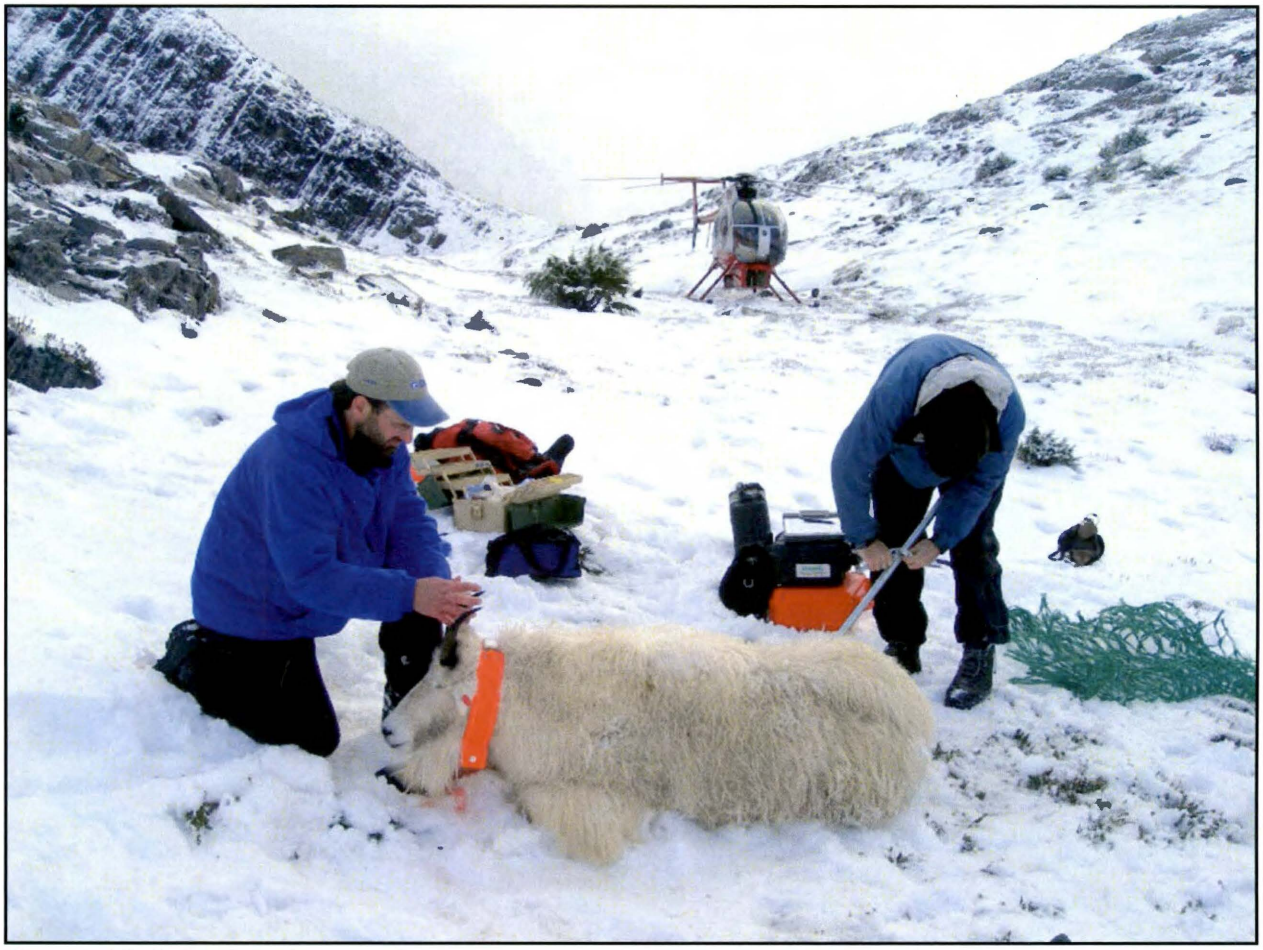
Mountain Goat Management Report

of survey-inventory activities

1 July 2007–30 June 2009

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



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Grants W-33-6 and W-33-7, Project 12.0
2010 Set

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Please note that this report was released as a complete set in 2011, but is part of the 2010 set of species management reports. We encourage referencing this report as a 2010 report to maintain understanding of when reports were written and ease of locating this particular set of reports.

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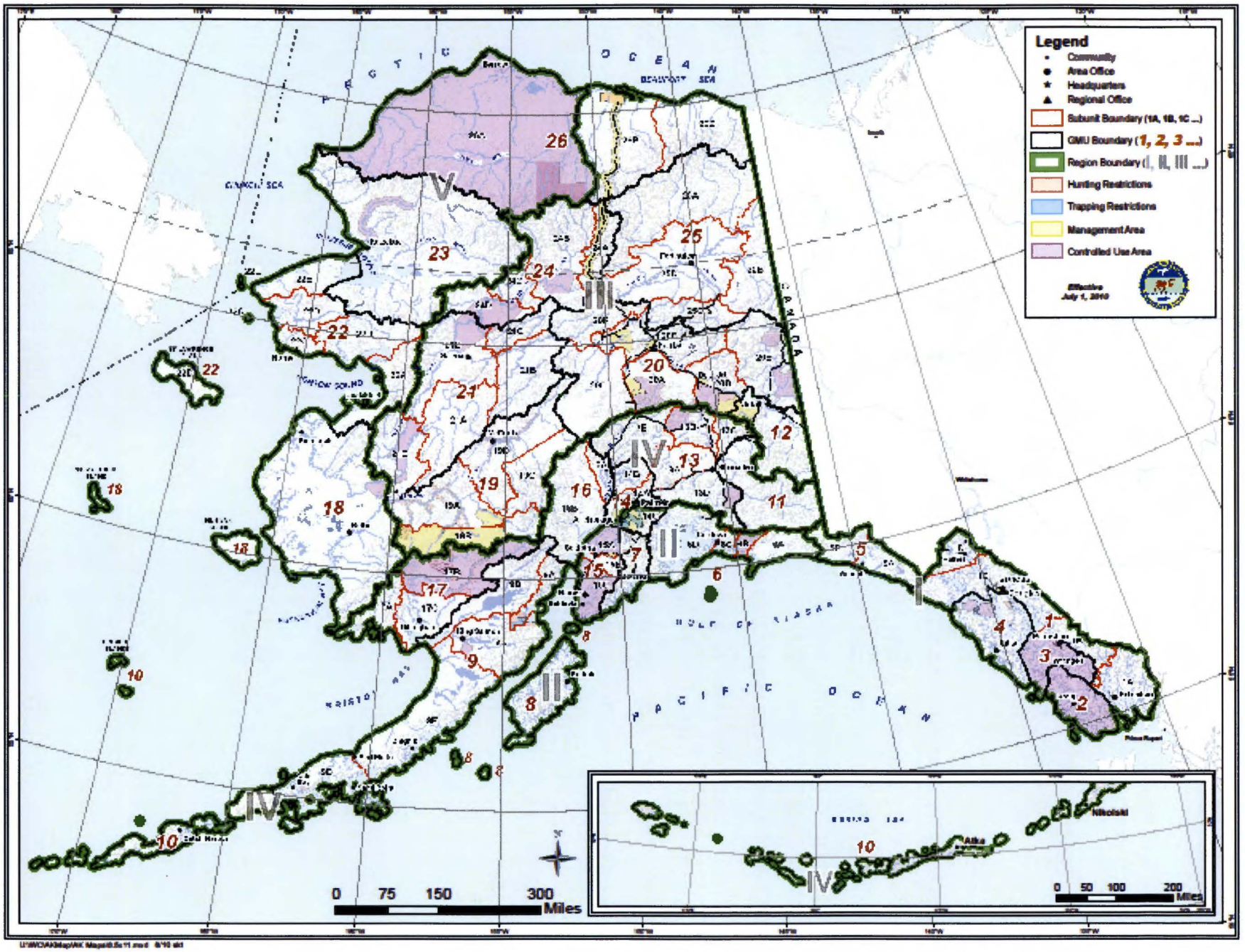
Please note that population and harvest data in this report are estimates and may be refined at a later date.

Cover Photo: ADF&G wildlife biologists, Neil Barten and Kevin White radiocollar a mountain goat in the mountains east of Lynn Canal. The goat research project is part of a multi-species assessment related to the potential development of a road from Juneau to the Katzehin River.

MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

TABLE OF CONTENTS


Legend
Community
Area Office
Headquarters
Regional Office
Subunit Boundary (1A, 1B, 1C ...)
GMU Boundary (1, 2, 3 ....)
Region Boundary (I, II, III ...)
Hunting Restrictions
Trapping Restrictions
Management Area
Controlled Use Area
Effective July 1, 2010
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
GULF OF ALASKA
PACIFIC OCEAN
CANADA
0 75 150 300 Miles
0 50 100 200 Miles
Nikolski
Atka

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

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

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

BACKGROUND

Severe winter weather conditions during 1968–1975 resulted in up to 90% reductions in Unit 1A mountain goat (*Oreamnos americanus*) populations (Smith 1984). Subsequent moderating weather enabled populations to recover and we believe they are currently stable at moderate 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 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. New sightings of goats as recently as 2009 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 during 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 those seasons. During 2008 we issued 20 permits and harvested 4 goats. Throughout Alaska, nonresident hunters must contract with a licensed Big Game Guide to hunt mountain goats.

MANAGEMENT DIRECTION

Management Objectives

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

2. Survey goats 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^2. We generally initiate surveys during August or September, and begin daily survey efforts from 0500–0800 or 1700–1900 hours. This report contains a summary of the 2007 and 2008 regulatory years.

We obtain hunt and harvest information through a mandatory hunt report that is part of a required registration permit (RG001) and a separate drawing permit DG003. 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 try to determine if there is 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 of 6 harvest points per 100 adult goats observed during surveys (providing the survey conditions were good, and the survey was considered reliable) using a 3-year running average. Hunt areas that reach the harvest cap are closed by emergency order or drawing permits are reduced. 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 assume that some animals die during the winter and consequently less animals would be available for the following hunting season. Managing goat 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 doing our best to not overharvest goats.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During fall 2007 we completed aerial surveys in 5 of the TCAs: K-6 Cleveland Peninsula, K-9 Chickamin River to 2722, K- 12A Mirror Lake to Swan Lake, K-12B Swan Lake and K-13 Deer Mountain (Table 2). Compiling these surveys we observed 373 goats in 4.8 hours of flying. The 78 goats/hour observation rate was slightly higher than in recent years. The ratio of 26 kids per 100 adults was within the range of 17-78 from the previous 7 years (Table 1).

During 2008 due to poor flying conditions we only completed aerial surveys in the 2 following TCAs: K-6 Cleveland Peninsula and K-13 Deer Mountain. We counted 106 total goats in two hours of flying. The 53 goats per hour during 2008 was higher than the average of 61 goats mostly as a result of low observation hours in only two survey routes.

Population Size

Results of aerial mountain goat surveys can be interpreted only as minimum population values (Ballard 1975). However, because of our strategy of managing the goat harvest conservatively, we use these minimum counts as the basis of setting our guideline harvest levels. 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^2 to these areas which resulted in a mainland estimate of 3000–4000 goats. This estimate is based on using all goat habitat in the Unit and an average goat density in good habitat calculated from previous aerial surveys. We believe this is the best estimate available for Unit 1A goat numbers.

Population Composition

A series of mild winters, likely resulting in only moderate bear and wolf predation, and good habitat conditions have all contributed to healthy goat numbers in this unit. The surveys in 2007 and 2008 both yielded kid:100 adult ratios in the expected range given historical data comparisons; a good sign of productivity and for potential recruitment of young into the adult population.

Distribution and Movements

We continue to be concerned about disturbance to goats in this drawing area because of the high number of daily over flights by both fixed wing and rotary aircraft. This area is directly in the flight path of tourist flights going and returning from Misty Fiords National Monument, a popular cruise ship passenger destination.

The Cleveland Peninsula portion of Unit 1A remains closed to goat hunting (Porter 2004). We initiated a sightability study along the lower Cleveland fall of 2009. Seven goats now have radio collars and will provide a good reference to develop a sightability correction factor for aerial surveys in this area and to help identify critical winter habitat. Currently our estimate of goat numbers remains at about 50 total animals for the entire Cleveland area and do not appear to be

increasing at this time. This area produced world class trophy goats in the past and in fact, 5 of the top 10 Boone and Crocket record book goats were harvested from the Cleveland Peninsula.

Sealaska Native Corporation will start cutting timber along the western slope of the Cleveland Peninsula during summer 2010 and will continue building roads and harvesting timber for several years. Documented movements of collared goats during winter 2009 indicate they currently use the area where the Cleveland timber harvest is planned. This timber harvest and removal of important goat winter habitat will have a negative impact on mountain goats especially near Ship and Black Bear Mountains.

