estimated population size
6D WEST TOTAL		2002	Partial	456	(84)	90	(16)	20	546	955
West of Valdez		2003	None	--	--	--	--	--	--	1023
		2004	Partial	471	(83)	94	(17)	20	565	1097
Port. Narrows		2005–2006	None	--	--	--	--	--	--	1097
6D TOTAL		2002	Partial	551	(83)	110	(17)	20	661	2176
		2003	Partial	498	(78)	137	(22)	28	635	2336
		2004	Partial	471	(83)	94	(17)	20	565	2446
		2005	Partial	66		0		0	66	2476
		2006	None	--	--	--	--	--	--	2479
UNIT 6 TOTAL		2002	Partial	1031	(83)	209	(17)	20	1240	3842
		2003	Partial	776	(78)	217	(22)	28	993	4055
		2004	Partial	580	(84)	112	(16)	19	692	4177
		2005	Partial	78	(80)	19	(20)	24	97	4121
		2006	None	--	--	--	--	--	--	4125

TABLE 2 Unit 6 mountain goat harvest data by permit hunt, 2002–2006

Unit/ hunt nr	Permits RY issued	Nr did not hunt	Percent did not hunt	Nr unsuccessful hunters	Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters	Percent			Total harvest				
								M (%)	F (%)	Unk.	Unw <sup>a</sup>	W <sup>b</sup>			
6A/RG202	2002	11	5	45	4	67	2	33	1	(100)	0	(0)	1	2	3
	2003	7	6	86	0	0	1	100	0	(0)	0	(0)	1	1	2
	2004	12	6	50	4	67	2	33	2	(100)	0	(0)	0	2	2
	2005	7	5	71	1	50	1	50	1	(100)	0	(0)	0	1	1
	2006	15	10	67	3	60	2	40	1	(50)	1	(50)	0	2	3
6A/RG204	2002	5	2	40	0	0	3	100	3	(100)	0	(0)	0	3	3
	2003	18	13	72	1	20	4	80	4	(100)	0	(0)	0	4	4
	2004	11	6	55	0	0	5	100	5	(100)	0	(0)	0	5	5
	2005	13	5	38	5	63	3	38	2	(67)	1	(33)	0	3	4
	2006	12	9	75	0	0	3	100	3	(100)	0	(0)	0	3	3
6A/RG206	2002	6	2	33	1	25	3	75	3	(100)	0	(0)	0	3	3
	2003	9	5	56	2	50	2	50	2	(100)	0	(0)	0	2	2
	2004	4	2	50	1	50	1	50	1	(100)	0	(0)	0	1	1
	2005	10	3	30	4	57	3	43	1	(50)	1	(50)	1	3	5
	2006	7	6	86	0	0	1	100	0	0	0	1	1	1	2
6A/RG212	2002	2	1	50	1	100	0	0							
	2003	8	8	100											
	2004	4	4	100											
	2005	0													
	2006	4	4	100											
6A/RG215	2002	4	2	50	0	0	2	100	2	(100)	0	(0)	0	2	2
	2003	3	1	33	0	0	2	100	2	(100)	0	(0)	0	2	2
	2004	6	3	50	0	0	3	100	3	(100)	0	(0)	0	3	3
	2005	8	6	75	1	50	1	50	1	(100)	0	(0)	0	1	1
	2006	8	5	63	3	100	0	0	0	0	0	0	0	0	0
6A TOTAL	2002	28	12	43	6	38	10	63	9	(100)	0	(0)	1	10	11
	2003	45	33	73	3	25	9	75	8	(100)	0	(0)	1	9	10
	2004	37	21	57	5	31	11	69	11	(100)	0	(0)	0	11	11
	2005	38	19	50	11	58	8	42	5	(71)	2	(29)	1	8	11
	2006	46	34	74	6	50	6	50	4	(80)	1	(20)	1	6	8

TABLE 2 continued

Unit/ hunt nr	R Y	Permits Issued	Nr did not	Percen Nr		Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters	Male (%)	Female (%)	Unk.	Total harvest			
				did hunt	unsuccessful hunters							Unw <sup>a</sup>	W <sup>b</sup>		
6B/RG220	2002	0													
	2003	4	1	25	0	0	3	100	3	(100)	0	(0)	0	3	3
	2004	6	5	83	0	0	1	100	1	(100)	0	(0)	0	1	1
	2005	17	12	71	4	80	1	20	0	(0)	1	(100)	0	1	2
	2006	20	9	45	7	64	4	36	3	(100)	0	(0)	1	4	5
6B/RG226	2002	18	12	67	4	67	2	33	2	(100)	0	(0)	0	2	2
	2003	13	6	46	1	14	6	86	5	(83)	1	(17)	0	6	7
	2004	10	6	60	2	50	2	50	1	(50)	1	(50)	0	2	3
	2005	13	9	69	2	50	2	50	1	(50)	1	(50)	0	2	3
	2006	23	15	65	1	13	7	88	7	(100)	0	(0)	0	7	7
6B	2002	18	12	67	4	67	2	33	2	(100)	0	(0)	0	2	2
	2003	17	7	41	1	10	9	90	8	(89)	1	(11)	0	9	10
	2004	16	11	69	2	40	3	60	2	(67)	1	(33)	0	3	4
	2005	30	21	70	6	67	3	33	1	(33)	2	(67)	0	3	5
	2006	43	24	56	8	42	11	58	10	(100)	0	(0)	1	11	12
6C/RG230	2002	10	2	20	4	50	4	50	4	(100)	0	(0)	0	4	4
	2003	23	6	26	11	65	6	35	4	(80)	1	(20)	1	6	8
	2004	15	5	33	4	40	6	60	4	(67)	2	(33)	0	6	8
	2005	16	6	38	6	60	4	40	2	(50)	2	(50)	0	4	6
	2006	37	19	51	12	67	6	33	4	(67)	2	(33)	0	6	8
6C/RG231	2002	8	2	25	2	33	4	67	4	(100)	0	(0)	0	4	4
	2003	15	4	27	4	36	7	64	3	(43)	4	(57)	0	7	11
	2004	10	3	30	5	71	2	29	1	(50)	1	(50)	0	2	3
	2005	10	1	10	3	33	6	67	4	(80)	1	(20)	1	6	8
	2006	17	7	41	5	50	5	50	4	(80)	1	(20)	0	5	6
6C/RG232	2002	14	3	21	5	45	6	55	6	(100)	0	(0)	0	6	6
	2003	25	12	48	6	46	7	54	6	(86)	1	(14)	0	7	8
	2004	22	12	55	9	90	1	10	1	(100)	0	(0)	0	1	1
	2005	38	18	47	11	55	9	45	6	(67)	3	(33)	0	9	12
	2006	23	16	70	5	71	2	29	0	(0)	2	(100)	0	2	4

TABLE 2. continued

Unit/ hunt nr	RY	Permit issued	Nr did not hunt	Percent did not hunt	Nr unsuccessful hunters	Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters				Total harvest			
									Male (%)	Female (%)	Unk.	Unw <sup>a</sup>	W <sup>b</sup>		
6C TOTAL	2002	32	7	22	11	44	14	56	14	(100)	0	(0)	0	14	14
	2003	63	22	35	21	51	20	49	13	(68)	6	(32)	1	20	27
	2004	47	20	43	18	67	9	33	6	(67)	3	(33)	0	9	12
	2005	64	25	39	20	51	19	49	12	(67)	6	(33)	1	19	26
	2006	77	42	55	22	63	13	37	8	(62)	5	(38)	0	13	18
6D/RG242	2002	59	30	51	15	52	14	48	12	(0)	2	(0)	0	14	16
	2003	73	34	47	23	59	16	41	15	(0)	1	(0)	0	16	17
	2004	62	23	37	18	46	21	54	13	(0)	5	(0)	3	21	28
	2005	34	11	32	10	43	13	57	11	(85)	2	(15)	0	13	15
	2006	40	25	63	6	40	9	60	7	(78)	2	(22)	0	9	11
6D/RG244	2002	32	23	72	5	56	4	44	3	(75)	1	(25)	0	4	5
	2003	27	13	48	5	36	9	64	6	(67)	3	(33)	0	9	12
	2004	26	17	65	8	89	1	11	1	(100)	0	(0)	0	1	1
	2005	18	9	50	8	89	1	11	0	(0)	1	(100)	0	1	2
	2006	26	24	92	2	100	0	0	0		0		0	0	0
6D/RG245	2002	31	10	32	17	81	4	19	4	(100)	0	(0)	0	4	4
	2003	19	12	63	2	29	5	71	1	(25)	3	(75)	1	5	9
	2004	40	25	63	11	73	4	27	2	(50)	2	(50)	0	4	6
	2005	24	11	46	10	77	3	23	2	(67)	1	(33)	0	3	4
	2006	28	18	64	10	100	0	0	0		0		0	0	0
6D (EAST) TOTAL	2002	122	63	52	37	63	22	37	19	(86)	3	(14)	0	22	25
	2003	119	59	50	30	50	30	50	22	(76)	7	(24)	1	30	38
	2004	128	65	51	37	59	26	41	16	(70)	7	(30)	3	26	35
	2005	104	41	39	41	65	22	35	18	(82)	4	(18)	0	22	26
	2006	117	78	67	28	72	11	28	8	(73)	3	(27)	0	11	14
6D/RG249	2002	19	5	26	4	29	10	71	6	(67)	3	(33)	1	10	14
	2003	0													
	2004	21	11	52	1	10	9	90	6	(86)	1	(14)	2	9	11
	2005	28	10	36	5	28	13	72	12	(92)	1	(8)	0	13	14
	2006	61	40	66	10	48	11	52	9	(82)	2	(18)	0	11	13

TABLE 2. continued

Unit/ hunt no.	R Y	Permits issued	Nr did not hunt	Percent did not hunt	Nr unsuccessful hunters	Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters	Males (%)	Female (%)	Unk	Total harvest			
												<sup>a</sup> Unw	<sup>b</sup> W		
6D/RG252	2002	33	14	42	10	53	9	47	5	(56)	4	(44)	0	9	13
	2003	28	13	46	3	20	12	80	9	(75)	3	(25)	0	12	15
	2004	48	34	71	7	50	7	50	7	(100)	0	(0)	0	7	7
	2005	50	24	48	13	50	13	50	11	(92)	1	(8)	1	13	15
	2006	34	22	65	1	8	11	92	7	(64)	4	(36)	0	11	15
6D/RG266	2002	22	14	64	5	63	3	38	2	(100)	0	(0)	1	3	4
	2003	34	23	68	6	55	5	45	4	(80)	1	(20)	0	5	6
	2004	24	12	50	1	8	11	92	8	(73)	3	(27)	0	11	14
	2005	17	5	29	4	33	8	67	5	(63)	3	(38)	0	8	11
	2006	51	31	61	8	40	12	60	9	(75)	3	(25)	0	12	15
6D (West) TOTAL	2002	74	33	45	19	46	22	54	13	(65)	7	(35)	2	22	30
	2003	62	36	58	9	35	17	65	13	(76)	4	(24)	0	17	21
	2004	93	57	61	9	25	27	75	21	(84)	4	(16)	2	27	32
	2005	95	39	41	22	39	34	61	28	(85)	5	(15)	1	34	40
	2006	146	93	64	19	36	34	64	25	(74)	9	(26)	0	34	43
6D TOTAL	2002	196	96	49	56	56	44	44	32	(76)	10	(24)	2	44	55
	2003	181	95	52	39	45	47	55	35	(76)	11	(24)	1	47	59
	2004	221	122	55	46	46	53	54	37	(77)	11	(23)	5	53	67
	2005	199	80	40	62	52	56	47	46	(84)	9	(16)	1	56	66
	2006	263	171	65	47	51	45	49	33	(73)	12	(27)	0	45	57
UNIT 6 TOTAL	2002	274	127	46	77	52	70	48	57	(85)	10	(15)	3	70	82
	2003	306	157	51	64	43	85	57	64	(78)	18	(22)	3	85	105
	2004	321	174	54	71	48	76	52	56	(79)	15	(21)	5	76	94
	2005	331	145	44	100	54	86	46	64	(77)	19	(23)	3	86	107
	2006	429	271	63	83	53	75	47	55	(75)	18	(25)	2	75	94

<sup>a</sup> Unweighted harvest; each male, female, and unknown counted as 1.

<sup>b</sup> Weighted harvest; males counted as 1, females counted as 2 and unknowns counted as 1.5.