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 raised the number of permits for the 2008 season from 12 to 20. Success rates have been lower than expected and goat numbers in this drawing permit area appear to be high enough to sustain additional harvest at this time.

Hunter Harvest. Ninety-eight permits and 118 permits were issued for Unit 1A during 2007 and 2008, respectively. Forty-two hunters killed 13 goats in 2007 and 44 hunters killed 19 goats during the 2008 season. The 2007 harvest was substantially lower than the 9-year average of 19 goats and 2008 was right at the average (range 13–27) (Table 3). The 42 hunters in 2007 and 44 hunters in 2008 continued a three-year trend of fewer hunters afield (range 42–54; Table 4). There were likely several reasons for reduced hunter participation during those seasons,

including persistent poor weather conditions for flying into alpine hunting areas, and a slow but steady downturn in the economy.

Successful hunters spent an average of 2.7 days to kill a goat during the 2007 season, and 2.8 days to kill a goat during 2008 (range 1–7 days).

Permit Hunts. Goat hunting in Unit 1A has been regulated by registration permit for the past 25 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 applicants). Of the 150 applications in 2007, 61% were Ketchikan residents, 30% were other Alaska residents, and 9% were nonresidents. During 2008, 252 hunters applied with 48% of applicants residing in Ketchikan, 45% other Alaska residents, and 7% were nonresidents. Six goats and four goats were harvested during 2007 and 2008 respectively from DG003 (Table 7).

Hunter Residency and Success. Nine and 8 nonresidents hunted goats successfully in Unit 1A during 2007 and 2008 (Table 4). Thirty-one percent and 37% respectively of the 2007 and 2008 harvest was by hunters residing within the subunit. Alaska residents were responsible for 31% of the 2007 harvest and 58% of the 2008 harvest (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. We are seeing a steady increase in nonresident goat hunting effort as big game guides promote the trophy quality of southern Southeast mountain goats.

Since 1996, approximately 50% of hunters on average who register for RG001 actually report hunting effort and 28% of those hunters are successful each year (Table 3).

Two of six DG003 hunters were nonresidents during 2007 and both nonresidents harvested goats during the 2007 drawing hunt. One nonresident hunted goats in the drawing area in 2008, but was unsuccessful. Eighty-three and 65% of hunters with drawing permits actually hunted during 2007 and 2008 respectively (Table 7).

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 2007 and 2008, 46% and 58% of the respective harvest was during September, the highest monthly percentage. October is becoming more popular as more nonresident hunters hire licensed big game guides and wait until later in the season for longer hair and the better hide quality. Thirty one percent and 26% of the harvest occurred during October during 2007 and 2008 respectively (Table 5).

The DG003 drawing goat hunting effort and success are more spread out over the fall season. Hunters are not limited by stormy boating weather or poor flying conditions because this hunt area near Ketchikan is accessible via maintained hiking trails from paved roads accessible from Ketchikan.

Transport Methods. Airplanes accounted for 77% and 95% of the transportation used by successful hunters during the past two seasons, respectively (Table 6). Airplanes have accounted

for 78% of the transportation used by Unit 1A hunters during the past 10 seasons (range 50–100%). The balance of goat hunters used boats to access hunting areas.

Horn Growth Rates. We had greater success this report period getting hunters to submit their horns from harvested goats to ADF&G for measurement of growth annuli. Observed horn growth, especially during the first 3 years of life, appears to be highest in the two introduced populations of goats, including Mahoney Mountain and Reid Mountain herds.

CONCLUSIONS AND RECOMMENDATIONS

Mountain goat populations appear to be stable throughout most of Unit 1A. We will continue to monitor goat numbers on the Cleveland Peninsula, a portion of Unit 1A west of Ketchikan that remains closed to hunting because of goat population viability concerns. We will continue the new sightability study on the Cleveland and make multiple aerial counts each year to monitor changes. Sealaska Native Corporation's timber harvest along the Cleveland will have negative impacts on critical winter habitat and the local mountain goats in the near future. We will continue to try and work with Sealaska to lessen the impact of their logging activities on goats in any way possible.

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 continue to monitor the DG003 drawing hunt and offer permit numbers according to recent survey counts.

The new drawing permit hunt DG003 in this area has been successful with about 50% hunter success each year. We remain concerned about air traffic both fixed wing and helicopter disturbance to goats in the drawing area. This herd is close to town and directly in the flight path of the high volume tourist flights going and coming back from Misty Fiords National Monument. We continue to monitor this situation.

We continue to educate goat hunters about the importance of harvesting male goats and how to identify male goats in the field.

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Table 1. Unit 1A mountain goat survey data, 2000–2008.

Survey Dates	Nr Kids	Nr. Adults	Total Goats	Kids:100 Adults	Count Time (hrs.)	Goats/ Hour
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
Aug 16–Oct. 5, 2007	78	295	373	26	4.8	78
Aug 10–Oct 2, 2008	34	72	106	47	2.0	53
Average[a]	83	303	386	30	5.6	54

[a] Overall average does not include the single trend area count during 2004.

Table 2. Unit 1A mountain goat trend count area surveys, 2000–2008.

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
K-4	2002	54	14	68	0.9	76	26	0
	2000	73	10	83	1.0	83	14	2
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
K-6	2008	11	7	18	1.0	18	64	0
	2007	22	6	28	0.8	37	27	0
	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

Table 2. continued.

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 Adults	Sets of Twins
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
K-9	2007	64	12	76	1.5	51	19	4
	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
K-12A	2007	43	14	57	0.5	114	33	1
	2004	50	12	62	0.5	124	24	2
	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

Table 2. continued.

Survey Area	Year	Adults	Kids	Total Goats	Survey Time (hrs)	Goats Observed/hr	Kids:100 Adults	Sets of Twins
K-12B	2007	60	15	75	1.0	75	25	2
	2004	56	20	76	1.0	76	36	1
	2002	35	16	51	0.5	102	46	0
	2000	76	21	97	1.2	81	28	0
	1998	62	12	74	1.3	57	19	0
	1996	74	35	109	1.6	68	47	6
K-13	2008	61	27	88	1.0	88	44	1
	2007	106	31	137	1.0	137	29	2
	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

Table 3. Unit 1A mountain goat harvest data by permit hunt, regulatory years 2000–2008.

Hunt	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Harvest						Total harvest
						Males	(%)	Females	(%)	Unk	(%)	
RG001												
	2000	154	100	31	23[a]	14	(58)	10	(42)	0	(0)	24
	2001	132	87	22	23	17	(74)	5	(22)	1	(4)	23
	2002[b]	123	72	35	16	8	(50)	8	(50)	0	(0)	16
	2003	138	85	35	18	10	(56)	8	(44)	0	(0)	18
	2004	121	79	20	22	16	(73)	6	(27)	0	(0)	22
	2005	106	54	25	27	13	(48)	12	(44)	2	(7)	27
	2006	101	56	31	14	11	(79)	3	(21)	0	(0)	14
	2007	98	56	29	13	10	(77)	3	(23)	0	(0)	13
	2008	118	74	25	19	16	(84)	3	(16)	0	(0)	19
	Average	121	74	28	19	13	(65)	6	(33)	<1	(2)	20

[a] One hunter killed 2 goats (23 hunters killed 24 goats).
[b] Regulation changed; bag limit reduced to 1 goat per season.

Table 4. Unit 1A mountain goat hunter residency and success, regulatory years 2000–2008.

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
2000	8	5	10	23	(43)	24	4	3	31	(57)	54
2001	10	4	9	23	(51)	17	2	3	22	(49)	45
2002	6	3	7	16	(31)	20	7	8	35	(69)	51
2003	9	3	6	18	(34)	25	6	4	35	(66)	53
2004	14	7	1	22	(52)	19	1	0	20	(48)	42
2005	13	9	5	27	(52)	20	3	2	25	(48)	52
2006	4	2	8	14	(31)	22	3	6	31	(69)	45
2007	4	0	9	13	(31)	24	4	1	29	(69)	42
2008	7	4	8	19	(43)	15	3	7	25	(57)	44
Average	8	4	7	19	(41)	21	4	4	28	(59)	48

[a] Local resident hunters reside in Unit 1A.

Table 5. Unit 1A goat harvest chronology percent by month, 2000 through 2008.

Regulatory year	Aug	(%)	Sep	(%)	Oct	(%)	Nov	(%)	Dec	(%)	Unk	(%)	n
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)	1	(4)	23
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	(26)	7	(26)	2	(7)	1	(4)	0	(0)	27
2006	3	(21)	3	(21)	7	(50)	0	(0)	0	(0)	1	(8)	14
2007	2	(15)	6	(46)	4	(31)	1	(8)	0	(0)	0	(0)	13
2008	3	(16)	11	(58)	5	(26)	0	(0)	0	(0)	0	(0)	19
Average	5	(26)	7	(38)	6	(30)	1	(4)	>1	(>1)	0	(1)	19

Table 6. Unit 1A mountain goat harvest percent by transport method, regulatory years 2000–2008.

Regulatory	Harvest percent by transport method						
year	Airplane	Air (%)	Boat	Boat (%)	Unk	Unk.(%)	n
2000	18	(75)	6	(25)	0	(0)	24
2001	16	(73)	6	(27)	1	(4)	23
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
2007	10	(77)	2	(16)	1	(7)	13
2008	18	(95)	1	(5)	0	(0)	19
Average	15	(79)	4	(20)	<1	(2)	19

Table 7. DG003 Deer Mountain area drawing permit hunt, regulatory years 2006–2008.

Regulatory year	Applications	Number permits issued	Harvest male	Harvest female	Hunted	Aerial survey count
2006[a]	202	12	4	2	11	109
2007	150	12	5	1	10	137
2008	252	20	3	1	13	88
Average	201	15	4	1	11	110

[a] First year drawing permits issued

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT: Unit: 1B (3000 mi^2)

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 Kirchhoff 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 determined 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.

Immediately prior to the fall 2000 hunting season, under discretionary permit hunt requirements, ADF&G shortened the period within which successful goat hunters must report their take from 10 to 5 days regionwide.

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 (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. This closure was the result of the goat harvest objective having been achieved in those drainages before the season's end.

In fall 2005, for the second consecutive year, an EO was issued for the early closure of the season (RG004) in the Unit 1(B) 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 emergency closure was again the result of the goat harvest objective having been achieved early in the season in those drainages.

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

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 traditionally harvested the majority of goats taken in the subunit. However, those trends have weakened in recent years. For the first time in 2001, and again in 2002, 2004 and 2005, the harvest by nonresidents exceeded that of local residents (residents of Petersburg, Wrangell, or Kake). And in 2004 for first time since at least 1984, the number of goats harvested by nonlocal residents also exceeded the number taken by 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. Since then, 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, 2004 and 2005, 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 and Horn Cliffs, Thunder Mountain, LeConte Bay and Wilkes Range in 2005. 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. (See Nonregulatory management problems/needs below.)

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:

- 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

We flew aerial surveys within established trend count areas to obtain the number of goats and the percentage of kids in the population. We used the results of the aerial surveys to establish harvest objectives for specific mountain goat populations within each registration hunt area. These objectives allow for a harvest quota of 5–6 points per 100 goats observed based on the most recent aerial survey and population trend data. Male goats count as 1-point and females 2-points toward the allowable harvest quota. Once the harvest quota has been achieved for specific goat populations, emergency orders are issued closing the goat hunting season in that area. 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 are 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. Although data specific to goats in Unit 1B are scarce, available information indicates that with the exception of the Cleveland Peninsula, most Unit 1B goat populations have remained relatively stable since 2000.

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 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 1,219 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 of annual differences in survey coverage and because inclement weather frequently makes complete surveys difficult. No goat surveys were conducted in Unit 1B during 2007, due to limited pilot availability and early snowfall. In the October 2008 surveys, 19% of the goats classified were kids. Annual differences in survey coverage and uncertainties about the sightability of goats during aerial surveys make it difficult to develop precise population estimates for the entire unit. Nonetheless, aerial surveys provide valuable information with which to establish harvest guidelines and monitor population trends within select portions of the broader unitwide goat population. Because not all of the 27 individual trend count areas in Unit 1B can be surveyed annually, survey efforts typically focus on trend count areas that receive the most hunting pressure.

Distribution and Movements

Until recently, quantitative data on goat movement patterns and winter diet were limited to data obtained from radiotelemetry studies conducted in in Unit 1C (Schoen1979) and Unit 1A and the extreme southern portion of Unit 1B (Smith 1982). Radiotelemetry studies currently underway in subunits 1A, 1B, 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, White and Barten 2009). 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 move between major ridge complexes, whereas females remain on ridges where they were captured. Inter-ridge movement by males appears to be associated with the rut and contribute to relatively large winter home ranges. Inter-ridge movements by males may be important for preventing problems associated with inbreeding.