TABLE 3 Unit 6 mountain goat hunter residency and success, 2002–2006

Unit	Regulatory year	Successful					Unsuccessful					Total hunters
		Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	
6A	2002	0	1	9	10	(63)	1	5	0	6	(38)	16
	2003	0	1	10	11	(73)	1	3	0	4	(27)	15
	2004	0	0	11	11	(69)	2	3	0	5	(31)	16
	2005	0	2	6	8	(40)	0	4	8	12	(60)	20
	2006	0	2	4	6	(55)	1	4	0	5	(45)	11
6B	2002	0	0	2	2	(67)	0	0	1	1	(33)	3
	2003	0	2	5	7	(100)	0	0	0	0	(0)	7
	2004	0	1	2	3	(60)	0	1	1	2	(40)	5
	2005	0	1	2	3	(38)	0	4	1	5	(63)	8
	2006	0	3	8	11	(58)	3	1	4	8	(42)	19
6C	2002	14	0	0	14	(56)	11	0	0	11	(44)	25
	2003	18	2	0	20	(53)	17	1	0	18	(47)	38
	2004	8	1	0	9	(33)	18	0	0	18	(67)	27
	2005	13	6	0	19	(54)	13	3	0	16	(46)	35
	2006	7	5	1	13	(37)	16	6	0	22	(63)	35
6D	2002	8	19	18	45	(47)	12	28	11	51	(53)	96
	2003	3	23	21	47	(53)	10	19	13	42	(47)	89
	2004	3	22	28	53	(56)	8	23	10	41	(44)	94
	2005	5	20	31	56	(48)	21	28	12	61	(52)	117
	2006	1	17	27	45	(49)	11	31	5	47	(51)	92
Unit 6 Total	2002	22	20	29	71	(51)	24	33	12	69	(49)	140
	2003	21	28	36	85	(57)	28	23	13	64	(43)	149
	2004	11	24	41	76	(54)	28	27	11	66	(46)	142
	2005	18	29	39	86	(48)	34	39	21	94	(52)	180
	2006	8	27	40	75	(48)	31	42	9	82	(52)	157

TABLE 4 Unit 6 mountain goat harvest chronology percent by month, 2002–2006

Unit	Regulatory year	Harvest Periods						n
		August	September	October	November	December	January	
6A	2002	0	60	30	0	10	0	10
	2003	27	36	36	0	0	0	11
	2004	36	45	18	0	0	0	11
	2005	0	88	13	0	0	0	8
	2006	17	67	17	0	0	0	6
6B	2002	50	0	50	0	0	0	2
	2003	14	86	0	0	0	0	7
	2004	67	33	0	0	0	0	3
	2005	67	33	0	0	0	0	3
	2006	36	64	0	0	0	0	11
6C	2002	50	0	50	0	0	0	2
	2003	14	86	0	0	0	0	7
	2004	67	33	0	0	0	0	3
	2005	67	33	0	0	0	0	3
	2006	36	64	0	0	0	0	11
6D	2002	0	60	22	11	4	2	45
	2003	0	43	50	7	0	0	46
	2004	0	62	30	2	2	4	53
	2005	0	50	46	0	4	0	56
	2006	0	66	32	0	2	0	44
Unit 6	2002	1	46	30	13	6	4	71
Total	2003	5	36	48	5	0	7	84
	2004	8	51	30	1	3	7	76
	2005	2	42	42	7	5	1	85
	2006	7	54	26	12	1	0	74

TABLE 5 Unit 6 mountain goat harvest percent by transport method, 2002–2006

Subunit	Regulatory year	Airplane		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Unknown		Total n
		n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
6A	2002	8	(80)	0	(0)	0	(0)	0	(0)	0	(0)	2	(20)	0	(0)	10
	2003	11	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	11
	2004	9	(82)	2	(18)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	11
	2005	6	(75)	2	(25)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	8
	2006	4	(67)	1	(17)	1	(17)	0	(0)	0	(0)	0	(0)	0	(0)	6
6B	2002	2	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2
	2003	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	2004	3	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	3
	2005	2	(67)	0	(0)	0	(0)	0	(0)	1	(33)	0	(0)	0	(0)	3
	2006	10	(91)	0	(0)	1	(9)	0	(0)	0	(0)	0	(0)	0	(0)	11
6C	2002	0	(0)	5	(36)	1	(7)	0	(0)	0	(0)	8	(57)	0	(0)	14
	2003	0	(0)	1	(5)	3	(15)	0	(0)	1	(5)	15	(75)	0	(0)	20
	2004	0	(0)	0	(0)	1	(11)	0	(0)	0	(0)	7	(78)	1	(11)	9
	2005	0	(0)	1	(5)	3	(16)	0	(0)	2	(11)	12	(63)	1	(5)	19
	2006	0	(0)	2	(15)	1	(8)	0	(0)	0	(0)	10	(77)	0	(0)	13
6D	2002	19	(40)	24	(51)	2	(4)	0	(0)	0	(0)	1	(2)	1	(2)	47
	2003	19	(40)	24	(51)	0	(0)	0	(0)	0	(0)	3	(6)	1	(2)	47
	2004	23	(43)	25	(47)	2	(4)	1	(2)	0	(0)	2	(4)	0	(0)	53
	2005	17	(30)	29	(52)	1	(2)	2	(4)	0	(0)	5	(9)	2	(4)	56
	2006	21	(47)	22	(49)	2	(4)	0	(0)	0	(0)	0	(0)	0	(0)	45
Unit 6	2002	29	(40)	29	(40)	3	(4)	0	(0)	0	(0)	11	(15)	1	(1)	73
Total	2003	37	(44)	25	(29)	3	(4)	0	(0)	1	(1)	18	(21)	1	(1)	85
	2004	35	(46)	27	(36)	3	(4)	1	(1)	0	(0)	9	(12)	1	(1)	76
	2005	25	(29)	32	(37)	4	(5)	2	(2)	3	(3)	17	(20)	3	(3)	86
	2006	35	(47)	25	(33)	5	(7)	0	(0)	0	(0)	10	(13)	0	(0)	75

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## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT UNIT:** 7 and 15 (8397 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Kenai Peninsula

### **BACKGROUND**

Mountain goats inhabit the length of the Kenai Mountains. Goat populations are most abundant on the coastal mountains and least abundant in the interior portions of the Kenai Mountains where they coexist with Dall sheep. Nearly all the goat habitat on the Kenai Peninsula is within the Kenai Fjords National Park (KFNP), the Kenai National Wildlife Refuge, Chugach National Forest, or Kachemak Bay State Park. Hunting goats within the KFNP was abolished when the park was established in 1980.

### **MANAGEMENT OBJECTIVES**

To monitor population trends, maintain a low proportion of nannies in the harvest, and restrict or liberalize hunting permits and allowable harvest based on conservative assessments of minimum population size and population trends.

### **METHODS**

The Kenai Peninsula mountain goat range, excluding KFNP, is divided into individual count areas that correspond to hunt areas. There are 28 areas that have had hunts at some point during the past 5 seasons (Table 1). Since the early 1970s, ADF&G has monitored goat populations in these areas through midsummer aerial surveys (Nichols 1980). Each area is surveyed once every 3 years depending on funding availability. Surveys distinguish kids (<4 months old) from adults.

The current population of roughly 3000 goats steadily declined more than 30% from 1992 to 2006. There was a history of high harvest rates during the 1990s, which may have contributed to localized population declines. Compared to introduced populations, which often show high population growth and can sustain high harvest rates, Kenai goats have inhabited the area for centuries and need to be managed based on conservative harvest rates (Hamel et al. 2006). The protocol to determine the number of hunting permits to issue each year in each area considers past hunting success, population size and trends, the age of survey data, past harvest rates, the age structure of the harvest, the number of females taken each year and in successive years, ease

of access, and other factors (McDonough and Selinger 2008). To protect the female proportion of the population, each nanny harvested is counted as 2 goats and each male as 1 goat when determining sustainable harvest levels.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size and Composition*

The overall population has decreased more than 30% since the early 1990s. Populations in areas 331, 333, 335, 343, 355, and 356 decreased to levels that prompted managers to either close the hunts or greatly reduce the number of permits. However, some individual count areas have stable or increasing populations (Table 2). For example, the goat population in area 365 has increased about 25% since 2001 and tallied the highest count on record.

### MORTALITY

#### *Harvest*

Season and Bag Limit For the past 2 decades, goat hunting on the Kenai Peninsula has been managed by a combination of drawing and registration permit hunts. Since 2001, the drawing permit season has been 10 August–15 October and the registration permit season has been 1–30 November. The majority of the harvest opportunity is provided through drawing permits. At the end of each drawing season, hunt areas can be opened to a registration permit hunt if the area can sustain additional harvest. The number of permits issued in the registration hunts is limited to reduce the chance of overharvest. The bag limit has been 1 goat per season since 1974.

Board of Game Actions The Board eliminated the Tier II hunts (TG364 and TG365), replacing them with registration hunts (RG364 and RG365) for Alaska residents only, with 10 August–15 October season dates. Permits for these registration hunts are available only in Seldovia for RG364 and in Port Graham/Nanwalek for RG365.

Hunter Harvest During the past 5 seasons, the annual average harvest was 60 goats during the drawing season and 9 goats during the registration season (Table 3). Individual statistics for each drawing and registration hunt are shown in Table 4.

Hunter Residency and Success Each year for the past decade, less than 5% of the hunters for the drawing season have been nonresidents. The 5-year average success rate was 34% for drawing hunts and 14% for registration hunts (Table 3).

Harvest Chronology The harvest chronology for the drawing season was spread throughout the season and is a reflection of seasonal weather conditions (Table 5).

## CONCLUSIONS AND RECOMMENDATIONS

Goat populations are very vulnerable to overharvest compared to other ungulates. The harvest of even a few females from small populations can be unsustainable (Hamel et al. 2006). The taking of female goats often prevents registration hunts from opening that would have if only males

were taken. A high female harvest one year may also limit or prevent a hunt in subsequent years. We believe there may be a method to increase hunting opportunity by limiting the harvest of females.

For many years, ADF&G has attempted to educate hunters on how to distinguish males from females through handouts available at area offices and our State web site ([www.wildlife.alaska.gov/index.cfm?adfg=goathunt.main](http://www.wildlife.alaska.gov/index.cfm?adfg=goathunt.main)). In addition to these educational materials, letters are sent to each drawing permit holder that emphasize the importance of focusing hunt efforts on males. All of these efforts have failed to reduce the proportion of females in the harvest. The proportion of females in the harvest has remained around 30–40% for decades.

Even though it is difficult to successfully draw a Kenai goat permit, many residents apply each year with the hopes of hunting each year. Also, many hunters have the option to hunt most years through a registration permit. Making it illegal to take a female is too restrictive and unduly punishes honest mistakes. Managers would like to start a system on the Kenai Peninsula where hunters can choose to take a female, but it will render them ineligible to hunt for Kenai goats for a period of 3–5 years. This passive strategy may help motivate hunters to educate themselves on how to distinguish males from females. Managers believe this measure of self-regulation, along with continued educational efforts, may reduce the proportion of females in the harvest and thereby allow for greater hunting opportunity and a greater ability to maintain stable or growing populations.

Hunters who take a goat on the Kenai Peninsula are required to bring in the horns for measuring. The results of a goat horn study comparing growth on the Kenai Peninsula, a native population, with Kodiak, a relatively new population, shows that horn growth can be used as a measure of habitat quality (McDonough et al. 2006).

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TABLE 1. Number and description of hunt/count areas on the Kenai Peninsula

Area number	Unit	Area description
331	7	Resurrection Creek West
332	7	Gilpatrick Mt.
333	7	Seattle Creek
334	7	Mills Creek
335	7	Placer River West
336	7	Spencer Glacier
339	7	Grant Lake
340	7	Kings River
341	7	Cecil Rhodes Mt.
342	7	Lost Lake
343	7	Victor Creek (Andy Simmons Mts.)
344	7	Nellie Juan Lake
345	7	Whidbey Bay
346	7	Resurrection Peninsula
347	7	West Seward
352	7&15C	Brown Mt.
354	15B	Skilak Glacier
355	15B	Twin Lakes
356	15B	Indian Creek
357	15C	Tustumena Glacier
358	15C	Fox River
359	15C	Bradley Lake
360	15C	Dixon Glacier
361	15C	Halibut Cove
362	15C	Sadie Cove
363	15C	Port Dick
364	15C	Seldovia
365	15C	English Bay

TABLE 2 Mountain goat survey counts for the Kenai Peninsula (Units 7 & 15), 2003–2007

Survey Year	Area	Adults	Kids	Total Goats
2007	332	34	11	45
	333	42	10	52
	341	40	18	58
	344	59	18	77
	352	73	7	80
	354	11	5	16
	355	2	0	2
	358	24	8	32
	359	53	14	67
	360	110	30	140
	361	72	15	87
	362	84	27	111
2006	331	3	3	6
	333	24	4	28
	336	89	14	103
	337	18	3	21
	341	22	16	38
	343	33	5	38
	353	2	0	2
	354	20	4	24
	355	3	1	4
	356	8	2	10
	357	25	8	33
	365	209	51	260
2005	339	62	11	73
	346	222	44	266
	351	38	7	45
	363	122	31	153
2004	334	80	23	103
	335	18	3	21
	337	11	3	14
	338	23	6	29
	340	38	6	44
	341	26	6	32
	342	85	17	102
	343	37	6	43
	345	85	18	103
	347	87	14	101
	364	49	9	58
2003	356	20	5	25
	358	34	5	39
	361	46	15	61

TABLE 3 Harvest totals for mountain goat drawing and registration permits on the Kenai Peninsula (Units 7 & 15), 2003–2007