During spring goats generally move to lower elevation, south-facing rock cliffs, brush, and forest habitats, presumably to take advantage of new green vegetation. Throughout the summer, goats disperse to a variety of habitat types with an increase in elevation and greater use of northerly exposures. During fall goats move to lower elevations but still use north-facing exposures and inhabit forest, alpine, subalpine, and cliff habitats. Throughout winter goats use 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

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

Board of Game Actions and Emergency Orders. The Board of Game took no actions affecting Unit 1B goat hunting, and no emergency orders were issued during this reporting period.

Hunter Harvest. The 2007 and 2008 Unit 1B harvests of 12 and 6 goats, respectively, were each well below the mean harvest of 21 goats annually during the preceding 10-year period (Table 2). The harvest of 12 goats in 2007 and 6 goats in 2008 were the second lowest and lowest goat harvests, respectively, in Unit 1B since at least 1984. The low harvest during the report period was primarily attributed to above average snowfall and reduced hunter effort, particularly in 2008. We do not believe the low harvest during the report period is indicative of a significant population decline. It should be noted 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 also likely limited the harvest to some degree. Hunter success was 22% in 2007 and 19% in 2008; also significantly less than previous years. In 2007 and 2008 males composed 67% and 100% 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.

In 2006, local big game guides, USFS permitting staff and the local ADF&G area biologist met and reached a cooperative agreement designed to reduce and stabilize the number of guided hunts occurring annually in Guide Use Areas (GUA) 01-06 and restricting the number of hunts occurring during the late-season.

In 2007 the number of guided goat hunts in Unit 1B declined to its lowest level since 1999 after 4 stable years averaging 16 guided hunts a year. In 2008 the number of guided hunts dropped even further to its lowest level since 1993. Although the reason for the decline in the number of guided hunts is difficult to explain, a decline in the number of guides permitted to hunt in the unit, the 2006 cooperative agreement to reduce the number of guided hunts occurring annually in GUA 10-06, and the recent economic downturn are all at least partially responsible for the decline. The continued closure of goat hunting in that portion of RG001 on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet may have been practically responsible for the low number of guided hunts in Unit 1B during the report period.

In 2007 a total of 12 nonresidents hunted goats in Unit 1B (Table 3). Of those, 11 employed the services of a big game guide and 1 was accompanied by next-of-kin. In 2008 7 nonresidents hunted goats, all of whom employed big game guides. The number of goats harvested by guided hunters during the report period was 4 in 2007 and 5 in 2008.

Since 2004, we have witnessed a general decline in the number of local resident goat hunters taking to the field each year (Table 3). Local participation in goat hunting increased slightly in 2007 with 35 local residents taking to the field in Unit 1B. This represents the highest local resident participation since 2003 when 37 local residents took to the field. However, the 20 local residents who pursued goats in 2008 represent the lowest local resident participation since at least 1984 and was well below the preceding 10-year average of 36 local resident hunters annually in Unit 1B. Severe winter weather, particularly during the late-season, likely contributed to the decline in local resident participation during the 2008 goat season.

Federal subsistence regulations allow qualified local residents to take a second goat in that portion of Unit 1B located south of LeConte Bay and north of the North Fork of the Bradfield River. During the report period, no federal permits were issued for the taking a second goat in the Unit.

Hunter Residency and Success. In 2007, the harvest by local residents exceeded that of both nonresidents and nonlocal residents. In 2008, the harvest by nonresidents once again exceeded that of local residents by a large margin (Table 3).

Local residents traditionally represent the largest group of unsuccessful hunters, and this remained the case during this report period. During this report period, local residents had 11% success; nonlocal residents had 25% success, and guided nonresidents 47% 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 22% in 2007 and 19% in 2008. From 1997 to 2006, the average success rate for guided hunters in Unit 1B was 52% and ranged from 13 to 75%. During this report period the success rate for guided nonresident hunters was 33% in 2007 and 71%, in 2008. Because of the guide requirement, nonresident hunters typically enjoy the highest success rate. However, in 2007 nonlocal residents enjoyed the highest success rate (43%) followed by guided nonresidents (33%). In 2008 guided nonresidents once again enjoyed the highest success rate.

Geographical locations of harvest. Goat harvest occurred in 8 Unit 1B Wildlife Analysis Areas (WAAs) during this report period. These include WAAs in the Stanton Peak (#1602), Thomas Bay (#1603 and #1604), Patterson River to Thunder Mountain (#1605), Horn Cliff and LeConte Bay (#1706), Stikine River (#1707 and #1708) and Berg Mountain (#1811) areas. In 2007 harvest occurred in 8 WAAs, with #1602, #1603, #1605, and #1707 each with 17%, followed by #1604, #1706, #1708, and #1811 each with 8% of the subunit's total annual harvest. In 2008, harvest occurred in just 3 WAAs with #1605 providing 67% of the total harvest, followed by #1604 and #1605 each with 17%.

Harvest Chronology. Winter weather, particularly during the late season, can have a profound influence on harvest chronology. The greatest proportion of the 2007 harvest occurred in October, followed by identical harvests in August and December. The largest percentage of the 2008 harvest occurred in November, followed by September, the only months during which goat harvests were reported (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 2007, 50% of successful hunters reported using boats, and 42% reported using airplanes to access their hunting area. In 2008, 83% of hunters reported using boats, and 17% reported using airplanes. During the report period, only one 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.

Although the disease is believed to be rare, goats displaying symptoms of contagious ecthyma, commonly called "orf," have been occasionally reported in the Horn Cliffs area of 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.

Following several consecutive years with mild winter weather, much of Southeast Alaska experienced record snowfall during the winter of 2006–2007 (NOAA 2010), followed by well above average snowfall in 2007–2008 and 2008–2009 (NRCS 2010). It is likely, therefore, that mountain goats in Unit 1B experienced increased mortality as a result of 3 consecutive winters with heavy snowfall in the central panhandle region of Southeast Alaska.

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 renewed a preliminary permit for 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 Lake 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

As related in the past management reports (Lowell 2008) 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 continues to be needed to develop reliable methods of inventorying Southeast Alaska goat populations.

A recent management issue is the potential for localized overharvest and potential conflicts between guided nonresident hunters and federally qualified subsistence hunters. The USFS has been concerned 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 taken in a 2006 cooperative agreement to both reduce and stabilize the number of guided hunts occurring annually. (See details in Lowell 2008).

To ensure adequate goat hunting opportunity for local residents, in 2006 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 2007

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. During the late 2008 season 2 permitted guides were each given authority to conduct 1 late-season goat hunts in the area. During the report period there were no guided big game hunts conducted in the GUA 01-07 portion of Unit 1B.

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. Record snowfall during winter 2006–2007, followed by well above average snowfall in 2007–2008 and 2008–2009 severely hampered late-season goat hunting and is thought to be primarily responsible for the relatively low goat harvest and success rates in Unit 1B during 2007 and 2008.

The 2007 and 2008 Unit 1B harvest of 12 and 6 goats, respectively, were well below the mean harvest of 23 goats annually during the preceding 10-year period. The harvest of just 12 goats in 2007 and 6 goats in 2008 were the second lowest and lowest, respectively, unitwide harvest totals since at least 1984. Research conducted in Unit 1C indicated that the severe winter weather and heavy snowfall likely played a key role on increased mortality of mountain goats during 2006 and 2007 (White and Barten 2008) Although a similar increase in mountain goat mortality in Unit 1B is likely following 3 consecutive winters with above average snowfall, we don't believe a significant population decline was responsible for the low harvest during the report period. Instead, we think the low harvest was due to the above average fall and winter snowfall hampering hunter effort and success, fewer residents participating in the hunt during 2008, and fewer nonresidents hunting because of reductions in the annual number of guided hunts (see below).

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 above average snowfall in 2007–2008 and 2008–2009 probably limited the Unit 1B harvest to some extent during the report period. In 2007 and 2008 the number of guided goat hunts in Unit 1B continued a 6-year decline reaching its lowest level since 1993. A number of factors likely contributed to the decline in the number of guided hunts including: a decrease in the number of permitted guides; the 2006 cooperative agreement to reduce the number of annual guided hunts in GUA 10-06; and the recent economic downturn.

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 1A, 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 believe the 2-goat bag limit allowed under federal hunting regulations should to be reduced, at least in 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 possible 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. .

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Table 1 Unit 1B summer aerial mountain goat composition counts, regulatory years 1998–2008

Regulatory year[a]		Adults	(%)	Kids	(%)	Unknown	Kids: 100 adults	Total goats observed	Goats /hour
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
2007		0	0	0	0	0	0	0	0
2008	(Oct. 2008)	117	(81)	27	(19)	0	23	144	60

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

Table 2 Unit 1B mountain goat harvest data by permit hunt, regulatory years 1999 through 2008

Hunt	Year	Permits [a] issued	Nr hunted	(%) Did not hunt	Nr successful hunters	(%) successful hunters	Nr males	(%) males	Nr females	Total harvest
RG001	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
	2007		0		0	(0)	0	(0)	0	0
	2008		0		0	(0)	0	(0)	0	0
RG004	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[b]	(31)	15	(88)	2	17
	2007	102	54	(57)	12	(22)	8	(67)	4	12
	2008	71	32	(55)	6	(19)	6	(100)	0	6

Table 2 continued

Hunt	Year	Permits [a] issued	Nr hunted	(%) Did not hunt	Nr successful hunters	(%) successful hunters	Nr males	(%) males	Nr females	Total harvest
Combined	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[b]	(30)	15	(88)	2	17
	2007		54		12	(22)	8	(67)	4	12
	2008		32		6	(19)	6	(100)	0	6

[a] Number of permits issued for 1B in hunt number RG001 is unknown because this hunt includes part of Unit 1A.
[b] One hunter killed 2 goats, second goat via federal subsistence permit.

Table 3 Unit 1B mountain goat hunter residency and success, regulatory years 1999 through 2008

	Successful					Unsuccessful					
Year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
1999	15	1	8	24	(32)	32	14	4	50	(68)	73
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
2007	5	3	4	12	(22)	30	4	8	42	(78)	54
2008	1	0	5	6	(19)	19	5	2	26	(81)	32

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

Table 4 Unit 1B mountain goat harvest chronology, percent by month, regulatory years 1999 through 2008

	Month										
	August		September		October		November		December		Total
Year	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	harvest
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	(38)	1	(4)	24
2002	4	(29)	2	(14)	5	(36)	1	(7)	2	(14)	14
2003	6	(29)	6	(29)	8	(38)	1	(5)	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
2007	3	(25)	0	(0)	4	(33)	2	(17)	3	(25)	12
2008	0	(0)	1	(17)	0	(0)	5	(83)	0	(0)	6

Table 5 Unit 1B mountain goat harvest, percent by transport methods, regulatory years 1999 through 2008

	Percent of harvest						
Year	Airplane		Boat		Other		Total harvest
	n	(%)	n	(%)	n	(%)	
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
2007	5	(42)	6	(50)	1	(8)	12
2008	1	(17)	5	(83)	0	(0)	6

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 1C (7600 mi^2)

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

BACKGROUND

There are three main concerns regarding mountain goat management in Unit 1C: guided hunting, commercial helicopter tourism, and construction activity. 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. ADFG continues to work with the U.S. Forest Service in allocating an appropriate number of permits, and to distribute hunting effort in the Tracy and Endicott Arm area.

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. A heli-skiing company is operating in the Juneau area during the winter months, and 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. ADFG and the U.S. Forest Service are working cooperatively on a monitoring plan for areas of Juneau and Unit 1D.

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 continue a mountain goat radiocollaring project to investigate these concerns. Mountain goat monitoring continues at the

Lake Dorothy hydroelectric site which is nearing completion. An Additional area has been identified as possible hydroelectric site (Sweetheart Lake) and department staff have begun to plan for aerial surveys in the area.

Contagious ecthyma (also referred to as orf) conintues to be detected in Unit 1C. 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 9 cases reported in the Juneau area, 5 that led to the deaths of affected kid goats and 4 others in adult goats. The occurrence of the disease does not appear to be limited to an isolated area, rather, infected goats have been taken across Unit 1C. The disease is endemic in the area and affects young and older goats, especially those with undeveloped or compromised immune systems; healthy adult goats generally survive a contagious ecthyma infection.

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: Lake Dorothy, Cape Fanshaw, and Endicott Arm, all in the RG013 permit area. Additional surveys were flown in conjunction with research being conducted in Lynn Canal, including portions of Unit 1C and Unit 1D. White and Barten (2009) documented decreased survival in mountain goats in the study area. Decreased survival is most likely due to severe winter weather conditions during the report period (White et. al. 2009). When assessing

mountain goats population health and determining guideline harvest levels, we also need to consider the survival rate of the population.