Permit Type	Year	Permits Issued	# Hunted	Harvest			Total	% Success
				Males	Females	Unknown		
Drawing	2003	379	195	37	20	3	60	31
	2004	383	181	30	17	0	47	26
	2005	388	201	48	27	0	75	37
	2006	362	148	34	18	0	52	35
	2007	331	164	44	20	0	64	39
Registration	2003	252	133	14	5	0	19	14
	2004	182	73	2	4	0	6	8
	2005	152	62	7	2	0	9	15
	2006	0	0	0	0	0	0	0
	2007	90	38	7	5	0	12	32

TABLE 4 Mountain goat harvest for drawing and registration permits on the Kenai Peninsula (Units 7 & 15), 2003–2007

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
331	2003	0	0	0	0	3	0	0					0		
	2004	1	1	0	2	3	3	67					0		
	2005	0	3	0	3	3	3	100					0		
	2006					0							0		
	2007					0							0		
332	2003	1	1	0	2	4	2	100					0		
	2004	0	0	0	0	4	3	0	0	0	0	0	23	12	0
	2005	1	0	0	1	4	4	25					0		
	2006	2	0	0	2	4	2	100					0		
	2007	0	2	0	2	4	4	50					0		
333	2003	0	0	0	0	22	13	0					0		
	2004	1	1	0	2	15	12	17					0		
	2005	2	0	0	2	15	11	18					0		
	2006	0	0	0	0	8	3	0					0		
	2007					0							0		
334	2003	3	2	0	5	10	8	63					0		
	2004	3	1	0	4	15	13	31					0		
	2005	2	0	0	2	15	8	25	0	0	0	0	17	11	0
	2006	4	0	0	4	15	8	50					0		
	2007	5	1	0	6	15	13	46					0		
335	2003	1	0	0	1	6	4	25	2	2	0	4	92	54	7
	2004	0	0	0	0	6	4	0					0		
	2005	1	0	0	1	6	4	25					0		
	2006	0	0	0	0	6	3	0					0		
	2007	0	0	0	0	3	3	0					0		

TABLE 4 continued

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
336	2003	1	0	0	1	25	12	8	1	0	0	1	71	29	3
	2004	0	1	0	1	30	9	11	0	0	0	0	56	19	0
	2005	2	0	0	2	30	10	20					0		
	2006	2	2	0	4	30	8	50					0		
	2007	3	1	0	4	30	10	40					0		
339	2003	3	1	0	4	15	12	33					0		
	2004	1	0	0	1	15	9	11	2	0	0	2	23	14	14
	2005	4	2	0	6	15	14	43					0		
	2006	2	3	0	5	15	12	42					0		
	2007	4	1	0	5	10	9	56					0		
340	2003	0	0	0	0	20	6	0					0		
	2004	1	0	0	1	20	4	25	0	0	0	0	0	0	0
	2005	1	0	0	1	20	4	25	0	0	0	0	11	1	0
	2006	1	0	0	1	20	4	25					0		
	2007	2	0	0	2	20	9	22					0		
341	2003	2	2	0	4	4	4	100					0		
	2004	0	0	0	0	4	3	0					0		
	2005	1	1	0	2	4	3	67					0		
	2006	0	0	0	0	2	1	0					0		
	2007	1	0	0	1	2	2	50					0		
342	2003	1	1	0	2	14	9	22					0		
	2004	3	0	0	3	15	11	27	0	0	0	0	10	4	0
	2005	1	1	0	2	15	7	29	5	1	0	6	43	25	24
	2006	1	1	0	2	15	9	22					0		
	2007	3	0	0	3	15	5	60					0		

TABLE 4 continued

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
343	2003	2	2	0	4	10	8	50					0		
	2004	0	0	0	0	10	7	0					0		
	2005	0	2	0	2	10	7	29					0		
	2006	0	0	0	0	10	3	0					0		
	2007	1	0	0	1	2	2	50					0		
344	2003	0	0	0	0	10	4	0					0		
	2004	1	1	0	2	10	3	67					0		
	2005	1	1	0	2	10	6	33					0		
	2006	0	0	0	0	10	3	0					0		
	2007	0	0	0	0	5	3	0	0	0	0	0	12	2	0
345	2003	2	1	0	3	25	8	38					0		
	2004	2	1	0	3	25	7	43	0	0	0	0	5	0	0
	2005	2	1	0	3	25	9	33	1	0	0	1	13	1	100
	2006	1	2	0	3	25	7	43					0		
	2007	2	0	0	2	25	11	18	1	0	0	1	11	4	25
346	2003	4	3	2	9	40	27	33	11	3	0	14	80	48	29
	2004	5	3	0	8	40	18	44	0	4	0	4	54	24	17
	2005	10	7	0	17	40	31	55					0		
	2006	3	4	0	7	40	19	37					0		
	2007	7	6	0	13	40	24	54					0		
347	2003	3	0	0	3	20	11	27					0		
	2004	4	2	0	6	20	9	67					0		
	2005	3	2	0	5	20	13	38					0		
	2006	3	1	0	4	20	9	44					0		
	2007	2	2	0	4	20	14	29					0		

TABLE 4 continued

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
352	2003	4	1	1	6	25	10	60	0	0	0	0	9	2	0
	2004	0	0	0	0	25	2	0	0	0	0	0	11	0	0
	2005	3	1	0	4	30	16	25	0	0	0	0	5	0	0
	2006	7	0	0	7	30	10	70					0		
	2007	0	6	0	6	30	15	40					0		
354	2003	0	0	0	0	8	1	0					0		
	2004	0	0	0	0	8	2	0					0		
	2005	0	0	0	0	8	2	0					0		
	2006	1	0	0	1	2	2	50					0		
	2007	0	0	0	0	2	1	0					0		
355	2003	1	0	0	1	4	2	50					0		
	2004	1	0	0	1	2	1	100					0		
	2005	0	0	0	0	2	2	0					0		
	2006	0	0	0	0	2	2	0					0		
	2007					0							0		
356	2003	0	0	0	0	5	1	0					0		
	2004	0	1	0	1	5	1	100					0		
	2005	1	0	0	1	5	1	100					0		
	2006	0	0	0	0	2	0	0					0		
	2007					0							0		
357	2003	0	0	0	0	5	4	0					0		
	2004	0	0	0	0	5	2	0					0		
	2005	1	0	0	1	5	2	50					0		
	2006	0	0	0	0	2	0	0					0		
	2007	0	0	0	0	2	1	0					0		

TABLE 4 continued

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
358	2003	0	0	0	0	8	1	0					0		
	2004	1	1	0	2	8	5	40					0		
	2005	0	0	0	0	8	0	0					0		
	2006	0	0	0	0	8	5	0					0		
	2007	1	0	0	1	8	3	33					0		
359	2003	0	1	0	1	10	5	20					0		
	2004	0	0	0	0	10	6	0					0		
	2005	1	0	0	1	10	4	25					0		
	2006	1	0	0	1	10	2	50					0		
	2007	0	0	0	0	10	1	0	1	0	0	1	1	1	100
360	2003	4	1	0	5	25	13	38					0		
	2004	1	0	0	1	25	15	7					0		
	2005	2	1	0	3	25	10	30					0		
	2006	1	0	0	1	25	8	13					0		
	2007	3	1	0	4	25	11	36	1	3	0	4	7	4	100
361	2003	0	1	0	1	15	9	11					0		
	2004	1	1	0	2	15	8	25					0		
	2005	2	2	0	4	15	7	57					0		
	2006	3	0	0	3	15	10	30					0		
	2007	0	0	0	0	15	3	0	0	0	0	0	12	5	0
362	2003	1	1	0	2	18	10	20					0		
	2004	1	0	0	1	18	10	10					0		
	2005	2	0	0	2	18	5	40					0		
	2006	2	3	0	5	18	9	56					0		
	2007	5	0	0	5	18	8	63					0		

TABLE 4 continued

Area	Year	Drawing Hunts							Registration Hunts						
		Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success	Billy	Nanny	Unk <sup>a</sup>	Total	permits issued	# Hunted	% Success
363	2003	4	2	0	6	30	12	50					0		
	2004	4	3	0	7	30	13	54					0		
	2005	5	3	0	8	30	18	44					0		
	2006	0	2	0	2	30	11	18					0		
	2007	5	0	0	5	30	12	42					0		
364 <sup>b</sup>	2003	1	0	0	1	14	4	25					0		
	2004	1	0	0	1	14	6	17					0		
	2005	1	1	0	2	14	10	20					0		
	2006	1	0	0	1	14	3	33					0		
	2007					0			3	0	0	3	10	8	38
365 <sup>b</sup>	2003	3	3	0	6	30	12	50					0		
	2004	3	2	0	5	30	10	50					0		
	2005	5	1	0	6	30	11	55					0		
	2006	8	1	0	9	29	16	0					0		
	2007					0			1	2	0	3	28	10	30

<sup>a</sup> Unk = Unknown

<sup>b</sup> Drawing permit totals for these areas were Tier II hunts (TG364 and TG365) which became registration hunts (RG364 and RG365) in 2007

TABLE 5 Harvest chronology (% of harvest) for mountain goat drawing permits on the Kenai Peninsula (Units 7 & 15), 2003–2007.

Year	August	September	October	Unspecified
2003	28	35	30	7
2004	13	56	31	0
2005	21	46	33	0
2006	16	50	34	0
2007 <sup>1</sup>				

<sup>1</sup>Data for 2007 were not available when this report was written.

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## **MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

### **LOCATION**

**GAME MANAGEMENT UNIT:** 8 (5097 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Kodiak and adjacent islands

### **BACKGROUND**

The mountain goat population in Unit 8 originated from 11 females and 7 males relocated from the Kenai Peninsula to the Hidden Basin area during 1952 and 1953. In 1964, 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; the number of permits available and open areas change to reflect population trends and goat movements.

From the late 1960s through 1970s, goat populations were lightly harvested, and most areas were closed to hunting to encourage colonization. Permits were allocated through the registration or drawing system with a harvest quota of up to 15 goats. During the 1980s, the population continued to increase from an estimated 150 to more than 400 animals, and new pockets of goats were observed on the southern end of the island. The permit allocation process switched from a drawing system to a registration system in 1984 and 1985; a Tier II (subsistence) area was also established in 1985. A number of emergency orders were issued during the 1985 hunting season when harvest goals were reached. Smith (1986) reported numerous inexperienced goat hunters going afield during that year, resulting in high hunter densities, less selectivity, herd shooting, and wanton waste. 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 the island, which had been closed to facilitate colonization, was open to limited hunting in 1991. A new hunt area (DG478) 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 (DG479 North Road System).

In 2000 the Federal Subsistence Regional Advisory Council (RAC) received a proposal to consider Kodiak Island goats as a "customary and traditional" resource, and to open Kodiak National Wildlife Refuge to subsistence goat hunting by registration permit. In 2002 a joint

Kodiak Fish and Game Advisory Committee–Kodiak/Aleutians RAC working group was formed to explore ways to satisfy the rural residents’ concerns while retaining state management. To determine historic harvest patterns of Kodiak mountain goats, the U.S. Fish and Wildlife Service contracted the Division of Subsistence within the Alaska Department of Fish and Game (the department; ADF&G) to investigate and submit a report to the Federal Subsistence Board (Williams 2003). In March 2003, the Board of Game approved a proposal submitted by the work group that increased the maximum number of drawing permits from 250 to 500 and established registration hunts after the drawing hunts if an allowable surplus of goats existed. This prompted the Federal Subsistence Board to forgo actions that would have created a subsistence goat hunt on refuge lands.

Nine permit hunt areas are managed by drawing and registration permits. Goat harvest quotas are established for each permit hunt area annually. Harvest quota percentages in individual permit areas ranged from 5 to 20%, depending on the productivity of goats in each area, during this report period. If harvest quota objectives were not met during the drawing permit season, registration permits were available. With help from the goat working group, we established restrictions to minimize chances of overharvest and crowded hunting conditions during the registration hunts (Van Daele 2006).

Mountain goats currently occupy all available goat habitat on the island, and there have been confirmed reports of goats as far south as Kaguyak Bay and west to Sturgeon Head. Based on data from comprehensive aerial surveys, we estimated that the goat population of Unit 8 in 2006 was 1780 goats.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Maintain a pre-hunting population of 700–1000 goats island-wide, distributed in a manner that has minimal long-term impact on their habitat.

## **METHODS**

We complete composition counts annually with fixed-wing aircraft in July and August. 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 with assistance from staff from the Kodiak National Wildlife Refuge. 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*

Cooperative survey flights with the U.S. Fish and Wildlife Service in 2005 covered approximately 90% of the goat range, yielding a total count of 1686 goats. In August 2006, we surveyed about 35% of the goat range and classified 577 goats. Surveys indicate a stable goat

population on the northern and central portion of the island and an increasing population trend on the southern portion of the island. The estimated island-wide population in 2006 was 1780 goats, with most of the suitable habitat being used.

### *Population Composition*

During the past 5 years, the kid:adult ratio ranged from a high of 27:100 in 2002 to a low of 22:100 in 2006 ( $\bar{x} = 23.8$ )(Table 1). We did not collect 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 radiotelemetry or other movement studies have been conducted on Kodiak goats. Research in other areas suggests that male dispersal may be driven by competition for females, but female dispersal may be a response to 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, at least in small numbers, in most of the suitable habitats on Kodiak Island.

## **MORTALITY**

### *Harvest*

**Season and Bag Limits.** Goat hunting season for resident and nonresident hunters was open 20 August–25 October by drawing permit. In 2006–07, there were 9 permit hunt areas with a total of 498 permits issued (Table 2). A registration hunt 1 November–15 December following the drawing permit hunt was initiated in 2003–04 and restricted to Alaska residents only (Table 3). In 2006–07 seven permit hunt areas were open for registration hunts, with a total of 133 permits issued. The bag limit was 1 goat (either sex) for all areas.

Estimated age (horn ring) data was obtained from hunters on their report cards (1994–2000, 2004–2006) and from mandatory horn inspections by department staff (1993, 2001–2003). The mean age of goats harvested during this reporting period was 4.6 years for males and 5.0 years for females (Table 4).

**Game Board Actions and Emergency Orders.** During its March 2003 meeting, the Board of Game adopted a proposal from the Kodiak Advisory Committee and the Kodiak-Aleutians Regional Advisory Committee to increase the maximum number of goat drawing permits from 250 to 500. Within the same proposal, mountain goat registration hunts were created for all of the 9 hunt areas to provide additional harvest opportunity. The drawing hunt season dates were changed from 1 September–20 October to 25 August–25 October to allow a week to tally goat harvest prior to the opening of the registration hunt.

We issued emergency orders to close registration permit hunts RG473 and RG479 on 26 October 2006, prior to the scheduled registration hunt opening. Starting in the 2006–07 season, we increased the number of permits available in DG473 from 8 to 10, in DG474 from 15 to 20, in

DG475 from 90 to 180, in DG477 from 60 to 110, and in DG479 from 15 to 50, due to increasing goat populations in those areas.

**Permit Hunts.** All goat hunting in the unit was by either drawing or registration permit during this report period. Drawing permit numbers ranged from 340 to 498, while hunters afield ranged from 206 to 283, yielding a 5-year average of 59% of permittees participating in the hunt (Table 2). The number of registration permits issued ranged from 133 to 175. Hunters afield ranged from 45 to 58, with an average of 34% of permittees participating in these hunts (Table 3).

**Hunter Residency and Success.** Annual hunter success ranged 55–68% during this reporting period, with a 5-year mean of 63% (Table 5). Nonresidents have been the most successful hunters over the past 5 years (79%), followed by local (65%) and nonlocal (56%) residents.

**Harvest Chronology.** During most years, October was the preferred month for Unit 8 goat hunters (Table 6). Weather patterns, which affect hunter success and influence when hunters go into the field, largely determined the chronology of harvest.

**Transport Methods.** Aircraft (54%) were the predominant transportation method used by hunters from 2002–03 to 2006–05 (Table 7). Highway vehicles (20%) and off-road vehicles (12%) are becoming more popular as the number of permits increases along the road system near the city of Kodiak.

#### *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. We suspect the low production of kids in some years is caused by severe winter weather, but it is unknown whether early postnatal mortality of kids or low initial productivity occurred. The severe winter of 1998–99 yielded reports of a few winter-killed goats that were found along beaches 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 enhanced access into goat habitat in northern Kodiak Island, but overall it 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 the population is probably near the carrying capacity of the habitat in the northcentral 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 maritime environments, where precipitation at lower elevations may occur as either rain or snow. In studying goats on northern Kodiak Island, Hjeljord (1973) observed goats 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 affect goats on Kodiak during winters with high snowfall.

In recent years winter recreation activities have proliferated around Kodiak Island. Snowmachines are more abundant and efficient, and the sport of heli-skiing 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 the city of Kodiak 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.

#### **NON-REGULATORY MANAGEMENT PROBLEMS**

Fixed-winged aircraft seem to have little direct impact on the goats, but helicopters typically solicit flight responses from both individuals and groups. In April of 2002, a memorandum of agreement involving ADF&G, the U.S Fish and Wildlife Service, and U.S. Coast Guard regarding flight operations over Kodiak was finalized. This agreement has spurred further cooperation between the Coast Guard and ADF&G to minimize mountain goat disturbances from helicopter flight operations, and department staff participates in annual presentations to air crews at the U.S. Coast Guard base in Kodiak.

Increased fuel costs, coupled with expanding goat numbers and range, are dramatically increasing the cost of conducting aerial surveys. U.S. Fish and Wildlife Service has assisted us in recent years by providing aircraft and observers, allowing continuation of historic survey techniques.

#### **CONCLUSIONS AND RECOMMENDATIONS**

The goat population was stable in northern and central Kodiak and increasing on the southern end of the island. Based on the comprehensive aerial surveys of goat habitat in Unit 8, we estimated a total of 1780 goats. During this reporting period, goat harvest continued to increase due to more drawing permits and the addition of registration permits. The drawing permit hunter success remained above 55%. Registration permit hunter success was lower (28%) due to hunters obtaining multiple permits, harsh winter weather, archery-only hunt areas, and permit access restrictions.

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 many areas continue to increase. We are 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. The addition of late season registration hunts has enhanced our ability to increase hunter opportunity and stabilize goat numbers, but we must consider other alternatives if these measures are insufficient. 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:

- Develop sampling techniques that will allow population trend monitoring without relying on annual total counts of all goat habitat.
- Consider a radiotelemetry study to investigate goat movements and critical winter ranges.
- Evaluate applicability of current goat hunt boundaries and develop harvest rates that will maintain habitat quality while preserving hunting opportunities.
- Work closely with staff from Kodiak National Wildlife Refuge to initiate research into goat habitat and the impacts of goats on that habitat.
- Work with hunters and nonconsumptive users to explore methods of establishing areas where goats can regularly be seen from the Kodiak road system.

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TABLE 1 Unit 8 aerial summer mountain goat composition counts and estimated population size within permit hunt areas, 2002–2003 through 2006–07

Hunt Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/hour	Estimated population size
All permit hunt areas	2002–03	762 (79)	203 (21)	27	965	116.0	1400
	2003–04	633 (81)	148 (19)	23	781	78	1460
	2004–05	519 (81)	125 (19)	24	644	132	1560
	2005–06	1367 (81)	319 (19)	23	1686	85	1900
	2006–07	472 (82)	105 (18)	22	577	125	1780
DG/RG 471	2002–03	130 (77)	39 (23)	30	169	--	170
Wild Creek	2003–04	160 (78)	44 (22)	28	204	219	210
Center Mtn	2004–05	158 (84)	31 (16)	20	189	195	200
	2005–06	145 (81)	35 (19)	24	180	168	190
	2006–07	103 (86)	17 (14)	17	120		140
DG/RG 472	2002–03	50 (76)	16 (24)	32	66	--	70
Crown Mtn	2003–04	21 (95)	1 (5)	5	22	--	30
	2004–05	--	--	--	--	--	50
	2005–06	21 (84)	4 (16)	19	25	--	30
	2006–07	31 (79)	8 (21)	26	39	--	40

TABLE 1 continued

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/hour	Estimated population size
DG/RG 473	2002–03 <sup>a</sup>	60 (82)	13 (18)	22	73	--	80–100
Hidden Basin	2003–04	44 (81)	10 (19)	23	54	74	100
Terror Lake	2004–05	81 (87)	12 (13)	15	93	48	60
	2005–06	39 (80)	10 (20)	26	49		50
	2006–07	30 (86)	5 (14)	17	35		60
DG/RG 474	2002–03 <sup>a</sup>	110 (84)	21 (16)	19	131	76	140
Uganik River	2003–04	102 (87)	15 (13)	15	117	--	120
	2004–05	--	--	--	--	--	120
	2005–06 <sup>a</sup>	91 (81)	22 (19)	24	113	72	140
	2006–07	--	--	--	--	--	130
DG/RG 475	2002–03	--	--	--	--	--	300
Zachar River	2003–04	--	--	--	--	--	300
	2004–05	--	--	--	--	--	300
	2005–06	438 (81)	104 (19)	24	542	108	550
	2006–07	--	--	--	--	--	500
DG/RG 476	2002–03	95 (81)	23 (19)	24	118	--	120–140
Kiliuda Bay	2003–04 <sup>a</sup>	74 (86)	12 (14)	16	86	--	120
	2004–05	--	--	--	--	--	120
	2005–06	--	--	--	--	--	120
	2006–07	--	--	--	--	--	120

TABLE 1 continued

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/hour	Estimated population size
DG/RG 477	2002–03 <sup>a</sup>	43 (75)	14 (25)	33	57	--	250
Southwest	2003–04	--	--	--	--	--	250
Kodiak	2004–05	--	--	--	--	--	300
	2005–06 <sup>a</sup>	302 (84)	59 (16)	20	361	97	400
	2006–07	--	--	--	--	--	400
DG/RG 478	2002–03	203 (78)	58 (22)	29	261	--	261
South Road	2003–04	175 (79)	47 (21)	27	222	161	230
System	2004–05	186 (76)	58 (24)	31	244	134	250
	2005–06	174 (79)	46 (21)	26	220	144	230
	2006–07	170 (77)	51 (23)	30	221	149	225
DG/RG 479	2002–03	70 (79)	19 (21)	27	89	--	90–100
North Road	2003–04 <sup>a</sup>	57 (75)	19 (25)	33	76	--	100
System	2004–05	94 (80)	24 (20)	26	118	--	120
	2005–06	157 (80)	39 (20)	25	196	--	200
	2006–07	138 (85)	24 (15)	17	162	--	165

<sup>a</sup> Partial survey

TABLE 2 Unit 8 mountain goat harvest data by drawing permit hunt, 2002–03 through 2006–07

Hunt Area	Regulatory Year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
All drawing permit hunts	2002–03 <sup>a</sup>	230	39	33	67	61 (66)	32 (34)	0	1	94
	2003–04 <sup>b</sup>	337	44	39	61	67 (60)	45 (40)	0	3	115
	2004–05 <sup>b</sup>	338	39	34	66	88 (67)	43 (33)	1	1	133
	2005–06 <sup>b</sup>	340	38	33	67	84 (60)	55 (40)	0	0	139
	2006–07 <sup>b</sup>	498	43	45	55	95 (62)	59 (38)	1	0	155
DG 471 Wild Creek-Center Mountain	2002–03 <sup>a</sup>	35	40	33	67	9 (64)	5 (36)	0	0	14
	2003–04 <sup>b</sup>	40	49	53	47	7 (78)	2 (22)	0	0	9
	2004–05 <sup>b</sup>	40	42	45	55	6 (50)	6 (50)	0	0	12
	2005–06 <sup>b</sup>	40	58	45	65	6 (55)	5 (45)	0	0	11
	2006–07 <sup>b</sup>	40	38	52	48	7 (58)	5 (42)	0	0	12
122 DG 472 Crown Mtn	2002–01 <sup>a</sup>	10	90	0	100	0 (--)	1 (100)	0	0	1
	2003–04 <sup>b</sup>	10	40	33	67	2 (50)	2 (50)	0	0	4
	2004–05 <sup>b</sup>	10	60	25	75	3 (100)	0 (--)	0	0	3
	2005–06 <sup>b</sup>	12	58	20	80	2 (50)	2 (50)	0	0	4
	2006–07 <sup>b</sup>	10	60	25	75	3 (100)	0	0	0	3
DG 473 Hidden Basin-E. Terror Lake	2002–03 <sup>a</sup>	8	40	17	83	3 (60)	2 (40)	0	0	5
	2003–04 <sup>b</sup>	8	57	67	33	1 (100)	0 (--)	0	0	1
	2004–05 <sup>b</sup>	8	0	38	62	3 (60)	2 (40)	0	0	5
	2005–06 <sup>b</sup>	8	50	0	100	2 (50)	2 (50)	0	0	4
	2006–07 <sup>b</sup>	10	40	0	100	4 (67)	2 (33)	0	0	6
DG 474 Uganik River	2002–03 <sup>a</sup>	15	36	22	78	3 (43)	4 (57)	0	0	7
	2003–04 <sup>b</sup>	14	14	33	67	7 (88)	1 (12)	0	1	9
	2004–05 <sup>b</sup>	15	33	30	70	6 (86)	1 (14)	0	0	7
	2005–06 <sup>b</sup>	15	27	9	91	8 (80)	2 (20)	0	0	10
	2006–07 <sup>b</sup>	20	40	25	75	8 (89)	1 (11)	0	0	9