Although these surveys represent a small portion of Unit 1C, other indications such as hunter effort and harvest information and 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 goat by registration permit only	1 Oct–30 Nov
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 goat by registration permit by bow and arrow only	1 Oct–30 Nov (General hunt only)
Remainder of Unit 1C 1 goat by registration permit only	1 Aug–30 Nov

Board of Game Actions and Emergency Orders. No Board of Game actions were taken for Unit 1C mountain goats during the report period. No Emergency Orders were issued to close mountain goat hunting seasons during the report period.

Hunter Harvest. Eighty two goats were taken during this report period, 40 in 2007 and 42 in 2008 (Table 2); this period's harvest level is similar to the previous report period, and is only slightly below the mean harvest of 44.5 goats taken between 1999 and 2006. Point harvest levels were not

reached in any hunt area during the report period. For all of Unit 1C 106 points were available, 46 points were harvested. In-season management of goat hunts in Southeast, Alaska is common. Once harvest point levels have been reached department staff use emergency orders to close the season. Goat hunters in Unit 1C generally check with the department prior to going into the field to hunt to get the current status of the hunt.

Males again made up a large part of the harvest (89%), higher than the previous report period of 81%. 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 best interest to insure their hunters take billies.

Because we do not require hunters to present goats for sealing, there is a possibility that the reported harvest of male goats is inflated, as hunters are sometimes reluctant to admit to killing a nanny. Region I research staff have developed a mountain goat identification quiz (Jemison, unpublished) to assist hunters in selecting male goats to harvest. The quiz has been made available at all area wildlife offices and the department's website. Staff also contacted hunters post-hunt to determine the usefulness of the quiz; hunter input will be used to improve the material to assist hunters in selecting male goats.

As has been the case during the previous report periods, much of the harvest took place in 2 Wildlife Analysis Areas (WAA's) (Table 7). The WAAs representing Tracy and Endicott arms (2824 & 2825) account for 78% of the harvest for the period. WAA's 2824 and 2825 are combined for guideline harvest (points) purposes. 29-30 points are available in this area; 24 points were taken in 2008 and 12 points in 2007. While the harvest is often high in this area, hunters typically take male goats which can be attributed to the requirement that nonresidents must have a guide to mountain goat hunt. Both of these areas are accessible by boat and receive significant commercial guiding harvest. The remaining harvest (18 goats) was taken in widely distributed WAAs; 2517 (Bow hunt area), 2518 (upper Taku River), 2305 and 2306 (lower Chilkat Range), 2408 and 2409 (Berners Bay and lower Lynn Canal), and 2927 (Port Houghton). Sporadic harvest in most areas of the unit other than Tracy and Endicott arms is normal. Weather and access drive mountain goat hunting, and these combined with the challenges of hunting this species, limit the overall harvest in most areas.

Permit Hunts. Registration permit hunts RG012-North Juneau road system, RG013-South of Taku Inlet & Northern Chilkat Peninsula, and RG014-Bow hunt area) are included under a single permit. The number of permits issued increased from a 2-year mean of 196 during the previous report period to a mean of 215 in 2007 and 2008 (Table 3). The mean annual number of hunters during this report period was 96, higher than the previous period (84) and higher than the mean number of hunters (89) for the period 1999-2006. Roughly half of people who get registration permits actually hunt; again, weather, access and difficult terrain limit the number of hunters. Compliance with reporting requirements has been good, but we continue to resort to reminder letters and enforcement action to obtain information from some hunters.

Hunter Residency and Success. The average success rate of all hunters was 43% during this report period. Success rate decreased significantly from the previous report (55%). Alaska resident

hunters harvested fewer than half the number of goats taken by nonresident hunters (18 to 54, respectively) during the report period (Table 4). Nonresident hunter success rates were also much higher than resident hunters. Eighty-eight percent of nonresidents successfully harvested a goat compared to only 22% of resident hunters. This reflects the requirement that nonresidents hunt with a guide. Most guides are better equipped to hunt goats than the average local resident hunter. Successful hunters spent an average of 2.3 days afield per goat during the report period, the same as the previous report (Table 3). Unsuccessful hunters spent an average of 2.4 days in the field.

Harvest Chronology. The November harvest continued to be the highest of the 4-month season, accounting for 63% of the take during the report period. October was the month with the second highest harvest followed by September and then August. 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 guided harvest, which accounts for more than half the goats harvested, takes place later in the season.

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 90% of successful hunters using them (Table 5). Other means of transportation included airplanes (5%), and highway vehicles (5%). Highway vehicles were used along the Juneau road system and airplanes are used to access high-elevation lakes.

Commercial Services. Commercial services use decreased from the previous report period, with 36% of hunters using a commercial service compared to 45% during 2005–2006 (Table 6). The current level of commercial use is similar to previous report periods. Eighty-five percent of hunters who used commercial services used a guide, and 15% used commercial transportation to the field. This is not surprising since most huntable areas are only accessible by airplane or boat. Resident hunters most often used commercial services for transportation (almost entirely air charter), whereas nearly 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

Severe winter weather continued in both years of the report period. Deep snow forced many goats to low elevations in close proximity to downtown Juneau. Several goat mortalities were documented along Juneau trails that are believed to have been caused by weather conditions. Three dead goats (2 adults & 1 kid) were recovered from the Flume Trail near Juneau and an adult male (est. age~13 years) was euthanized on Thane Road after becoming incapacitated due to starvation. We examined the marrow of long bones associated with carcasses when available and all the marrow appeared red and gelatinous, consistent with starvation. Contagious Ecthyma (CE), also known as ORF, was documented in the male goat euthanized on Thane Road; an additional male yearling with apparent CE was harvested near Juneau. Samples for disease surveillance were provided to the Department's wildlife veterinarian. Little other data is 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. White and Barten (2009) visited several mortality sites along Lynn Canal but was unable to determine cause of death for most because carcasses had been scavenged.

Habitat

Assessment

Unit 1C winter and summer goat range is extensive and goats appear to be occupying most of this range. (See Lowell 2008 for a detailed description of mountain goat habitat in mainland Southeast Alaska.) Helicopter traffic in or near goat habitat and its potential to drive goats away from preferred habitat areas remains a concern. While there are fewer requests for additional flights and landings, there are consistent requests to relocate landings and their associated flight routes. Goats disturbed and displaced from preferred habitat areas could suffer reduced fitness which may ultimately play a role in population declines. Admittedly however, little is known about the effects of helicopter noise on goat populations.

Managers met with U.S. Forest Service personnel several times during the report period to discuss land use in the Tracy-Endicott Arm area focusing on guided mountain goat hunts. The USFS is reviewing the number of hunts allocated in the area and may initiate an official prospectus for the area in the future. As noted in the report, the majority of goats taken in Unit 1C come from these areas and any changes to the allocation of guided hunts will affect the management of goats in the area. Managers will continue to meet with service personnel and provide information and comments as needed.

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. 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 increased but success remained nearly the same as the previous report period. In both years of the report period hunters predominantly killed male goats. Although the percentage of nannies in the kill was low, we should continue to emphasize directing hunting pressure away from females. We will continue to use harvest guidelines established for each permit hunt area which 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, sealing may be necessary to assure accurate reporting of male and female goats.

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TABLE 1 Unit 1C Mountain Goat Aerial Survey Data 1995-2008

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	Percent Kids	Goats/Hr.	Location Description
1995				No Survey			
1996	215	78	293	36	27	52	East Chilkat Range
1997				No Survey			
1998	225	38	263	17	14	77	Eagle Glacier-Lace R.
1998	71	19	90	27	21	39	RG014 Hunt Area
1999	54	12	66	22	18	33	RG014 Hunt Area
2000	57	3	60	5	5	47	Lake Dorothy
2000	143	30	173	21	17	36	Chilkat Range
2001	464	113	577	24	20	132	Btw. Tracy & Endicott Arm
2001	174	57	231	33	25	139	North of Tracy Arm
2001	20	7	27	35	26	20	Btw. Whiting & Speel River
2001	18	1	19	6	5	27	Bart Lake
2002	163	47	213	29	22	82	Endicott Arm to Pt. Houghton
2002	152	26	178	17	15	85	Chilkat Range
2003	52	12	64	23	19	213	Lions Head Mt.
2003	98	14	112	14	13	170	Antler Lake
2004				No Survey			
2005	226	39	265	17	15	101	East Lynn Canal
2005	15	1	16	7	6	15	Border Lake
2006	203	33	236	16	14	16	Chilkat Range
2006	50	16	66	32	24	NA	Lemon Glacier
2006	45	4	49	9	8	NA	Herbert Glacier
2006	60	22	82	37	27	NA	Eagle Glacier
2007	15	0	15	0	0	14	Lake Dorothy
2007	196	36	232	18	16	80	Cape Fanshaw
2007	179	18	197	10	9	39	South of Endicott Arm
2008	8	4	12	50	33	10	Lake Dorothy
2008	121	43	164	36	26	44	Endicott Arm

TABLE 2 Unit 1C annual goat harvest, regulatory years 1999–2008

Year	Males	Females	Unknown	Total
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
2007	36	4	0	40
2008	37	4	1	42

TABLE 3 Unit 1C goat hunter effort and success, regulatory years 1999–2008

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
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
2007	213	40	92	2.3	58	153	2.6	98	245	2.5
2008	216	42	98	2.3	51	106	2.1	93	204	2.2

TABLE 4 Unit 1C goat hunter success by community of residence, regulatory years 1999–2008

		Successful hunters			Unsuccessful hunters		
Year	Percent success	Unit resident	Other AK	Non resident	Unit resident	Other AK	Non resident
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
2007	41	12	2	26	43	7	8
2008	45	14	0	28	40	8	3

TABLE 5 Unit 1C transport methods used by successful goat hunters, regulatory years 1999–2008

Year	Airplane		Boat		Foot		Hwy. vehicle		Other	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
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)
2007	3	(8)	36	(90)	0	(0)	1	(2)	0	(0)
2008	1	(2)	38	(91)	0	(0)	3	(7)	0	(0)

TABLE 6 Commercial services used by Unit 1C goat hunters, regulatory years 1999–2008[1]

Year	Unit residents		Other AK residents		Nonresidents		Total use		Registered guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
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
2007	51	4	8	1	2	32	61	37	29	8	0
2008	52	2	8	0	2	29	62	31	29	2	0

[1] 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 1999–2008

WAA	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
2202											-
2203					1						1
2304								1			1
2305			1	2		1		1		1	6
2306			6	4	1	1		4	1		17
2307											-
2408	1		1		1		2			2	7
2409		1	1	3	2	1	2			2	12
2410			1		1						2
2411	1		1								2
2412											-
2413						2		3			5
2514			1		5	2	1	3		1	13
2515								1			1
2517		1	1	3	1		5		1	2	14
2518	2	6	5	2	5	5	4	2	2	1	34
2519	1				1	5	3				10
2722											-
2823							1				1
2824	20	18	26	11	15	16	17	13	14	15	165
2825	13	11	10	10	10	13	11	13	19	16	126
2926			2								2
2927		2	4	2	1	1	3	1	3	2	19
Unkn											-
TOTAL	38	39	60	37	44	47	49	42	40	42	438

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 1D (2700 mi^2)

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

BACKGROUND

Mountain goat hunting is very popular in Unit 1D. Unlike many areas of Alaska where goats are hunted as a trophy species, the majority of goats harvested in Unit 1D are for consumption. Goat hunters in Unit 1D are less selective in taking male goats vs. female goats. As noted above, goats are hunted largely for food which often means the first goat that can be successfully harvested is taken. While the female goat harvest is higher than desired, Unit 1D hunters typically harvest more male than female goats. An extensive road system in the Haines area provides access to goat hunting areas and the majority of the remaining hunting occurs from boats. Mountain goat habitat ranges from alpine areas of densely forested mountains in coastally influences areas to brushy benches in areas influenced more by interior Yukon, Canada climate conditions. In addition, there are isolated areas, such as Takhin Ridge, where movement of goats is restricted by rivers and developed roads (Haines Highway).

There are three separate registration permit hunts with separate hunt areas in Unit 1D (RG023-Takshanuk Mountains, RG024-Upper Chilkat River & Skagway Area, and RG026-Takhinsha Mountains & northern Lynn Canal). Few hunters pursue goats in the early season (1 August) , and effort significantly increases in mid-September when areas accessible by road are open to goat hunting. A significant number of hunters pursue goats late into the season (November and December) when goats have moved down slope to wintering areas in forested habitat along Lynn Canal.

In some areas of Unit 1D goat numbers persist at low levels offering limited opportunity to harvest. As in other Southeast, Alaska locations, the Unit has been subdivided into smaller, unique geographical areas for management purposes. The intent of the management areas is to provide an additional opportunity to hunt if other locations in a hunt area (e.g., RG023) are closed because the guideline harvest level has been obtained. Prior to the start of the mountain goat hunting season biologist review point allocation for each management area. Changes to the allowable points may be made based on survey and harvest information. Based on aerial survey data, mountain goat populations appear to be stable or increasing in the unit. Two areas in

particular indicate increasing goat numbers; the area between the Skagway and Taiya River (Skagway Pie), and the Takshanuk Mountains (RG023).