TABLE 2 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Percent		Unknown	Illegal	Total harvest
						Males (%)	Female (%)			
DG 475	2002–03 <sup>a</sup>	60	43	47	53	13 (72)	5 (28)	0	0	18
Zachar River	2003–04 <sup>b</sup>	90	70	50	50	8 (62)	5 (38)	0	0	13
	2004–05 <sup>b</sup>	90	51	49	51	17 (77)	5 (23)	0	0	22
	2005–06 <sup>b</sup>	90	44	50	50	11 (46)	13 (54)	0	0	24
	2006–07 <sup>b</sup>	179	47	59	41	21 (55)	17 (45)	0	0	38
DG 476	2002–03 <sup>a</sup>	20	50	50	50	4 (80)	1 (20)	0	0	5
Kiliuda Bay	2003–04 <sup>b</sup>	20	55	56	44	2 (50)	2 (50)	0	0	4
	2004–05 <sup>b</sup>	20	63	43	57	4 (100)	0 (–)	0	0	4
	2005–06 <sup>b</sup>	20	50	33	67	5 (83)	1 (17)	0	0	6
	2006–07 <sup>b</sup>	20	50	60	40	1 (25)	3 (75)	0	0	4
DG 477	2002–03 <sup>a</sup>	40	44	23	77	11 (69)	5 (31)	0	1	17
Deadman Bay	2003–04 <sup>b</sup>	60	36	27	73	19 (70)	8 (30)	0	0	27
	2004–05 <sup>b</sup>	60	52	14	86	20 (83)	4 (17)	0	0	24
	2005–06 <sup>b</sup>	60	40	31	69	13 (52)	12 (48)	0	0	25
	2006–07 <sup>b</sup>	110	46	44	56	21 (64)	12 (36)	0	0	33
DG 478	2002–03 <sup>a</sup>	30	10	26	74	14 (70)	6 (30)	0	0	20
South Road System	2003–04 <sup>b</sup>	80	27	36	64	17 (46)	20 (54)	0	2	39
	2004–05 <sup>b</sup>	80	14	29	71	24 (52)	22 (48)	1	1	48
	2005–06 <sup>b</sup>	80	21	31	69	29 (69)	13 (31)	0	0	42
	2006–07 <sup>b</sup>	59	29	37	63	15 (58)	11 (42)	0	0	26
DG 479	2002–03 <sup>a</sup>	10	11	25	75	4 (67)	2 (33)	0	0	6
North Road System	2003–04 <sup>b</sup>	15	13	31	69	4 (44)	5 (56)	0	0	9
	2004–05 <sup>b</sup>	15	13	38	62	5 (63)	3 (37)	0	0	8
	2005–06 <sup>b</sup>	15	0	13	87	8 (62)	5 (38)	0	0	13
	2006–07 <sup>b</sup>	50	34	30	70	15 (65)	8 (35)	0	0	24

<sup>a</sup> Season Dates: 1 September–31 October<sup>b</sup> Season Dates: 20 August–25 October

TABLE 3 Unit 8 mountain goat harvest data by registration permit hunt, 2002–03 through 2006–07

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Percent			Illegal	Total harvest
						Males (%)	Female (%)	Unknown		
All registration permit hunts	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003–04	111	51	54	48	17 (65)	9 (35)	0	0	26
	2004–05	127	51	74	26	11 (69)	5 (31)	0	0	16
	2005–06	175	66	83	17	6 (60)	4 (40)	0	0	10
	2006–07	133	66	62	38	9 (53)	8 (47)	0	0	17
RG471	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003–04	14	36	78	22	1 (50)	1 (50)	0	0	2
	2004–05	12	75	100	0	0	0	0	0	0
	2005–06	16	81	100	0	0	0	0	0	0
	2006–07	7	100	0	0	0	0	0	0	0
RG472	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003–04 <sup>b</sup>	0	0	0	0	0	0	0	0	0
	2004–05	6	67	50	50	1 (100)	0	0	0	1
	2005–06	8	100	0	0	0	0	0	0	0
	2006–07	3	0	0	0	0	0	0	0	0
RG473	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003–04	6	100	0	0	0	0	0	0	0
	2004–05	10	80	100	0	0	0	0	0	0
	2005–06	10	80	100	0	0	0	0	0	0
	2006–07 <sup>c</sup>	0	0	0	0	0	0	0	0	0
RG474	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003–04	0	0	0	0	0	0	0	0	0
	2004–05	1	100	0	0	0	0	0	0	0
	2005–06	0	0	0	0	0	0	0	0	0
	2006–07	1	0	100	0	0	0	0	0	0

RG475	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003-04	22	43	58	42	4 (80)	1 (20)	0	0	5
	2004-05	21	38	77	23	3 (100)	0	0	0	3
	2005-06	19	88	50	50	1 (100)	0	0	0	1
	2006-07	10	100	0	0	0	0	0	0	0
RG476	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003-04	18	72	40	60	0	3 (100)	0	0	3
	2004-05	15	67	80	20	1 (100)	0	0	0	1
	2005-06	10	80	50	50	1 (100)	0	0	0	1
	2006-07	25	88	100	0	0	0	0	0	0
RG477	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003-04	25	60	30	70	5 (71)	2 (29)	0	0	7
	2004-05	27	27	63	37	4 (57)	3 (43)	0	0	7
	2005-06	30	62	55	45	2 (40)	3 (60)	0	0	5
	2006-07	40	55	50	50	6 (67)	3 (33)	0	0	9
RG478	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003-04	26	31	50	50	7 (78)	2 (22)	0	0	9
	2004-05	22	59	100	0	0	0	0	0	0
	2005-06	42	60	94	6	0	1 (100)	0	0	1
	2006-07	47	51	65	45	3 (38)	5 (62)	0	0	8
RG479	2002-03 <sup>a</sup>	--	--	--	--	--	--	--	--	--
	2003-04 <sup>b</sup>	0	0	0	0	0	0	0	0	0
	2004-05	13	31	56	44	2 (50)	2 (50)	0	0	4
	2005-06	40	48	90	10	2 (100)	0	0	0	2
	2006-07 <sup>c</sup>	0	0	0	0	0	0	0	0	0

<sup>a</sup> Registration hunts were initiated in 2003-04

<sup>b</sup> Hunting areas RG472 and RG479 closed by emergency order 31 October 2003

<sup>c</sup> Hunting areas RG473 and RG479 closed by emergency order 26 October 2006

TABLE 4 Unit 8 mountain goat harvest mean age data from horn rings, 1993–94 through 2006–07

Regulatory Year	Males	(n)	Females	(n)
1993–94 <sup>a</sup>	3.8	(31)	3.7	(16)
1994–95 <sup>b</sup>	4.7	(21)	5.7	(19)
1995–96 <sup>b</sup>	5.9	(18)	6.7	(7)
1996–97 <sup>b</sup>	5.2	(17)	6.2	(9)
1997–98 <sup>b</sup>	5.5	(42)	5.6	(12)
1998–99 <sup>b</sup>	5.3	(40)	5.5	(14)
1999–2000 <sup>b</sup>	4.5	(36)	4.6	(14)
2000–01 <sup>a</sup>	4.0	(24)	4.5	(15)
2001–02 <sup>a</sup>	4.1	(52)	5.3	(15)
2002–03 <sup>b</sup>	3.9	(57)	5.0	(29)
2003–04 <sup>b</sup>	4.4	(52)	4.9	(31)
2004–05 <sup>b</sup>	4.5	(76)	4.9	(30)
2005–06 <sup>b</sup>	4.6	(52)	5.7	(32)
2006–07 <sup>b</sup>	4.6	(68)	4.5	(38)

<sup>a</sup> Horn inspections required

<sup>b</sup> Hunters report goat age with report card

TABLE 5 Residence and success of hunters participating in Unit 8 mountain goat drawing hunts, 2002–03 through 2006–07

Regulatory year	Successful					Unsuccessful					Total hunters
	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	
2002–03	56	31	6	93	(67)	28	15	2	45	(33)	138
2003–04	58	44	11	113	(61)	33	31	8	72	(39)	185
2004–05	67	48	17	132	(66)	38	29	2	69	(34)	201
2005–06	59	65	15	139	(68)	20	43	2	65	(32)	204
2006–07	41	74	39	154	(55)	35	84	9	128	(45)	282

TABLE 6 Unit 8 mountain goat harvest chronology percent by time period, 2002–03 through 2006–07

Area	Regulatory year	Harvest periods					n
		Aug	Sep	Oct	Nov	Dec	
All	2002–03		49	51			93
permit hunts	2003–04 <sup>a</sup>	11	31	39	14	5	136
	2004–05	9	30	50	4	7	148
	2005–06	12	34	48	3	3	147
	2006–07	11	32	47	6	4	170

<sup>a</sup> Drawing hunt season changed and registration hunt established

TABLE 7 Unit 8 mountain goat hunter transport method (percent in parentheses), 2002–03 through 2006–07

Regulatory year	Transportation method							Total
	Aircraft	Boat	3 or 4 Wheeler	ORV	Highway vehicle	Snow- machine	Unknown	
2002–03	78 (59)	18 (13)	12 (9)	4 (3)	15 (11)	0 (--)	6 (5)	133
2003–04	85 (47)	17 (10)	24 (13)	8 (4)	43 (24)	0 (--)	4 (2)	181
2004–05	96 (48)	15 (8)	26 (13)	4 (2)	56 (28)	0 (--)	3 (1)	200
2005–06	109 (53)	10 (5)	31 (15)	4 (2)	35 (17)	0 (--)	15 (8)	204
2006–07	173 (61)	20 (7)	25 (9)	4 (>1)	51 (18)	0 (--)	9 (3)	282

**WILDLIFE  
MANAGEMENT REPORT**

**Alaska Department of Fish and Game  
Division of Wildlife Conservation**

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**MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

**LOCATION**

**GAME MANAGEMENT UNIT:** 11 (12,784 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Wrangell Mountains

**BACKGROUND**

Hunters have harvested mountain goats in Unit 11 for many years, but harvest data for goats were not collected until 1972. The reported average take between 1972 and 1974 was 49 goats. The season length and bag limit were reduced in the mid 1970s because of an increase in hunting pressure and harvest. Between 1975 and 1979 an average of 22 goats were taken yearly. Hunts have been administered via registration permits since 1980 on state, private, and preserve lands. The average reported harvest under the permit hunt between 1980 and 2000 was 16 goats. A subsistence goat registration hunt for local residents in the Wrangell–St. Elias National Park and Preserve is administered by the National Park Service (NPS).

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, though only periodically in conjunction with sheep counts.

**MANAGEMENT DIRECTION**

**MANAGEMENT OBJECTIVES**

Maintain an annual harvest of up to 10% of the estimated goat population.

**METHODS**

Department personnel conduct aerial surveys to determine sex and age composition and population trends on MacColl Ridge, located north of the Chitina River in the southeastern portion of Unit 11. Additional 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 2007 MacColl Ridge survey counted 69 goats (Table 1). The number is down 7% from the record high of 74 in 1999. The current count is slightly above the long-term average count of 57. Count fluctuations between years may reflect the difficulty of surveying mountain goat populations.

An estimated 700 goats inhabit the southern Wrangell and Chugach Mountains in Unit 11. This 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. This estimate has not been updated because goat counts over much of the unit have not been repeated due to budget constraints. Although the MacColl Ridge trend count area has shown no indication of population decline, declines are suspected in some areas and the overall population may be below this estimate.

#### *Population Composition*

The 2007 count of 20 kids was the highest number ever observed on the MacColl Ridge count area. The resulting ratio was 41 kids:100 adults (Table 1). The number of kids observed over the last six years has averaged 14 (Range = 12–20) per year. Recruitment has fluctuated yearly, but on average it is quite high and has been more than adequate to maintain the population and provide an annual harvest.

#### *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 movement is limited, and major rutting and kidding areas are unknown. Field observations indicate seasonal altitudinal movements; goats often use lower elevations during the 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 state season for resident and nonresident hunters was 1 September–30 November; the bag limit was one goat by registration permit only (RG580). Hunters killed 12 goats during the 2005 season, and 6 in 2006. The average yearly take since 1980 has been 16 goats (range = 4–30). The 2005 harvest comprised 11 (92%) billies and 1 nanny, while 6 (100%) billies were reported in 2006. Males composed 70% or more of the harvest during 6 of the last 7 years (Table 2). High male harvest is attributable to the selection of

larger trophy animals, especially by nonresidents on guided hunts. The federal harvest has averaged 2 goats (range = 1–3) a year since 2000 (Table 2).

**Board of Game Actions and Emergency Orders.** In 1980 the Board of Game established the Unit 11 goat hunt as a registration permit hunt. This action was necessary because much of the unit was included in Wrangell–St. Elias National Park and Preserve, concentrating hunting pressure for goats on preserve lands. Only subsistence hunting by local rural residents was allowed on “hard park” lands due to NPS rules. 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 goat hunters.

**Federal Subsistence Seasons and Bag Limits.** In 1990 the federal government assumed management of subsistence hunting on all federal lands. At that time, the Federal Subsistence Board determined no subsistence hunting of mountain goats was occurring in Unit 11 and subsequently closed the “hard park” to subsistence mountain goat hunting by local rural residents. In 1998 the NPS determined there was a subsistence use of mountain goats by local rural residents in the park. A 25 August–31 December season was established. Hunting was controlled by registration permit issued by the NPS to residents of designated rural subsistence communities. The bag limit was 1 goat, and a combined harvest quota of 45 mountain goats was set for the state and federal hunts.

**Hunter Residency and Success.** There were 35 state registration hunt (RG 580) permits issued and 37 federal (FG 110) permits in 2006. Since the registration hunt started in 1980, the number of state permits peaked in 1986 with 97 issued but has averaged 48 (range = 35–56) over the past 10 years. The number of federal permits has increased from only 3 the first year of the hunt (1998) to 41 in 2005 (Table 2). The success rate was 33% for state hunters and 17% for federal hunters in 2006, and 36% and 19% respectively in 2005. The high success rate in 2005 was due to an increase in nonresident hunters. Guided nonresidents have a higher success rate than residents. Successful state hunters reported spending 2.6 days in the field in 2005 but only 1.7 in 2006. Unsuccessful hunters reported 3.5 and 2.4 days hunting, respectively. Usually the hunting effort reported by Unit 11 goat hunters changes little each year, averaging 3–5 days of hunting per hunter. In the state registration hunt, nonresident hunters took 83% of the goats harvested in 2005 and 100% in 2006 (Table 3). The nonresident take has fluctuated between 33 and 100% of the total state harvest over the last 10 years. Local residents are hunting under the federal permit and have not taken a goat since 2001 in the state hunt.