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) management staff conducted aerial surveys in locations identified for high hunter effort during the reporting period. Additional aerial surveys were conducted by research staff concurrent with the Mountain Goat Assessment and Monitoring along the Juneau Access Road Corridor and near the Kensington Mine, Southeast, Alaska project (White and Barten 2009). These survey data are the result of intensive, replicate aerial surveys for four specific flight routes; two of these routes (Mt. Sinclair and Mt. Villard) are within the Unit 1D boundaries. In prior reports, both ADF&G and the Bureau of Land Management (BLM) staff conducted surveys and contributed to survey data (Tables 1a, 1b, and 1c). Though not directly comparable to ADF&G data due to different survey aircraft and methodology, results from BLM surveys are still valuable in providing long-term population trend data. A single registration permit (RG023) 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 unit wide 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. We do our best to approach each survey with similar weather conditions, timing, and aircraft to eliminate as much variability as possible.

In fall 2005, department research staff began a project to monitor and assess mining 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 and Barten 2009). Mine development is limited to Unit 1C, however other development associated with the Juneau Access Road would start in Unit 1C at Echo Cove, continue through Berners Bay and up the east shoreline of Lynn Canal, and terminate 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 mountain goats in order to learn more about spatial and temporal habitat use in the development areas. During the report period a sample of collared goats were maintained in the study area. 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. In order to better estimate sightability during aerial surveys, monitor survival, and develop population estimates for survey areas, VHF radio-collars will remain on goats in the study area once research activities have ended.

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 compared over years (Tables 1a, 1b, and 1c). 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 composition (kid-to-adult ratios) in certain areas within the unit during this report period. We concentrated our effort in two of the most heavily hunted areas Takhin Ridge (Table 1c) and Takshanuk Mountains (Table 1b), and included the Skagway Pie area (Table 1a) to collect data for the 2008 Alaska Board of Game meeting. A growing helicopter skiing and summer tourist industry has increased concerns about potential lethal and sub lethal 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.

MORTALITY

HARVEST

Season and bag limits	Resident and nonresident hunters
Unit 1D, that portion between Taiya Inlet and River and the White Pass and Yukon Railroad by bow and arrow only	15 Sep–15 Nov (General hunt only)

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

Board of Game action and Emergency Orders (EO). During the fall 2008 Alaska Board of Game (BOG) meeting a proposal was submitted by the Upper Lynn Canal Advisory Committee to open the Skagway Pie to goat hunting by archery only. This area has been closed to goat hunting since 1985 due to conservation concerns. An aerial survey in September 2008 detected an adequate number of goats for the department to support the proposal. The proposal was adopted by the board and the inaugural archery season will open in September 2009.

In 2007 the Takshanuk Mountain portion of the RG023 hunt area was closed by Emergency Order (EO) when guideline harvest levels, based on harvest point allocation, were reached. Mountain goats in the area are more accessible than other locations due to the proximity to the Haines Highway. In addition, several areas of RG024 (Halutu Ridge, East Fork of Skagway River, and Taiya Inlet north of Kasidaya Creek) were closed by EO; Takhin Ridge and Flower Mountain in RG026 were also closed by EO. In total, 8 discreet areas were closed to goat hunting prior to the scheduled end of the season. Several of these areas closed within 1-2 days of each other after favorable weather and sea conditions allowed access to goats, and harvest occurred quickly.

In 2008, 7 discreet hunting areas were closed by EO when guideline harvest levels were reached. These areas include: Tukgahgo Mountain, Takshanuk Mountains, east side of Chilkoot Lake, Halutu Ridge, East Fork of the Skagway River, Kasidaya Creek, and Kicking Horse River south. Although nearly the same number of locations were closed by EO as in 2007 the difference is that the closures were spread throughout the season rather than over a short time period, as was the case in 2007.

Hunter Harvest. A total of 69 goats were harvested during the report period, 43 in 2007 and 26 in 2008 (Table 2). The 2007 harvest consisted of 33 male (77%) and 10 (23%) female goats. In

2008 16 male (62%) and 10 female (38%) goats were taken. The harvest during 2007 and 2008 represents a slight increase from the last report period (Table 2). Harvest levels required the use of emergency orders (see Board of Game action and Emergency Orders above) to close the hunting season in several locations in Unit 1D once the allocated harvest points had been taken. For example, in the Takshanuk Mountains (RG023) in RY 2007, 10 goats were harvested before the area was closed by EO (10 points authorized); all of the goats were male (male=1 point, female=2 points). In RY 2008, only 8 goats were taken before an EO was issued (10 points authorized) because the harvest included two female goats. Taking female goats generally reduces the length of the hunting season.

Unit 1D hunters continue to do a good job of selecting male goats which is important for successful management of local goat populations. The female portion of the harvest is higher in Unit 1D than some other units because more hunters take goats for food rather than for trophies (Jemison, unpublished data). Department staff has developed sex identification material and a quiz to assist hunters in selecting male goats, and will conduct follow-up interviews with successful goat hunters to assess the utility of these materials. Summary data from interviews will be provided in future management reports.

Permit Hunts. Unit 1D mountain goat hunting is regulated under 3 registration permit hunts administered by a common hunt report. The main reason for maintaining 3 hunts in the subunit is to allow different opening and closing dates while attempting to adjust for relative differences in hunting pressure. These 3 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 2 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 small accessible areas while allowing other portions of the unit to remain open. An average of 161 permits were issued per year during the 2 years of the report period, slightly higher than the previous 8-year mean of 160 permits/year (Table 3).

Hunter Residency and Success. Local residents continue to be the majority of Unit 1D goat hunters. In 2007 and 2008, residents of the subunit took 29 (67%) and 18 (69%) of harvested goats, respectively, while nonlocal residents took 7 (16%) goats in 2007, and 1 (2%) in 2008 (Table 4). Unit 1D is a popular hunting destination for nonlocal Alaska residents because hunting areas are accessible by road. Nine nonresident hunters participated in a Unit 1D goat hunt during the 2007 season, and 10 in the 2008 season. The number of nonresident hunters did not change significantly from the last report period, averaging about 9 hunters each season. Nonresident hunters took 7 goats in each year of the reporting period, 16% and 27% of the respective harvest during 2007 and 2008.

Thirty-seven percent of all Unit 1D goat hunters were successful during the report period (Table 4). Seventy-four percent of nonresident hunters were successful compared to 33% of all Alaska resident hunters (unit residents and nonlocals). The higher rate of success for nonresident hunters is due to Alaska law requiring nonresidents to hunt with a licensed big game guide. Overall hunter success decreased, nonresident success increased, and resident success remained roughly the same as the previous report period.

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, hunters have taken most goats from late September to early November. During this report period 39% of the goats were harvested in November, 30% in October, 20% in September, 7% in August, and 3% in December. Although 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. Boats and highway vehicles continue to be the transport methods used most often by successful hunters, accounting for 51% and 33% respectively of transport during the report period (Table 5). A higher percentage of successful hunters use highway vehicles because hunting areas are close to the Haines Highway and other developed roads. Boats are used in both fresh water 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 17 nonresident hunters and 2 resident hunters reported using commercial services. The 2 resident hunters utilized transporter services to reach hunting areas. The only 2 nonresident hunters not using commercial services had second degree of kindred relatives guide them. The number of guides offering mountain goat hunts has remained the same for a number of years. However, large tracts of state-managed land and the absence of a guide use area system on state lands mean there is potential for an increase in guide numbers in Unit 1D. We need to monitor any increases in guiding pressure 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

Fine-scale mountain goat management continues to be necessary in Unit 1D as hunting pressure remains at a high level. 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. Finally, permanent trend count areas with well-defined boundaries should be established to enhance comparable surveys from year to year.

Helicopter activities have increased annually in Unit 1D for the past 6 years. Our concerns grow

over their immediate and long-term effects on mountain goats. Flightseeing is expected to continue to increase, as is the use of helicopters to access remote areas for hiking and mountaineering. Over the two years of this report period, staff spent increasing time working on ways to address agency and public concerns about effects of these 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. ADF&G was contacted by the Bureau of Land Management in January 2009 about summer tourism-related commercial helicopter activity on federal land in Unit 1D. (The majority of winter helicopter activity occurs on state-managed land.) We reviewed an extensive aerial survey dataset collected by BLM observers and commented on how to best use the data. A resource selection function (RSF) model (Griswold 2009), developed from the survey data, predicts what habitats goats prefer and use on BLM Unit 1D lands during the early summer periods covered by the surveys. ADF&G and BLM are seeking funding to validate the model by using GPS-equipped radio-collared goats to compare model predictions to data collected from marked goats. These data would help ADF&G and other resource management agencies respond to proposed new activities in the area that may affect mountain goats.

Mountain goats continue to be an important source of game meat for unit residents and hunting effort from all demographics appears to be stable or slightly increasing. Efforts to reduce the female goat harvest should continue to help ensure the viability of this resource in Unit 1D.

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TABLE 1A Unit 1D mountain goat composition counts, Skagway closed area, regulatory years 1981–2008

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[a]	11	5	16	45	31	20
1995[b]	21	7	28	33	25	N/A
1996-2000	No survey					
2001	32	7	39	22	25	93
2002-2007	No survey					
2008	99	19	118	19	16	59

[a] Skagway Pass side only, goats/hour is for the entire survey that included a portion of hunt area RG023.
[b] 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 1989–2008.

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Klukwah Mt. (K) and Ferebee Glacier/River (F) to Chilkoot Inlet						
1989 (K)	26	9	35	35	(26)	60
1993	*No survey*					
1994 (K,F)[1]	111	21	132	19	(16)	45
1995[2]	52	15	67	29	(22)	89
1996–1997	*No survey*					
1998	69	23	92	33	(25)	58
1999–2002	No survey					
2003	140	44	184	31	(24)	141
2004-2008	No survey					
Takshanuk Mtns. (E, W)						
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
2002-2006	No survey					
2007 (E,W)	219	45	264	21	17	165
2008	No survey					
North of the Klehini River and West of the Chilkat River						
1989	23	6	29	26	(21)	70
1993	No survey					
1994	58	4	62	7	(6)	69
1995	55	9	64	16	(14)	116
1996–2003	No survey					
2004	34	8	42	24	(19)	84
2005-2008	No survey					
East of Ferebee Glacier/River (F), Chilkoot/Taiya Inlet						
1989 (F,C)	39	17	56	44	(30)	40
1992 (F,C)	30	10	40	33	(25)	19
1993	No survey					
1994 (F,C)	119/130	21/33	1140/163	18/25	(15/20)	46/59
1995–2008	No survey					

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Harding Mountain to upper West Cr., upper Norse R. and Chilkoot Pass						
1995	64	9	73	14	(12)	50.5
1996–2008	No survey					
Twin Dewey Peaks, Skagway Pass, Warm Pass						
1995	20	6	26	30	(23)	20
1996–2008	No survey					
Katzehin River north to Twin Dewey Peaks						
1994	121	32	153	26	(21)	102
1995	No survey					
1996	103	26	129	25	(20)	105
1997	96	15	111	16	(14)	80
1998–1999	No survey					
2000	97	21	118	22	(19)	83
2001[3]	60	13	73	22	(18)	77
2002-2008	No survey					

[1] First survey listed conducted by the BLM in a PA-18 aircraft; this survey does not overlap with the ADF&G survey.
[2] Includes only the Chilkoot River side of the mountain range from Klukwah Mt. to Chilkoot Inlet.
[3] Partial survey from Kasidaya Creek north.