**Harvest Chronology.** In both 2005 and 2006, 67% of the state harvest occurred during the initial 3 weeks of the season (Table 4). This is similar to the harvest pattern over the last 10 years. The high harvests in the first 3 weeks of September are attributed to hunters combining sheep and goat hunts.

**Transport Methods.** The majority of successful goat hunters used aircraft. Highway vehicles, boats, and 4-wheelers also were reported as methods of transportation. Transportation methods 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 4-wheelers, highway vehicles and walking.

### *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, but predation rates have not been determined.

## **HABITAT**

### *Assessment*

The Wrangell Mountains and northwestern portion of the Chugach Mountains are part of the northernmost extension of mountain goat range in Alaska. Goat habitat is limited. A substantial number of goats live north of the Chitina River, from 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 increased the last 2 years, and current counts remain among the highest observed. Kid production and/or survival increased during the last 2 years of this reporting period, with the 2007 count being 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 goats observed on MacColl Ridge reflect actual population fluctuations or survey variables. MacColl Ridge is isolated for the most part, so movement is not considered a major problem. 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 past hunting pressure has been greater than in recent times. NPS and Federal Subsistence Board hunting regulations now restrict nonsubsistence goat hunting to the national preserve lands around McCarthy, MacColl Ridge, and Hawkins and Barnard glaciers. MacColl Ridge receives some of the heaviest hunting pressure in the unit, especially for guided hunts, and accounts for the most goats taken. However, during this report period, harvests were not concentrated enough in any one area, including MacColl Ridge, to result in localized overharvests. One benefit to having the Unit 11 goat harvest concentrated on federal lands is the exclusive guide use system still employed there. One guide has a much better chance to minimize overhunting if no other guides are competing for the same animals.

The federal subsistence hunt in the hard park should not present a management problem for the state hunt because hunters participating in the state hunt are limited to preserve lands. The new federal subsistence hunt allows hunting of mountain goats in portions of Unit 11 that have been protected for more than a decade. Harvests are expected to be low under the federal hunt because the number of individuals eligible for subsistence permits is very low. Hunt areas are, for the

most part, very remote, and federal regulations prohibiting the use of aircraft for subsistence hunting greatly limit access.

Goat harvest rates 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 Barnard 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 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. To date, such a high harvest has not occurred, and there have been no emergency closures. Timely emergency closures will be difficult because most of the harvest takes place during a short period of time 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 recommend regulation changes to reduce the harvest. I also recommend conducting goat counts in other count areas. Incidental sightings suggest goat numbers may have declined in western portions of the Chitina Valley.

**PREPARED BY:**

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**SUBMITTED BY:**

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Please cite any information taken from this section, and reference as:

TOBEY, R.W. 2008. Unit 11 mountain goat management report. Pages 130–138 in P. Harper, editor. Mountain goat management report of survey and inventory activities 1 July 2005–30 June 2007. Alaska Department of Fish and Game. Project 12.0. Juneau, Alaska.

TABLE 1 Unit 11 MacColl Ridge trend count area mountain goat composition counts and estimated population size, 2000–2007

Area	Regulatory Year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size <sup>a</sup>
MacColl Ridge	2000–2001	46 (77)	14 (23)	0	30	60	60
	2001–2002	55 (86)	9 (14)	0	16	64	64
	2002–2003	42 (78)	12 (22)	0	29	54	54
	2003–2004	48 (79)	13 (21)	0	27	61	61
	2004–2005	37 (74)	13 (26)	0	35	50	50
	2005–2006	49 (83)	10 (17)	0	20	59	59
	2006–2007	55 (77)	16 (23)	0	29	71	71
	2007–2008	49 (71)	20 (29)	0	41	69	69

<sup>a</sup> Estimate considered to be total count because all goat habitat on ridge counted.

TABLE 2 Unit 11 mountain goat harvest data by permit hunt, 2000–2007

Hunt nr /area	Regulatory Year	Permits issued	Percent <sup>a</sup>	Percent <sup>b</sup>	Percent <sup>b</sup>	Males (%)	Females (%)	Unk.	Illegal	Total harvest
			did not hunt	unsuccessful hunters	successful Hunters					
RG580	2000–2001	39	54	67	33	6 (100)	0	0	0	6
RG580	2001–2002	54	40	65	35	4 (36)	7 (64)	0	0	11
RG580	2002–2003	50	44	86	14	3 (75)	1 (25)	0	0	4
RG580	2003–2004	54	44	67	33	7 (70)	3 (30)	0	0	10
RG580	2004–2005	56	55	75	25	5 (83)	1 (17)	0	0	6
RG580	2005-2006	44	25	64	36	11(92)	1(8)	0	0	12
RG580	2006-2007	35	49	67	33	6(100)	0	0	0	6
FG110	2000–2001	20	70	60	40	1 (50)	1 (50)	0	0	2
FG110	2001–2002	27	50	91	9	1 (100)	0	0	0	1
FG110	2002–2003	28	40	75	25	3 (100)	0	0	0	3
FG110	2003–2004	33	61	69	31	3 (100)	0	0	0	3
FG110	2004–2005	39	58	80	20	3 (100)	0	0	0	3
FG110	2005-2006	41	54	81	19	0	3(100)	0	0	3
FG110	2006-2007	37	46	83	17	2(100)	0	0	0	2

<sup>a</sup> Percent of total permittees returning hunter reports

<sup>b</sup> Percent of total permittees reporting hunted

TABLE 3 Unit 11 RG580 mountain goat hunter residency and success, 2000–2007

Regulatory year	Successful				Unsuccessful				Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total (%)	Local <sup>a</sup> resident	Nonlocal resident	Non-resident	Total (%)	
2000–2001	0	2	4	6 (33)	2	7	3	12 (67)	18
2001–2002	2	3	6	11 (35)	4	12	4	20 (65)	31
2002–2003	0	1	3	4 (14)	3	18	3	24 (86)	28
2003–2004	0	5	5	10 (33)	2	15	3	20 (67)	30
2004–2005	0	4	2	6 (25)	2	11	5	18 (75)	24
2005–2006	0	2	10	12 (36)	1	15	5	21 (64)	33
2006–2007	0	0	6	6 (33)	0	11	1	12 (67)	18

<sup>a</sup> Local resident means resident of Unit 11, 13, or that portion of Unit 12 along the Nabesna Road.

TABLE 4 Unit 11 RG580 mountain goat harvest chronology percent<sup>a</sup> by time period, 2000–2007

Regulatory year	September				October					n
	1–7	8–15	16–23	24–30	1–7	8–15	16–23	24–31	1–30	
2000–2001	33	33	17	17	--	--	--	--	--	6
2001–2002	9	45	27	9	--	--	--	9	--	11
2002–2003	50	--	50	--	--	--	--	--	--	4
2003–2004	20	20	20	20	10	--	10	--	--	10
2004–2005	17	50	--	--	--	--	33	--	--	6
2005–2006	8	17	42	--	--	25	--	--	8	13
2006–2007	0	50	17	--	--	--	33	--	--	6

<sup>a</sup>Totals of the percentages for each year may be greater or less than 100% due to rounding

Table 5 Unit 11 RG580 mountain goat harvest percent by transport method, 2000–2007

Regulatory year	Percent of harvest							n
	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
2000–2001	100	--	--	--	--	--	--	6
2001–2002	82	--	--	--	--	18	--	11
2002–2003	50	25	--	--	--	25	--	4
2003–2004	90	--	10	--	--	--	--	10
2004–2005	67	33	--	--	--	--	--	6
2005–2006	83	17	--	--	--	--	--	12
2006–2007	100	0	--	--	--	--	--	6

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**MOUNTAIN GOAT MANAGEMENT REPORT**

From: 1 July 2005

To: 30 June 2007

**LOCATION**

**GAME MANAGEMENT UNIT:** 13D and 14 (12,370 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Talkeetna Mountains and western Chugach Mountains

**BACKGROUND**

During the 1990s, the goat population in the western Chugach Mountains (Units 13D, 14A, and 14C) 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. Since 1999, partial surveys have been conducted incidental to sheep surveys in Unit 14C. No surveys were conducted in Unit 14C in 2004 or 2005; however, in 2006 a complete survey of the Twentymile River drainage was conducted, and additional goats were counted during a partial sheep survey. Due to infrequent surveys, poor survey conditions and incomplete surveys over the past decade, it is difficult to ascertain any population trends for goats in Unit 14C. However, there is anecdotal evidence suggesting goats in Unit 14C may be expanding their range. The goat population in the Talkeetna Mountains (Unit 14A and 14B) remains chronically low, but may be increasing slightly.

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 hunting season (10 August–31 December) and a 2-goat bag limit. In 1967 the bag limit for Unit 14 was lowered to 1 goat; however, hunters in Subunit 13D could harvest 2 goats until 1975. In the 1970s the hunting season in Unit 14 began in early August or September and ran until 15 November. In the early 1980s goat hunting in the western Chugach Mountains was at its most restricted, with only 50 or 100 drawing permits issued. Since 1984 most hunting in Unit 14 has been by registration permit. In 1987 Subunit 13D opened to 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 Subunit 14A north of the Matanuska River, goat hunting has been closed since 1986. The season for goats in Subunit 14B has been closed since 1990 (by emergency orders in 1990 and 1991).

Most of Subunit 14C was closed to goat hunting in 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 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

Subunit 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 (Subunit 14C) continue to increase. The Chugach National Forest receives more permit requests every year for motorized winter activities that have the potential to impact winter goat habitat. One of the most prevalent permitted winter activities is heli-skiing. Currently, only Chugach Powder Guides, operating out of Girdwood, has a permit to conduct commercial heli-ski activities in the Chugach National Forest. During 2000–2002, the Glacier Ranger District of the Chugach National Forest contracted the Alaska Department of Fish and Game to conduct winter surveys for goats in areas potentially affected by heli-ski operations. The purpose was to identify habitat repeatedly used by mountain goats during winter. The information gathered during these surveys enabled biologists to designate “no-fly zones” in winter use areas for mountain goats to help reduce potential impacts to the goat population.

Heli-ski guides in Subunit 13D operate in the Chugach mountains just north of Valdez out of Thompson Pass as well as out of the Majestic Valley Lodge into the Upper Matanuska and Upper Nelchina glacier areas. Heli-ski operations on state land do not require permitting, and thus there is no process by which to regulate these activities to avoid conflict with important mountain goat wintering or kidding areas. We recommend future goat management in these areas take into consideration heli-ski operations and identify critical habitat areas throughout the year to help prevent negative impacts on goats in the area.

During this reporting period, participation in goat registration hunts in Units 14A and 14C increased dramatically. This increase began primarily in 2002, a year after goat hunts on the Kenai Peninsula were moved to a later time frame, with drawing hunts from 10 August–15 October and a late season registration hunt from 1–30 November. As a result, the only early season registration goat hunts available in the area were in Units 14A and 14C. Hunter participation, specifically guided nonresident hunters, increased rapidly for these registration hunts. By 2005, these registration hunts were closing within 2 weeks of opening due to harvest quotas being met at a rapid pace. In 2005 and 2006, harvest exceeded desired quotas in Unit 14C. As a result, the Board of Game approved a department proposal to change the registration goat hunts in Units 14A and 14C to drawing permit hunts, to be followed by late season registration permit hunts if the quotas were not made with the initial drawing permit hunts. The new hunts will begin in the 20082009 season.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

#### *Subunit 13D (Chugach Mountains)*

- Maintain a pre-hunting population of at least 100 goats.

#### *Subunits 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.

#### *Subunit 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.

#### *Subunit 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**

When possible, we monitored sex and age composition and population trends of goat populations through aerial surveys. We monitored harvests by requiring successful hunters to report harvests within 5 or 10 days of kill, depending on hunt location. In addition, all hunters were required to return hunt reports, whether they harvested a goat or not.

## **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). No surveys were conducted in Subunits 14A and 14B (Talkeetna Mountains) during the reporting period. Partial surveys were conducted in 2004 in Subunit 14A (Chugach Mountains) and in 2005 and 2006 in 13D. In 2006 a complete survey of the Twentymile River was conducted in Unit 14C, as well as a partial survey in additional portions of Unit 14C.

Due to the lack of survey data on goats for the past 10 years, it is difficult to ascertain any population trends in the Chugach or Talkeetna Mountains. Most of the goats counted in the Chugach during this reporting period were counted incidental to sheep surveys. Harvest areas surrounding Lake George in Subunit 14C were not surveyed at all within this reporting period. Therefore, it is difficult to estimate the goat population for the Western Chugach. However, anecdotal reports suggest that goats in 14C may be expanding their range throughout Chugach State Park. Goat numbers in the Talkeetna mountains (Units 14A and 14B) and in Unit 13D are chronically low.