TABLE 1C Unit 1D mountain goat composition counts, hunt area RG026, regulatory years 1974-2008

Year	Number adults	Number kids	Total goats	Kids:100 adults	(%) kids	Goats/hour
Tsirku River (T) and Takhin Ridge (N,S)						
1983 (T)	67	23	90	34	(26)	29
1985 (S)	41	13	54	32	(24)	69
1987 (N,S)	14	4	18	29	(22)	11
1989 (N,S)	111	33	144	30	(23)	126
1993 (N,S)	100	21	121	21	(17)	112
1994 (T,N,S)[a,b]	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					
2007 (N,S)	67	16	83	24	(19)	104
2008 (N,S)	84	19	103	23	(18)	103
Remainder of Area West of Chilkat Inlet						
1974	39	3	42	8	(7)	72
1975	20	9	29	45	(31)	---[3]
1993	*No survey*					
1994	184	32	216	17	(15)	49
1995–2008	No survey					
East of Chilkoot Inlet-Katzehin River South						
1993	*No survey*					
1994	32	10	42	31	(24)	98
1995–1996	*No survey*					
1997	5	2	7	40	(29)	N/A
1998–2008	*No survey*					

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

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

TABLE 2 Unit 1D annual mountain goat harvest, regulatory years 1999–2008

Year	Males	Females	Unknown	Total
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
2007	33	10	0	43
2008	16	10	0	26

TABLE 3 Unit 1D mountain goat hunter effort and success, regulatory years 1999-2008

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg. Nr days	Nr. hunters	Total Nr days	Avg. Nr days	Nr hunters	Total Nr days	Ave. Nr days
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
2007	153	43	97	2.3	57	161	2.8	100	258	2.6
2008	168	26	53	2.0	59	184	3.1	85	237	2.8

TABLE 4 Unit 1D goat hunter success by community of residence, regulatory years 1999-2008

		Successful hunters			Unsuccessful hunters		
Year	Percent success	Unit resident	Non-local	Non-resident	Unit resident	Non-local	Non-resident
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
2007	43	29	7	7	43	12	2
2008	31	18	1	7	49	7	3

TABLE 5 Unit 1D transport methods used by successful goat hunters, regulatory years 1999-2008

	Airplane		Boat		Foot		Hwy vehicle		Other[a]	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
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)
2007	1	(2)	22	(51)	0	(0)	14	(33)	6	(14)
2008	0	(0)	13	(50)	0	(0)	9	(35)	4	(15)

[a] Includes 3- and 4- wheelers and unknown transportation

TABLE 6 Unit 1D commercial services reported by goat hunters, regulatory years 1999-2008

Year	Unit residents		Other AK residents		Non-residents		Total use		Registered Guide	Transporter	Other
	No	Yes	No	Yes	No	Yes	No	Yes			
1999[a]	56	2	21	1	0	0	77	3	1	1	1
2000[b]	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
2007	71	1	19	0	1	8	91	9	8	1	0
2008	67	0	7	1	1	9	78	10	9	1	0

[a] Six percent of hunters did not report whether they used commercial services in 1999.
[b] 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 1999-2008

	WAA					
Regulatory year	4302	4303	4405	4407	4408	*Total*
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
2007	22	1	5	12	3	43
2008	15	0	3	7	1	26

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

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

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

BACKGROUND

Mountain goat populations were established on Baranof Island (~1865 square miles) in 1923, when 18 animals were transplanted from Tracy Arm in Game Management Unit 1 (Paul 2009). Goats were not believed to have been indigenous to the island, although early written Russian history is confusing with references to "white deer." Recently, tissue samples from goats in Unit 4 were analyzed and compared using DNA analysis. The genetic makeup of most goats is similar to that of goats in Tracy Arm where Baranof goats were transplanted from. However, several of the goats had DNA that was different enough to suggest that they originated from a different stock (Kevin White, pers. Comm.). Further DNA analysis may help determine if indeed there are two different genotypes on Baranof, and what might have occurred to make this possible. 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) (Paul 2009), 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 have declined somewhat during the period 2006-2009 due to winters with above-normal snow pack and cold, late spring conditions. The recent range expansions to areas on the southern part of the island that occurred prior to this period appear to have withdrawn.

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 1,000 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).

Harvest guidelines consider population trend data, number of kids observed per 100 adults counted, nanny harvest ratio to billy harvest, and age of harvested goats,

Management objectives were revised in 2006 to be more consistent regionwide. The new objectives are based on a point system, setting a maximum allowable harvest of 6 points (males=1pt, females=2pts) per 100 goats observed during aerial surveys. Thus, the objective is no more than 6 males, or 3 females, or any combination of those points not exceeding 6 per 100 goats.

A 5-year trend which showed slight increases in the number of guided nonresident hunters ended in this reporting period. A downturn in national economic conditions and decline in discretionary spending is believed to be the primary factor. Although harvest of males is encouraged, females averaged 41% 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. The point 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 the area and number of days hunted, kill date, sex of goat harvested, transportation used, and any use of commercial services. Since 1998 successful hunters had been encouraged to voluntarily bring in the horns from their goat for age determination. Hunter participation in the voluntary program dropped to 72% prior to the 2006 and 2007 seasons. Once the point system was put in place in 2006, the percentage of hunters bringing in horns climbed to 91%. However, because a typical surge in harvest during late December increases our need to have an accurate and timely count of male and female goats throughout the season, horn measurement became a mandatory condition of the permit hunt beginning with the 2008 season.

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 by helicopter under optimal conditions 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. During 2005-2008, only partial surveys have been completed due to poor weather and aircraft availability. A fairly complete aerial survey was accomplished in 2009 for the northern third of the island.

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 1,300 goats and an estimated population of 1,530 goats. See Mooney 2008 for details on this and earlier surveys. 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 and 2008, following record snowfall, poor weather prevented extensive surveys. In 2009, surveys via helicopter were accomplished for the northern third of the island on established trend count routes and tallied 348 goats. More importantly, the number of kids per 100 goats sighted dropped to 18%; a 4.4% decline. Additional survey effort should be expended in future years to determine sightability, which should lead to more precise population estimates.

Up until 2007, goat populations continued to expand both spatially and numerically on Baranof Island. Record winter snow packs during the winters of 2006 through 2008, along with three consecutive late and cold springs, have reduced the goat population. 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 and winter range may be affected proposed developments of hydroelectric projects in Sitka and Takatz Bay. A decision by the City and Borough of Sitka to raise the height of the Blue Lake dam will directly affect some wintering goats due to habitat loss. The project may provide hunters with improved boat launching at the dam and better access to goat winter range, affecting goat vulnerability. A second proposed hydroelectric development on the eastern side of the island at Takatz Bay could include a couple of dams and an overland transmission line route across the island to a tie-in with the Green Lake-Blue Lake transmission line. This development has the potential for direct impacts to the movement of goats on summer and winter range.

Areas on the northern one-third of Baranof Island (where an estimated 60-70% of the goat population resides) show an extensive network of trails and dig-outs. Dig-outs are areas of soft, damp ground were goats dig up the ground to lie on and cool off. We have discussed the potential for a cooperative agency habitat assessment project to determine the impact of goats on the alpine summer range with the US Forest Service. As of this report date, funding for a project has not been secured.

E. L. Young estimated a Baranof Island population of 1,000 goats in 1991 (cited by Faro 1994). Whitman (2002) estimated the population at 1,350, and an estimate from the 2004 surveys was

1,529 goats. Survey and harvest data since then indicate a decline with a current estimated population of 1,300 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%. Surveys conducted in 2009 saw a decline to 18%. These data should be viewed cautiously because of differences in observers, pilots, type of aircraft used, and timing of surveys. Although we can differentiate kids and adults during aerial surveys, we are unable to differentiate male and female goats using the aerial survey methodology. Therefore we do not know the sex ratio of goats on the landscape. We do have harvest data, but, since hunters are encouraged to select males, the harvest sex ratios do not reflect population-wide sex ratios.

From 1976 to 2008, hunters harvested 1,139 goats that have been classified by sex. 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 and the 2007 harvest resulted in 13 females taken and 26 males. The mean ages by sex of harvested goats (only 8 females and 17 males were aged) were 3.8 years for males and 5.3 years for females. In 2008, hunters harvested 10 females and 22 males but only 21 males and 8 females were aged. The mean ages by sex of harvested goats were 4.4 years for males and 3.5 years for females.

In 2007 and 2008, 3 harvested females were $\geq$ 8 years of age, while 2 males were $\geq$ 8 years of age. Approximately 81% of all harvested females and 82% of all harvested males were between the ages of 1.5 and 5 years. One female and one male were aged at 10 years old when harvested during this reporting period.

With a goal of encouraging hunters to select billies (male goats) over nannies (female goats), we show hunters a series of close-up photographs of goats on Baranof Island at the Sitka office to help them identify characteristics of the sexes in the field. This effort complements a region-wide brochure on the subject, issued in the summer of 2008, which can be distributed to hunters.

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. Until 2007 public reports and survey observations of goats south of Whale and Gut bays were increasing yearly. Contiguous goat habitat is limited south of Whale and Gut bays and that limitation plays a part in slowing the range expansion and population growth of the goats in this area. Winter habitat is more difficult to define, but south-facing cliffs are generally preferred. The extreme winters of 2006 through 2008 most likely adversely affected goats in less than optimal habitat. Continuing island-wide surveys is an important priority for the next reporting period since management harvest guidelines are derived from population surveys and hunter harvest numbers.

Horn Growth Rates

In an effort to better understand growth characteristics of Unit 4 goats, hunters were requested to voluntarily submit horns for aging and measuring from 1998 through 2007, and beginning 2008, are now required to do so. A total of 481 goats from the 1998–2008 seasons yielded data on horn growth and have been aged based on discreet annuli in horns (Brandborg 1955).

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. Also, after 6 years of age, growth annuli are so small that accurate measurements are difficult.

Despite earlier indications that incremental horn growth may reflect winter severity (Whitman 2000), analysis of horn growth data from the 1999 through 2008 seasons suggests 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 previous report period, the board adopted a proposal to prohibit the taking of a nanny with kids. No new proposals were adopted during this report period.

Hunter Harvest. During 2007 and 2008, 331 and 285 registration permits were issued, respectively (Table 1). A total of 38 (2007) and 32 (2008) goats were legally harvested. Fifty-one percent of permittees actually hunted in 2007 and 44% hunted in 2008. For those hunters going afield, the success rate was 22% in 2007 and 26% in 2008. Five-year averages for the period 2004–2008 were: 305 permits issued; 145 hunters afield; and 45 goats reported harvested. Hunters reported 68% male goats in the harvest in 2007 and 69% in 2008 (Table 1). With the current Unit 4 population estimate for goats at 1,300 animals, documented harvest during the report period accounts for less than 3.5% of the population 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. Seventy-five percent of hunters were local residents during 2007, a number that dropped to 72% in 2008 (Table 2). The proportion of nonresident guided hunters was 15% in 2007 and rose to 18% in 2008. Although these percentages of nonresidents are still low, the trend indicates a slight long-term increase.

Harvest Chronology. Weather and hunter access are 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. In the last decade however, hunters have elected to hunt after early-season snows drive goats to lower elevations. The 2007 season saw a swing back to what has been a more traditional trend with 13 (33%) goats harvested in August and 4 (10%) in September. During 2007, 10 goats (26%) were harvested during December, whereas 8 (21%) were harvested in November and only 4 (10%) taken in October (Table 3). Some of the early season effort in

2007 is attributable to increases in guided nonresident hunter effort. In 2008 hunters' largest monthly harvest was during December when 10 (31%) were taken. In August 2008, 7 (22%) goats were taken and 6 goats (19%) each were harvested in September and November.

Transport Methods. Boats continue to be the main mode of transportation for Unit 4 goat hunters. During 2007, 56% of the successful hunters used boats for primary access. In 2008, successful hunters used boats for primary access 69% of the time (Table 4). The use of airplanes dropped to 18% in 2007, declining further to 13% in 2008.

Other Mortality

We have no quantitative estimates of extent or causes of other goat mortality. Brown bear-caused mortality occurs but we don't know its significance. During aerial surveys we have observed bears at elevations between 3,000-4,200 feet lying prone in the rocks above goats; these bears may have been waiting in apparent ambush. Baranof Island's abundant deer and goat populations on summer alpine range appear to provide a plentiful resource for opportunistic bears. Bald eagles have been observed hazing young goats and kids as they cross over narrow ridges, similar to behavior exhibited by golden eagles in other locales. Winter starvation and accidental deaths due to falls, rockslides, and avalanches undoubtedly take some toll on the population.

HABITAT

Assessment

A preliminary 2004 sampling effort of 3 sites on Baranof found that dwarf blueberry (*Vaccinium caespitosum),* fireweed *(Epilobium sp.)*, and oatgrass *(Trisetum sp.)* were grazed at each location (see Mooney 2008 for more details). No other habitat studies have been conducted.

Enhancement

No habitat enhancement activities were conducted on goat range during this report period. In cooperation with U.S. Forest Service Sitka Ranger District biologists, we continue to seek funding to develop projects 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 Blue Lake and Takatz Lake hydroelectric projects proposed by the City and Borough of Sitka may have some negative impacts to goats.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 4 mountain goat population appears to be in a slight decline at this time. We recommend that current state regulations remain in effect concerning season dates and bag limits. The current registration permit hunt works well and hunters seem to readily accept the hunt conditions and obligations. If the proportion of harvested females continues an upward trend, we will need to review whether hunter targeting of males should remain voluntary. The new brochure to help hunters with sex identification of goats will continue to be used. The mandatory horn measurement requirement as part of the registration permit for successful hunters is providing good information and filling in the voids from the earlier voluntary program. It also provides an opportunity for us to collect small tissues samples for DNA analysis with little additional work.

To help develop long tem management strategies, we need to explore ways to determine goat sightability during aerial survey efforts. Knowing that will allow a better estimation of goat population size on the island. Also, habitat assessment studies may help to identify the highest number of goats habitats can support without degradation leading to finer scale geographic harvest management.

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TABLE 1 Unit 4 mountain goat harvest data for registration permit hunt RG150, regulatory years 2004-2008

Year	Permits issued	Did not report	Did not hunt	Unsucess-ful hunters	Successful hunters	Males	Females	Sex unk.	Illegal	Total Harvest
2004	313	0	162	104	47	27	19	1	0	47
2005	285	2	142	88	53	30	20	3	0	53
2006	309	5	166	84	54	31	22	1	0	54
2007	331	4	158	131	38	26	12	0	1	39
2008	285	2	159	92	32	22	10	0	0	32

TABLE 2 Unit 4 mountain goat hunter residency and success for registration permit hunt RG150, regulatory years
2004–2008

Year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonres	Total	Local[a] resident	Nonlocal resident	Nonres	Total	
2004	38	1	8	47	109	16	15	140	187
2005	30	5	18	53	90	4	7	101	154
2006	32	2	20	54	80	6	25	111	165
2007	28	3	7	38	92	12	17	121	159
2008	18	3	11	32	70	11	10	91	123

[a]Residents of Baranof Island

TABLE 3 Unit 4 mountain goat harvest chronology by month for registration permit hunt RG150, regulatory years 2004–2008

	Month					
Year	August	September	October	November	December	Total
2004	14	9	10	3	11	47
2005	19	10	4	9	11	53
2006	3	14	13	9	15	54
2007	13	4	4	8	10	39
2008	7	6	3	6	10	32

TABLE 4 Unit 4 mountain goat harvest by transport method used by successful hunters for registration permit hunt RG150, regulatory years 2004–2008

Year	Airplane	Boat	Snow machine	Off-road Vehicle[c]	Vehicle	Walked	Total
2004	16	24	0	2	1	4	47
2005	19	29	0	0	1	2	53[a]
2006	16	34	0	1	0	1	54[a]
2007	7	22	0	3	3	3	39
2008	4	22	0	2	3	1[b]	32

[a] 2 goats taken in each of these years were unspecified by transport method
[b] Listed as "other" on report – but locations given as Hidden Falls (Taken by Hidden Fall Res) & Cross Mt (taken by Sitka Res)
[c] Off-road vehicle includes ¾ wheeler & off-road vehicle

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

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. During the 1980s Unit 5A surveys and anecdotal accounts from guides, pilots, and hunters indicated that goat numbers were higher than recorded in the early 1970s. In the 1990s no aerial surveys were conducted, but anecdotal information from hunters and guides 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 beginning 2000. ADF&G omitted "Nunatak Bench" from the legal hunt area of RG170, thereby closing it to goat hunting under state regulation. 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.

Unit 5 has both a state registration permit hunt and a federal subsistence regulations hunt for goats. The federal subsistence goat hunt is managed by the U. S. Forest Service under a federal subsistence registration permit, and has been in existence since 1997. Season dates for the federal hunt are 1 August 1 to 31 January. The state hunt opens 1 August and ends on 31 December. ADF&G receives information from all successful hunters and unsuccessful hunters in the state hunt, but information from federal permittees is often difficult to obtain because the reporting requirement is not strictly enforced.

MANAGEMENT DIRECTION

Management Objectives

Unit 5 mountain goat management objectives identified by staff 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.
- Identify discrete geographic areas and manage within these areas.
- Maintain a guideline harvest not to exceed 6 points (males = 1 pt. and females = 2 pts.) per 100 goats observed.
- Conduct aerial surveys at least every 3 years in areas of high harvest.
- Continue to monitor the Nunatak Bench goat population through aerial surveys.

METHODS

We conducted several aerial surveys within the unit during this report period. Because of our concern with low goat numbers at Nunatak Bench and areas west of Harlequin Lake, we made it a priority to survey these areas during the report period. We conducted a complete survey of the Brabazon Range in 2008.

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. We also gathered anecdotal information 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 remains depressed in spite of the hunting closure that has been implemented since 2000. The area east of Harlequin Lake appears to also be experiencing a downward trend in goat numbers. We will continue to monitor these areas through aerial surveys, and take management actions (hunt reinstatement, harvest quota reduction, hunt closure, etc.) based on the number of goats detected. Areas east of Harlequin Lake appear to be healthy and aerial surveys consistently demonstrate adequate goats to support a hunt.

Mortality

Harvest

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

Board of Game Actions and Emergency Orders (EO). During RY 2008, an Emergency Order was issued to close a portion of the RG170 mountain goat hunting season in the area bounded by Harlequin Lake to the east, and Russell Fiord to the west, and Nunatak Fiord to the north due to declining numbers of goats detected in aerial surveys (Table 1).

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 desire for no harvest in this area by using EOs and Special Action Requests to close the federal season.

Hunter Harvest. Seven goats (6 males & 1 female) were harvested during the report period (3 in 2007 and 4 in 2008). Areas that were open to mountain goat hunting during the report period generally allowed 5-6 points to be taken (male=1 point and female=2 points). Neither the harvest in 2007 or 2008 reached the harvest point quota. The mountain goat harvest has been extremely low in Unit 5B and a harvest point quota has not been established in this unit. Three were harvested in Unit 5A, and 4 were from 5B. Three of the goats taken in Unit 5B were taken under a federal subsistence permit. The percentage of male goats in the harvest was 86%, which is only slightly lower than the previous report period (100%) and still higher than the previous 8-year mean of 77%. The relatively low harvest during 2007 and 2008 is consistent with that seen during the previous 3 report periods (Table 2). 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.

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, at least partially occurring on Nunatak Bench, and should be viewed as an anomaly. After this poaching operation was eliminated, the harvest of 10 goats in 2000 was again closer to the long-term annual harvest. During the past 9 years, the mean Unit 5 harvest has been 3 goats per year.

Permit Hunts. A total of 27 and 23 registration permits were issued during 2007 and 2008, respectively, slightly below the number of permits issued during the previous report period (29 & 35) (Table 4). Hunting effort was minimal with only 10 and 9 people hunting during 2007 and 2008, respectively. The mean of 10 hunters per year during the report period is similar to the last three report periods (2001-2006). 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. The goat hunter success rate was 30% in 2007, and increased to 44% in 2008. The 37% success rate for the period is slightly lower than the previous report period (44%). Success rates in Unit 5 have ranged from 14% to 55% since 2001 (Table 3). Goat hunting success in Unit 5 is extremely variable. There is no obvious reason for the variability, however, weather and access drives goat hunting activity in most locations and may also account for the variability in success rate. Unlike the previous 4 years, resident hunters took the majority of goats (4 of 7) during this report period. This is chiefly due to increased hunting activity by federally qualified hunters under federal regulation. Nonresidents are not eligible for the federal

hunt. Of the 4 goats taken by residents, 3 were taken in Unit 5B under authority of a federal subsistence permit, and the remaining goat was taken in Unit 5A with a state registration permit. Overall, 10 resident hunters and 9 nonresident hunters indicated they hunted mountain goats in Unit 5 during the report period (Table 3).

Harvest Chronology. During the report period 2 goats were harvested in October, and 5 were taken in November. The Unit 5 goat harvest is traditionally spread throughout the season, with the greatest number of goats typically taken during October and November when goats may be found at lower elevations.

Transport Methods. In 2007, airplanes were the transportation method used by 2 of the 3 successful hunters, with the third hunter using a boat. In 2008, boats accounted for 100% of the transportation used by successful goat hunters (Table 5). Local residents continued to favor boats as their preferred mode of transportation. Local and non-local residents use commercial services in the form of charter aircraft to fly them into remote airstrips that provide access to hunting areas (Table 6). Nonresident hunters must have a guide to hunt mountain goats in Alaska (also Table 6), and the few guides offering goat hunts in Unit 5 use aircraft access hunting areas. The two hunters using aircraft for access in 2007 were nonresidents on a guided hunt in Unit 5A.

Other Mortality

The decline in goat numbers at Nunatak Bench, and areas southeast to Harlequin Lake despite hunt closures, suggests something unrelated to hunting is limiting goat numbers in those areas. Winter severity may be an additive factor contributing to the continued decline but numbers began to dip prior to the extreme winter of 2006-2007. Predation or disease could also be factors. Region I wildlife research staff are working with U.S. Forest Service biologists to develop ways to intensively monitor mountain goats in this area with aerial surveys, and to design a research project with the objective of identifying the causes(s) of the current decline.

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 understanding of goat population levels, as well as herd composition and distribution. Few of the Unit 5 mountain goat management objectives are quantifiable. The two that are, harvest point levels and goat per hour observations were achieved; however, goats per hour must be considered in the context of the overall number of goats observed, percentage of kids, and areas surveyed. We achieved other management objectives by providing hard-copy and internet-based mountain goat sex identification resources for hunters, and conducting multiple surveys in areas with depressed mountain goat numbers. These efforts should continue, especially at Nunatak Bench and surrounding areas, where the population appears to be persistently low. Like many areas in Southeast, Alaska, the mountain goat habitat capability in Unit 5 in unknown. Future research should focus on the development of habitat capability models for Southeast, Alaska. The Nunatak Bench and areas west of Harlequin Lake will remain closed to hunting until aerial surveys results suggest goat numbers have increased to near 80 on Nunatak Bench, and 100 in the area west of Harlequin Lake.

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TABLE 1 Unit 5 Mountain Goat Aerial Survey Data 1986-2008[a]

Year	Number Adults	Number Kids	Total Goats	Kids:100 Adults	Percent Kids	Goats/Hr.
1986	36	11	47	31	23	40
1987	196	53	249	27	21	60
1988	140	53	193	38	27	56
1989	64	29	93	45	31	47
1990-1999				No Survey		
			Nunatak Bench			
2000	69	13	82	19	16	91
2000	40	6	46	15	13	52
2001	37	11	48	30	23	20
2001	37	2	39	5	5	54
2002	25	4	29	16	14	19
2003	29	14	43	48	33	40
2004				No Survey		
2005			19			
2006				No Survey		
2006	26	7	33	27	21	48
2007	17	6	23	35	2	31
2008	35	9	42	25	20	25
			East Harlequin Lake			
2000	103	20	123	19	16	41
2001	119	31	150	26	21	52
2002-2006				No Survey		
2007[d]	55	5	60	8	21	103
2008[f]	38	14	52	37	27	29
			West Harlequin Lake			
2003	63	21	84	33	25	126
2004				No Survey		
2005[b]	122	28	150	23	19	75
2006[c]	103	13	116	13	11	82
2007[e]	57	9	66	16	14	33
2008[g]	164	25	189	15	13	145

[a]Beginning in 2000, aerial survey data is listed for specific area of Unit 5A and 5B.
[b]Survey of Chaix Hills, Unit 5B
[c]Nunatak Fiord south to Miller Creek
[d]Mt. Reborn to Italio Lake
[e]Crescent Mountain to W. Nunatak Glacier
[f]Nunatak to Harlequin Lake
[g]Harlequin Lake to Novatak Glacier

TABLE 2 Unit 5 annual goat harvest, regulatory years 1999–2008

Year	Males	Females	Unknown	Total
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
2007	2	1	0	3
2008	4	0	0	4

TABLE 3 Unit 5 goat hunter success by community of residence, regulatory years 1999–2008

		Successful hunters			Unsuccessful hunters		
Year	Percent success	Unit resident	Other AK	Non-resident	Unit resident	Other AK	Non-resident
1999[1]	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
2007	30	1	0	2	3	0	4
2008	44	3	0	1	2	1	2

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

TABLE 4 Unit 5 goat hunter effort and success, regulatory years 1999 through 2008

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits Issued	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days	Nr hunters	Total days	Avg nr days
1999	44	19	31	1.6	7[1]	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
2007	27	3	5	1.7	7	29	4.1	10	34	3.4
2008	23	4	15	3.8	5	21	4.2	9	36	4.0

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

TABLE 5 Unit 5 transport methods used by successful goat hunters, regulatory years 1999–2008

	Airplane		Boat		Snowmachine		Highway vehicle		Foot	
Year	Total	%	Total	%	Total	%	Total	%	Total	%
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
2007	2	67	1	33	0	0	0	0	0	0
2008	0	0	4	100	0	0	0	0	0	0

TABLE 6 Unit 5 commercial services used by goat hunters, regulatory years 1999-2008

	Unit residents		Other AK residents		Nonresidents		Total use	
Year	No	Yes	No	Yes	No	Yes	No	Yes
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
2007	4	0	0	0	0	6	4	6
2008	3	2	1	0	0	3	4	5

Alaska Department of Fish and Game
Division of Wildlife Conservation
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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

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

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Mountain goats are endemic to the mainland 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 have been required to report, except during 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 survey conditions 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 5 of 18 permit hunt areas during this reporting period (Table 1) which was fewer surveys than normal. Poor survey conditions during August and September hindered the effort. Based on these and surveys from previous years, the population was approximately 4000 goats (Table 1). Unit 6D had the highest number of goats. Lack of surveys

probably masked a possible decline of around 15% for goat populations caused by severe snowfall during the reporting period.