#### *Age Distribution*

Goats observed were categorized as kids or adults., kids comprised 24–29% of observed goats in Subunit 13D during this reporting period (Table 1), 25% in Subunit 14A from 2004 (Chugach Mountains; Table 2), and 21% in Subunit 14C from 2006 (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 areas. 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.

In Unit 13, goats are found primarily in the Chugach Mountains of Subunit 13D; however, occasionally goats are observed in the Talkeetna Mountains in Subunit 13A, 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 regulated primarily by winter weather and secondarily by predation. Greatly reduced goat numbers in Unit 13 have been attributed to deep snowfall. The Talkeetna Mountains provide only marginal habitat and, therefore, may be unable to support a large goat population.

## **MORTALITY**

### *Harvest*

Seasons and Bag Limits. From 2005–2006, in Subunit 13D goat hunting for residents and nonresidents was 10 August–20 September, and the bag limit was 1 goat of either sex by drawing permit. The taking of kids, and nannies accompanied by kids, was prohibited. Harvests in Subunit 13D have been low, with 6 goats per season in 2005 and 2006 (Table 5).

In Subunit 14A (south of the Matanuska River) the hunting season for residents and nonresidents was 1 September–31 October and was 1 goat by registration permit only. Goat harvest in Unit 14C is managed by both registration and drawing permit hunts. For the reporting period, there were 4 drawing hunts in Subunit 14C, 1 in the East Fork of the Eklutna River drainage, 1 in the Glacier and Winner creek drainages, 1 in Bird Creek drainage, including Penguin Creek, and 1 in the upper Eagle River drainage, including Icicle Creek, but excluding Raven Creek drainage. These hunts were open from the day after Labor Day to 15 October, with a bag limit of 1 goat., Goat hunting by registration permit only season dates were from 1 September–15 October, with 1 goat by archery-only registration 16–31 October in Unit 14C.

Board of Game Actions and Emergency Orders. In 2007, the Board of Game authorized the department to replace 3 registration hunts (RG866, RG868, and RG869) with 3 drawing hunts in Unit 14, while retaining the ability to hold short registration hunts if warranted, and establish an early-season, archery-only registration hunt for goats in Unit 14C. Beginning in the 2008–2009 season, 1 goat by permit only may be harvested in the following newly established hunts: Unit 14A (DG866: 1 September–31 October), Unit 14C Lake George and Twentymile River areas (RG879/RG878: 16–31 August, archery only), Unit 14C Lake George area (DG859 1–21 September, DG869 22 September–15 October), and Unit 14C Twentymile River area (DG868 1 September–15 October). If harvest quotas for the Lake George and Twentymile areas (Unit 14C) have not been met by the end of the draw period, a late season registration hunt will be held from 1–15 November in both or either areas.

In 2007, the Board of Game also authorized the conversion of a portion of drawing permit area in 13D to a registration hunt area. South of the Tiekkel River and east of a line beginning at the confluence of the Tiekkel and Tsina rivers is no longer in the drawing permit area, but is open by registration permit.

During the reporting period, emergency orders were issued by department staff in 2004 and 2005 to close registration goat hunts RG869, RG879, RG868, and RG878. These hunts were closed due to harvest quotas being reached before the end of the season.

Permit Hunts. The number of goat registration and drawing permits issued for Unit 14 ranged from 166 to 172 during this reporting period (Table 6). The number of Subunit 14C drawing permits issued is based on the number of goats observed during surveys. During this reporting period the number of drawing permits decreased from 21 in 2005 to 13 in 2006 (Table 6). Reduction of permits in 2006 resulted from lack of survey data for goats in these permit areas. Thirty-five drawing permits were issued for the eastern portion of Subunit 13D each year during the reporting period (Table 7).

Hunter Residency and Success. The majority of goat hunters in Unit 13D are nonlocal residents (Table 8). In Unit 14A and the Lake George area of Unit 14C there has been a shift in successful hunters from a majority of local resident hunters to nonresident hunters (Table 9). Other registration and drawing hunts in Unit 14C overall are dominated by resident hunters.

Success rates from 2002 to 2006 ranged from 30 to 61% in Subunit 13D (Table 8) and 23–62% in Unit 14A and 32–67% in Unit 14C (Table 9). In all 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. Most goats were taken in September in Unit 14 while goats were more evenly distributed across the entire season in Unit 14C (Table 10). Harvests in Subunit 13D were too small to evaluate chronologically and were distributed evenly across the season dates of 10 August–20 September..

Weather plays an important role in the timing of hunts, and field 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. In addition, increased participation and emergency order closures of registration hunts in Unit 14 have resulted in high hunt participation in early September.

Transport Methods. In Subunit 13D, the majority of successful hunters used airplanes (83% each year), with others using highway vehicles, (0–17%) or boats (0–17%, Table 11). In Subunit 14A and the Lake George portion of Subunit 14C, aircraft were the primary mode of transport for successful hunters (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 was difficult.

## **HABITAT**

### **ASSESSMENT**

Summer habitat quality and availability have not been assessed in Units 13D and 14. High productivity in the western Chugach goat population suggests 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 Subunit 14C. However, data are limited. No direct winter habitat assessments have been conducted.

## **CONCLUSIONS AND RECOMMENDATIONS**

All management objectives were met. At least 22 goats were harvested in Subunit 14C annually during this reporting period, and goat harvests exceeded 75% males annually. In Unit 14A 7–10 goats were harvested annually, and harvests exceeded 70% males. Goat season remains closed in the Talkeetna Mountains portion of Unit 14.

No complete surveys were conducted during this reporting period, and all goats were counted incidental to sheep surveys. No surveys were completed in 14A during the reporting period. Sheep surveys typically are conducted in the morning hours, whereas goat surveys are optimally conducted during evening hours. Survey methods, therefore, may account for variation in goat numbers among years. Because of the low harvest in Subunits 13D and 14A, goats need to be surveyed only every 3 years; however, fewer incomplete surveys have been conducted within this reporting period. In Subunit 14C, because of a relatively large harvest, budget limitations, and high goat population, surveys should be conducted at least biennially, unless there is severe winter weather or increased hunting pressure. No complete surveys of goats were conducted in Subunit 14C during the reporting period. We recommend dedicated, comprehensive surveys be conducted for goats within Subunit 14C.

In 2004 and 2005, all registration goat hunts in Subunit 14C were closed by emergency order. Hunting pressure in the subunit has increased dramatically since the Kenai Peninsula goat hunts were changed to early season drawing hunts followed by late season registration hunts. Specifically, hunting pressure in the Lake George area has become dominated by nonresident guided hunts, which are typically more successful. As a result, registration hunts in the area are typically closed within several weeks of opening. In addition, there has also been increased participation in the 14A registration goat hunt. Due to the popularity of the 14C and 14A registration hunts, it has become exceedingly difficult to manage the number of participants and the harvest. Under a board-approved regulation change in 2007, two registration hunts in Unit 14C and the one registration goat hunt in Unit 14A will be changed to drawing hunts beginning in the 2008–2009 season.

The Talkeetna Mountains portions of Subunits 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.

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TABLE 1 Unit 13D aerial mountain goat composition counts, 2002-2006

Regulatory year	Adults (%)		Kids (%)		Kids: 100 adults	Goats Observed	Goats /hour
2002/03 <sup>a</sup>							
2003/04 <sup>b</sup>	37	(100)	0	(0)	0	37	
2004/05 <sup>a</sup>							
2005/06 <sup>c</sup>	121	(78)	35	(22)	29	156	6.9
2006/07	75	(81)	18	(19)	24	93	10.1

<sup>a</sup>No surveys conducted.

<sup>b</sup>Partial surveys conducted incidental to sheep surveys (count areas 1-5).

<sup>c</sup>Partial surveys conducted incidental to sheep surveys (count areas 2,3,5,6,9,11, and 12).

<sup>d</sup>Partial surveys conducted incidental to sheep surveys (count areas 14 and 18).

TABLE 2 Unit 14A, Chugach Mountains, aerial mountain goat composition counts, 2002-2006

Regulatory year	Adults (%)		Kids (%)		Kids: 100 adults	Total observed	goats	Goats /hour
2002/03	106	(78)	29	(22)	27	135		
2003/04 <sup>a</sup>								
2004/05	118	(75)	40	(25)	34	158		
2005/06 <sup>a</sup>								
2006/07 <sup>a</sup>								

<sup>a</sup> No surveys conducted.

TABLE 3 Unit 14A and 14B, Talkeetna Mountains, aerial mountain goat composition counts, 2002-2006

Regulatory Year	Adults (%)	Kids (%)	Kids: 100 adults	Total Goats Observed	Goats /hour
2002/03 <sup>a</sup>					
2003/04 <sup>a</sup>					
2004/05 <sup>a</sup>					
2005/06 <sup>a</sup>					
2006/07 <sup>a</sup>					

<sup>a</sup> No surveys conducted.

TABLE 4 Unit 14C aerial mountain goat composition counts and estimated population size, 2002-2006

Regulatory Year	Adults (%)		Kids (%)		Kids: 100 adults	Total goats observed	Goats /hour
2002/03 <sup>a</sup>	127	(84)	25	(16)	20	152	
2003/04 <sup>a</sup>	86	(86)	14	(14)	16	100	
2004/05 <sup>b</sup>							
2005/06 <sup>b</sup>							
2006/07 <sup>c</sup>	121	(79)	33	(21)	27	154	

<sup>a</sup> Partial survey (goats counted incidental to sheep surveys; Lake George and Twentymile River not counted).

<sup>b</sup> No surveys conducted.

<sup>c</sup> Complete survey of Twentymile River. Additional goats counted incidental to sheep surveys.

TABLE 5 Annual mountain goat harvest by unit, 2002-2006

Regulatory Year	Unit				Total
	13D <sup>a</sup>	14A <sup>b</sup>	14B <sup>c</sup>	14C <sup>d</sup>	
2002/03	5	8		25	38
2003/04	11	8		38	57
2004/05	10	8		22	40
2005/06	6	7		36	49
2006/07	6	10		24	40

<sup>a</sup> Drawing permit only.

<sup>b</sup> Registration permit only.

<sup>c</sup> Closed to mountain goat hunting.

<sup>d</sup> Both registration and drawing permits.

TABLE 6 Unit 14 mountain goat harvest data by permit hunt, 2002-2006

Area	Regulatory Year	Permits issued	Percent did not hunt <sup>a</sup>	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total Harvest <sup>b</sup>
RG866 Unit 14A	2002/03	38	65	38	62	7	(88)	1	(12)	8
	2003/04	75	67	68	32	6	(75)	2	(25)	8
	2004/05	48	58	60	40	6	(75)	2	(25)	8
	2005/06	62	52	77	23	7	(100)	0	(0)	7
	2006/07	33	45	44	56	7	(70)	3	(30)	10
DG852 Unit 14C East Eklutna	2002/03	5	20	100	0	0	(0)	0	(0)	0
	2003/04	5	0	40	60	1	(33)	2	(67)	3
	2004/05	5	20	75	25	1	(100)	0	(0)	1
	2005/06	5	20	25	75	1	(33)	2	(67)	3
	2006/07	3	0	33	67	1	(50)	1	(50)	2
DG854 <sup>c</sup> Unit 14C	2002/03	3	33	100	0	0	(0)	0	(0)	0
	2003/04	3	33	33	67	1	(50)	1	(50)	2
	2004/05	3	33	50	50	1	(100)	0	(0)	1
	2005/06	3	0	0	100	3	(100)	0	(0)	3
	2006/07	3	67	0	100	1	(100)	0	(0)	1
DG856 Unit 14C Glacier Ck.	2002/03	8	63	33	67	2	(100)	0	(0)	2
	2003/04	8	25	83	17	0	(0)	1	(100)	1
	2004/05	8	25	67	33	2	(100)	0	(0)	2
	2005/06	8	38	60	40	2	(100)	0	(0)	2
	2006/07	4	0	100	0	0	(0)	0	(0)	0
DG858 <sup>d</sup> Unit 14C	2002/03	5	20	25	75	1	(33)	2	(67)	3
	2003/04	5	0	60	40	2	(100)	0	(0)	2
	2004/05	5	20	50	50	1	(50)	1	(50)	2

Area	Regulatory Year	Permits issued	Percent did not hunt <sup>a</sup>	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)	Females (%)	Total Harvest <sup>b</sup>
	2005/06	5	40	33	67	2 (100)	0 (0)	2
	2006/07	3	67	100	0	0 (0)	0 (0)	0
RG868	2002/03	70	74	83	17	3 (100)	0 (0)	3
Unit 14C	2003/04	78	37	88	12	6 (100)	0 (0)	6
Twentymile River	2004/05	63	59	81	19	5 (100)	0 (0)	5
	2005/06	18	61	29 71	3	(60)	2 (40)	5
	2006/07	48	52	91	9	(100)	0 (0)	2
RG869	2002/03	98	71	39	61	14 (88)	2 (12)	17
Unit 14C	2003/04	73	34	43	57	14 (64)	8 (36)	22
Lake George	2004/05	69	65	33	67	16 (100)	0 (0)	16
	2005/06	53	55	25	75	15 (88)	2 (12)	18
	2006/07	73	53	44	56	14 (74)	5 (26)	19
RG878	2002/03	3	100	0	0	0 (0)	0 (0)	0
Unit 14C	2003/04	5	20	75	25	1 (100)	0 (0)	1
Twentymile River	2004/05	0	0	0	0	0 (0)	0 (0)	0
(archery)	2005/06	2	0	50	50	1 (100)	0 (0)	1
	2006/07	5	60	100	0	0 (0)	0 (0)	0
RG879	2002/03	8	75	100	0	0 (0)	0 (0)	0
Unit 14C	2003/04	5	20	75	25	0 (0)	1 (100)	1
Lake George	2004/05	4	100			0 (0)	0 (0)	0
(archery)	2005/06	10	40	67	33	2 (100)	0 (0)	2
	2006/07	0	0	0	0	0 (0)	0 (0)	0

Area	Regulatory Year	Permits issued	Percent did not hunt <sup>a</sup>	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total Harvest <sup>b</sup>
Totals for all Unit 14C	2002/03	200	71	58	42	20	(83)	4	(17)	25
	2003/04	182	35	64	36	25	(66)	13	(34)	38
	2004/05	153	40	76	24	21	(95)	1	(5)	22
	2005/06	104	48	35	65	28	(80)	7	(20)	36
	2006/07	139	51	65	35	18	(75)	6	(25)	24
Totals For all Unit 14	2002/03	238	70	58	42	27	(84)	5	(16)	33
	2003/04	257	49	65	35	31	(67)	15	(33)	46
	2004/05	201	63	60	40	27	(90)	3	(10)	30
	2005/06	166	50	50	50	35	(83)	7	(17)	43
	2006/07	172	50	60	40	25	(74)	9	(26)	34

<sup>a</sup> Includes permittees who did not report.

<sup>b</sup> Includes animals of unknown sex.

TABLE 7 Unit 13D mountain goat harvest data by permit hunt, 2002-2006

Area	Regulatory Year	Permits issued	Percent did not hunt <sup>a</sup>	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest
DG718	2002/03	10	70	67	33	0 (0)	1 (100)	1
Unit 13D	2003/04	10	50	40	60	2 (67)	1 (33)	3
West	2004/05	10	30	57	43	1 (33)	2 (66)	3
	2005/06	10	70	0	100	3 (100)	0 (0)	3
	2006/07	10	40	83	17	2 (40)	3 (60)	5
DG719	2002/03	25	64	56	44	3 (75)	1 (25)	4
Unit 13D	2003/04	25	48	38	62	5 (63)	3 (38)	8
East	2004/05	25	52	42	58	5 (71)	2 (29)	7
	2005/06	25	44	79	21	2 (67)	1 (33)	3
	2006/07	25	44	93	7	1 (100)	0 (0)	1
Totals	2002/03	35	66	58	42	3 (60)	2 (40)	5
For all	2003/04	35	49	39	61	7 (64)	4 (36)	11
Unit 13D	2004/05	35	46	47	53	6 (60)	4 (40)	10
	2005/06	35	51	64	36	5 (83)	1 (17)	6
	2006/07	35	57	70	30	3 (50)	3 (50)	6

<sup>a</sup> Includes permittees who did not report.

TABLE 8 Unit 13D mountain goat hunter residency and success, 2002-2006

Area	Regulatory Year	Successful				Unsuccessful				Total Hunters <sup>a</sup>
		Local Resident	Nonlocal Resident	Nonresident	Total (%)	Local resident	Nonlocal Resident	Nonresident	Total (%)	
DG718	2002/03	0	0	1	1 (33)	2	0	0	2 (67)	3
Unit 13D	2003/04	0	2	1	3(60)	0	2	0	2 (40)	5
West	2004/05	0	2	1	3 (43)	0	3	1	4 (57)	7
	2005/06	0	1	2	3 (100)	0	0	0	0 (0)	3
	2006/07	0	2	3	5 (83)	0	1	0	1 (17)	6
DG719	2002/03	0	2	2	4 (40)	0	5	1	6 (60)	10
Unit 13D	2003/04	0	3	2	8 (67)	1	3	0	4 (33)	12
East	2004/05	0	5	2	7 (58)	1	4	0	5 (42)	13
	2005/06	0	2	1	3 (21)	3	7	1	11 (79)	14
	2006/07	0	1	0	1 (7)	4	9	0	13 (93)	14
Totals	2002/03	0	2	3	5 (38)	2	5	1	8 (62)	13
For all	2003/04	0	5	3	11 (61)	1	5	1	7 (39)	18
Unit 13D	2004/05	0	7	3	10 (53)	1	7	1	9 (47)	19
	2005/06	0	3	3	6 (35)	3	7	1	11 (65)	17
	2006/07	0	3	3	6 (30)	4	10	0	14 (70)	20

<sup>a</sup> Includes hunters with unspecified residency and/or hunters that did not submit a report.

TABLE 9 Unit 14 mountain goat hunter residency and success, 2002-2006

Area	Regulatory year	Successful				Unsuccessful				Total Hunters <sup>a</sup>
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
RG866	2002/03	1	2	5	8(62)	1	1	3	5 (38)	13
Unit 14A	2003/04	2	0	6	8 (32)	9	8	0	17 (68)	25
	2004/05	0	6	2	8(40)	0	11	1	12 (60)	20
	2005/06	1	1	5	7 (23)	16	4	2	22 (77)	30
	2006/07	1	2	7	10 (56)	2	5	1	8 (44)	18
DG852	2002/03	0	0	0	0 (0)	1	3	0	4 (100)	4
Unit 14C	2003/04	3	0	0	3 (75)	1	0	0	1 (25)	5
East Eklutna	2004/05	0	1	0	1(25)	3	0	0	3 (75)	4
	2005/06	2	1	0	3 (75)	1	0	0	1 (25)	4
	2006/07	2	0	0	2 (67)	1	0	0	1 (33)	3
DG854	2002/03	0	0	0	0 (0)	2	0	0	2 (100)	2
Unit 14C	2003/04	2	0	0	2 (100)	0	0	0	0 (0)	2
	2004/05	0	1	0	1 (50)	1	0	0	1 (50)	2
	2005/06	3	0	0	3 (100)	0	0	0	0 (0)	3
	2006/07	0	1	0	1 (100)	0	0	0	0 (0)	1
DG856	2002/03	2	0	0	2 (67)	1	0	0	1 (33)	3
Unit 14C	2003/04	1	0	0	1 (17)	5	0	0	5 (83)	6
Glacier Ck.	2004/05	2	0	0	2 (33)	4	0	0	4 (67)	6
	2005/06	2	0	0	2 (40)	3	0	0	3 (60)	5
	2006/07	0	0	0	0 (0)	4	0	0	4 (100)	4
DG858	2002/03	2	1	0	3 (75)	1	0	0	1 (25)	4
Unit 14C	2003/04	1	1	0	2 (40)	3	0	0	3 (60)	5
	2004/05	1	1	0	2 (50)	2	0	0	2 (50)	4
	2005/06	0	0	2	2 (67)	1	0	0	1 (33)	3

Area	Regulatory year	Successful				Unsuccessful				Total Hunters <sup>a</sup>
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
	2006/07	0	0	0	0 (0)	1	0	0	1 (100)	1
RG868	2002/03	3	0	0	3 (17)	15	0	0	15 (88)	18
Unit 14C	2003/04	6	0	0	6 (15)	30	4	1	35 (85)	49
Twentymile River	2004/05	3	1	1	5(19)	17	4	0	21 (81)	26
	2005/06	0	5	0	5 (71)	0	2	0	2 (29)	7
	2006/07	2	0	0	2 (9)	21	0	0	21 (91)	23
RG869	2002/03	3	4	10	17 (61)	2	5	4	11 (39)	28
Unit 14C	2003/04	4	5	12	21 (54)	6	8	3	17 (44)	48
Lake	2004/05	3	2	11	16 (67)	4	0	4	8 (33)	24
George	2005/06	0	1	17	18 (75)	1	4	1	6 (25)	24
	2006/07	8	1	10	19 (56)	10	0	5	15 (44)	34
RG878	2002/03	0	0	0	0 (0)	0	0	0	0 (0)	0
Twentymile River	2003/04	1	0	0	1 (25)	3	0	0	3 (75)	4
(archery)	2004/05	0	0	0	0 (0)	0	0	0	0 (0)	0
	2005/06	0	1	0	1(50)	0	1	0	1 (50)	2
	2006/07	0	0	0	0 (0)	2	0	0	2 (100)	2
RG879	2002/03	0	0	0	0 (0)	1	0	1	2 (100)	2
Lake	2003/04	0	1	0	1 (25)	1	1	1	3 (75)	4
George	2004/05	0	0	0	0 (0)	0	0	0	0 (0)	4
(archery)	2005/06	0	1	1	2 (33)	1	3	0	4 (67)	6
	2006/07	0	0	0	0 (0)	0	0	0	0 (0)	0
Totals	2002/03	10	5	10	25 (41)	23	8	5	36 (59)	61
for all	2003/04	18	7	12	37 (32)	49	13	5	67 (58)	123
Unit 14C	2004/05	9	6	12	27 (41)	31	4	4	39(59)	70
	2005/06	7	9	20	36 (67)	7	10	1	18 (33)	54
	2006/07	12	2	10	24 (35)	39	0	5	44 (65)	68

Area	Regulatory year	Successful				Unsuccessful				Total Hunters <sup>a</sup>
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
Totals	2002/03	11	7	15	33 (41)	24	9	8	41 (59)	74
for all	2003/04	20	7	18	45 (48)	58	21	5	84 (51)	148
Unit 14	2004/05	9	12	14	35 (39)	31	15	5	51 (61)	90
	2005/06	8	10	25	43 (52)	23	14	3	40 (48)	84
	2006/07	13	4	17	34 (39)	41	5	6	52 (61)	86

<sup>a</sup> Includes hunters with unspecified residency or who failed to report.

TABLE 10 Unit 14 mountain goat harvest chronology percent by month, 2002-2006

Area	Regulatory year	Harvest period						Unknown ( <i>n</i> )	n
		August	September	October	November	December			
Unit 14A	2002/03	0	100	0	0	0	1	8	
	2003/04	0	0	0	0	0	8	8	
	2004/05	0	100	0	0	0	1	8	
	2005/06	0	100	0	0	0	1	7	
	2006/07	0	100	0	0	0	0	10	
Unit 14C	2002/03	4	84	8	0	0	1	25	
	2003/04	0	54	46	0	0	3	38	
	2004/05	4	65	31	0	0	0	22	
	2005/06	0	45	55	0	0	0	35	
	2006/07	68	32	0	0	0	0	24	

TABLE 11 Unit 13D successful mountain goat hunter transport methods, 2002-2006.

Regulatory year	Percent of harvest							Highway vehicle	n
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV			
2002/03	40	0	0	0	0	0	0	60	5
2003/04	36	9	0	0	0	0	0	55	11
2004/05	30	0	10	0	0	0	10	50	10
2005/06	83	0	17	0	0	0	0	0	6
2006/07	83	0	0	0	0	0	0	17	6

TABLE 12 Unit 14 successful mountain goat hunter transport methods (registration hunts only), 2002-2006

Area	Regulatory Year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
RG866	2002/03	88	0	0	0	0	0	0	12	8
Unit 14A	2003/04	75	0	0	25	0	0	0	0	8
	2004/05	44	0	11	11	0	11	0	22	9
	2005/06	86	0	0	0	0	0	0	14	6
	2006/07	56	0	0	0	0	0	0	44	9
RG868	2002/03	0	0	33	0	0	0	67	0	3
Unit 14C	2003/04	20	0	0	0	0	40	40	0	6
Twentymile River	2004/05	20	0	60	0	0	0	20	0	5
	2005/06	0	0	60	0	0	0	40	0	5
	2006/07	50	0	50	0	0	0	0	0	2
RG869	2002/03	100	0	0	0	0	0	0	0	17
Unit 14C Lake George	2003/04	90	0	2	0	0	0	0	5	22
	2004/05	82	0	0	0	0	0	0	18	11
	2005/06	89	0	0	0	0	0	0	11	18
	2006/07	89	0	5	0	0	0	0	5	19
RG878	2003/04	0	0	0	0	0	0	0	100	1
Unit 14C Twentymile River	2004/05	0	0	0	0	0	0	0	0	0
	2005/06	0	0	0	0	0	0	100	0	1
	2006/07	0	0	0	0	0	0	0	0	0
RG879	2003/04	100	0	0	0	0	0	0	0	1
Unit 14C Lake George	2004/05	0	0	0	0	0	0	0	0	0
	2005/06	100	0	0	0	0	0	0	0	2
	2006/07	0	0	0	0	0	0	0	0	0

Area	Regulatory Year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
Totals for all Unit 14C	2002/03	85	0	5	0	0	0	10	0	20
	2003/04	70	0	7	0	0	7	7	10	30
	2004/05	63	0	19	0	0	0	6	12	16
	2005/06	69	0	12	0	0	0	12	8	26
	2006/07	86	10	0	0	0	0	0	4	21





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.



Photo by Phil Mooney, ADF&G