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 October 7–31 January. The bag limit was 1 goat by registration permit only. Permit hunts were opened in all areas.

Unweighted and weighted harvests were 82 and 97 during 2007–08 and 64 and 77 in 2008–09, respectively (Table 2). The harvest included 16–18 % females overall, which was lower than usual.

The maximum allowable harvest was 145 goat units during 2007–08 and 147 during 2008–09. Weighted harvest exceeded the maximum allowable harvest in 5 of the 36 hunts held during this reporting period. Overall, there were no significant events of overharvest that could affect populations with the possible exception of RG248 during 2007.

Board of Game Actions and Emergency Orders. Ten emergency orders were issued closing registration permit hunts when MAH was reached. During 2007–08, hunts RG231, RG248, RG249, RG252, and RG266 were closed. During 2008–09, hunts RG202, RG215, RG231, RG248, RG249 and RG52 were closed. These were routine management actions.

Permit Hunts. Altogether, 366 registration permits were issued in each year of the period. (Table 2). This was a decline from a peak of 429 seen in 2006.

Hunter Residency and Success. Most successful goat hunters during this reporting period were residents (Table 3). Hunter success was lower during 2008–09 because of poor weather conditions in the fall.

Guided hunting activity has increased substantially in RG249 and RG252 because the U.S. Forest Service, Glacier Ranger District, permitted additional guides to use the areas. Currently guides are permitted more hunts than there is harvest quota. In RG252, 80-92% of the harvest quota was taken by guided nonresidents during the reporting period. I met with concerned guides and the Forest Service to resolve the situation. Thus far the Forest Service has agreed on a moratorium against any new guides, and guides have verbally agreed not to increase hunts above their normal, annual client number. I agreed to prioritize the reopening of RG243 (survey required) and investigate opening a new hunt between Unakwik Inlet and College Fiord.

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 4000. 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%.

To relieve crowded guiding conditions west of Valdez Arm I will survey and reopen RG243 in Port Fidalgo and investigate the area between Unakwik Inlet and College Fiord for a possible new registration hunt.

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TABLE 1 Unit 6 summer mountain goat composition counts and estimated population size, 2004–2008

Unit	Hunt nr. or area	Regulatory year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size[a]
6A	RG202	2004–2008	None	--	--	--	--	--	--	90
	RG204	2004–2008	None	--	--	--	--	--	--	195
	RG206	2004–2008	None	--	--	--	--	--	--	225
	RG212	2004–2008	None	--	--	--	--	--	--	96
	RG214	2004–2008	None	--	--	--	--	--	--	2
	RG215	2008	Full	4	--	0	0	--	4	5
	Remainder	2004–2008	None	--	--	--	--	--	--	72
6A TOTAL		2004–2008	Partial	4	--	0	0	--	4	685
6B	RG220	2004–2008	None	--	--	--	--	--	--	200
	RG226	2005	Full	78	(80)	19	(20)	24	97	116
		2008	Full	78	(88)	11	(12)	14	89	107
6B TOTAL		2004	None	--	--	--	--	--	--	397
		2005	Partial	78	(80)	19	(20)	24	97	316
		2006–2007	None	--	--	--	--	--	--	316
		2008	Partial	78	(88)	11	(12)	14	89	307
6C	RG230	2004	Full	109	(86)	18	(14)	17	127	168
	RG231	2008	Full	98	(78)	28	(22)	29	126	151
	RG232	2004–2008	None	--	--	--	--	--	--	252
6C TOTAL		2004	Partial	109	(86)	18	(14)	17	127	594
		2005–2007	None	--	--	--	--	--	--	594
		2008	Partial	98	(78)	28	(22)	29	126	571
6D	RG242	2004–2007	None	--	--	--	--	--	--	670
		2008	Partial	325	(85)	56	(15)		381	615
	RG243	2004–2008	None	--	--	--	--	--	--	170
	RG244	2004–2008	None	--	--	--	--	--	--	250
	RG245	2004–2008	None	--	--	--	--	--	--	134
	RG248	2005	Partial	66		0			66	78
	Heiden Canyon	2004–2008	None	--	--	--	--	--	--	55
	RG249	2004	Full	279	(84)	55	(16)	20	334	367
		2008	Full	200	(84)	37	(16)	19	237	270
	RG252	2004	Full	192	(83)	39	(17)	20	231	277
	RG266	2004–2008	None	--	--	--	--	--	--	319
	Remainder	2004–2008	None	--	--	--	--	--	--	133
6D TOTAL		2004	Partial	471	(83)	94	(17)	20	565	2446
		2005	Partial	66		0		0	66	2476
		2006–2007	None	--	--	--	--	--	--	2479
		2008	Partial	525	(85)	93	(15)	18	618	2411

TABLE 1 continued

Unit	Hunt nr. or area	Regulatory year	Survey coverage	Older goats	(%)	Kids	(%)	Kids:100 older goats	Total goats observed	Estimated population size[a]
UNIT 6	TOTAL	2004	--	--	--	--	--	--	--	4122
		2005	--	--	--	--	--	--	--	4071
		2006	--	--	--	--	--	--	--	4125
		2007	--	--	--	--	--	--	--	4074
		2008	--	--	--	--	--	--	--	3974

[a] Based on most current complete (full) survey(s)

TABLE 2 Unit 6 mountain goat harvest data by permit hunt, 2004–2008

Unit/ hunt nr	RY	Permits issued	Nr did not hunt	Percent did not hunt	Nr unsuccessful hunters	Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters	M	(%)	F	(%)	Unk.	Total harvest Unw [a]	W [b]
6A/RG202	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
	2007	9	8	89	1	100	0	0	0	(0)	0	(0)	0	0	0
	2008	30	15	50	10	67	5	33	4	(80)	1	(20)	0	5	6
6A/RG204	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
	2007	14	11	79	0	0	3	100	3	(100)	0	(0)	0	3	3
	2008	13	10	77	1	33	2	67	2	(100)	0	(0)	0	2	2
6A/RG206	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		1	1	2
	2007	12	6	50	2	33	4	67	3	(100)	0	(0)	1	4	5
	2008	4	3	75	0	0	1	100	1	(100)	0	(0)	0	1	1
6A/RG212	2004	4	4	100											
	2005	0													
	2006	4	4	100											
	2007	0													
	2008	0													
6A/RG215	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
	2007	4	4	100	0	0	0	0	0	(0)	0	(0)	0	0	0
	2008	0													
6A TOTAL	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
	2007	39	29	74	3	30	7	70	6	(100)	0	(0)	1	7	8
	2008	47	28	60	11	58	8	42	7	(88)	1	(13)	0	8	9

TABLE 2 continued

Unit/ hunt nr	RY	Permits Issued	Nr did not	Percen did hunt	Nr unsuccessful hunters	Percent unsuccessful hunters	Nr successful hunters	Percent successful hunters	Male	(%)	Female	(%)	Unk.	Total harvest Unw [a]	W [b]
6B/RG220	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
	2007	11	7	64	2	50	2	50	2	(0)	0	(0)	0	2	2
	2008	18	14	78	3	75	1	25	1	(100)	0	(0)	0	1	1
6B/RG226	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
	2007	9	6	67	1	33	2	67	2	(100)	0	(0)	0	2	2
	2008	6	2	33	4	100	0	0	0	(0)	0	(0)	0	0	0
6B TOT	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
	2007	20	13	65	3	43	4	57	4	(100)	0	(0)	0	4	4
	2008	24	16	67	7	88	1	13	1	(100)	0	(0)	0	1	1
6C/RG230	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
	2007	42	17	40	17	68	8	32	8	(100)	0	(0)	0	8	8
	2008	40	10	25	22	73	8	27	8	(100)	0	(0)	0	8	8
6C/RG231	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
	2007	16	5	31	5	45	6	55	3	(50)	3	(50)	0	6	9
	2008	31	8	26	17	74	6	26	2	(33)	4	(67)	0	6	10
6C/RG232	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
	2007	20	11	55	4	44	5	56	3	(60)	2	(40)	0	5	7
	2008	16	8	50	5	63	3	38	3	(100)	0	(0)	0	3	3

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	Male	(%)	Female	(%)	Unk.	Total harvest Unw [a]	Total harvest W [b]
6C TOTAL	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
	2007	78	33	42	26	58	19	42	14	(74)	5	(26)	0	19	24
	2008	87	26	30	44	72	17	28	13	(76)	4	(24)	0	17	21
6D/RG242	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
	2007	27	16	59	5	45	6	55	6	(100)	0	(0)	0	6	6
	2008	35	19	54	10	63	6	38	5	(100)	0	(0)	1	6	7
6D/RG244	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
	2007	16	14	88	2	100	0	0	0	(0)	0	(0)	0	0	0
	2008	27	18	67	6	67	3	33	1	(33)	2	(67)	0	3	5
6D/RG245	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
	2007	36	19	53	16	94	1	6	1	(100)	0	(0)	0	1	1
	2008	19	14	74	3	60	2	40	0	(0)	2	(100)	0	2	4
6D/RG248	2005	28	10	36	13	72	5	28	5	(100)	0	(0)	0	5	5
	2006	23	11	48	10	83	2	17	1	(50)	1	(50)	0	2	3
	2007	35	13	37	13	59	9	41	7	(78)	2	(22)	0	9	11
	2008	20	8	40	9	75	3	25	2	(67)	1	(33)	0	3	4
6D/RG249	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
	2007	33	13	39	5	25	15	75	9	(64)	5	(36)	1	15	21
	2008	18	8	44	2	20	8	80	6	(75)	2	(25)	0	8	10

TABLE 2. continued

Unit/ hunt no.	RY	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 Unw [a]	W [b]
6D/RG252	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
	2007	32	18	56	4	29	10	71	9	(90)	1	(10)	0	10	11
	2008	45	18	40	15	56	12	44	11	(100)	0	(0)	1	12	13
6D/RG266	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
	2007	50	29	58	10	48	11	52	10	(91)	1	(9)	0	11	12
	2008	44	34	77	6	60	4	40	4	(100)	0	(0)	0	4	4
6D TOTAL	2004	221	122	55	46	46	53	54	37	(77)	11	(23)	5	53	67
	2005	199	80	40	63	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
	2007	229	122	53	55	51	52	49	42	(82)	9	(18)	1	52	62
	2008	208	119	57	51	57	38	43	29	(81)	7	(19)	2	38	46
UNIT 6 TOTAL	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
	2007	366	197	54	87	51	82	49	66	(83)	14	(18)	2	82	97
	2008	366	189	52	113	64	64	36	50	(81)	12	(19)	2	64	77

[a] Unweighted harvest; each male, female, and unknown counted as 1.

[b] 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, 2004–2008

		Successful					Unsuccessful					
Unit	Regulatory year	Local resident	Nonlocal resident	Nonresident	Total	(%)	Local resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
6A	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
	2007	0	2	5	7	(70)	0	1	2	3	(30)	10
	2008	0	0	8	8	(42)	1	1	9	11	(58)	19
6B	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
	2007	0	1	3	4	(57)	0	3	0	3	(43)	7
	2008	0	0	1	1	(13)	1	2	4	7	(88)	8
6C	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
	2007	13	5	1	19	(42)	20	6	0	26	(58)	45
	2008	11	2	0	13	(100)	33	13	0	46	(78)	59
6D	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
	2007	9	19	24	52	(49)	17	36	2	55	(51)	107
	2008	5	12	24	41	(45)	13	30	8	51	(55)	92
Unit 6 Total	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
	2007	22	27	33	82	(49)	37	46	4	87	(51)	169
	2008	16	14	33	63	(35)	48	46	21	115	(65)	178

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	2004	36	45	18	0	0	0	11
	2005	0	88	13	0	0	0	8
	2006	17	67	17	0	0	0	6
	2007	29	57	14	0	0	0	7
	2008	38	25	38	0	0	0	8
6B	2004	67	33	0	0	0	0	3
	2005	67	33	0	0	0	0	3
	2006	36	64	0	0	0	0	11
	2007	25	50	25	0	0	0	4
	2008	100	0	0	0	0	0	1
6C	2004	67	33	0	0	0	0	3
	2005	67	33	0	0	0	0	3
	2006	36	64	0	0	0	0	11
	2007	0	0	53	5	16	26	19
	2008	0	0	31	31	15	23	13
6D	2004	0	62	30	2	2	4	53
	2005	0	50	46	0	4	0	56
	2006	0	66	32	0	2	0	44
	2007	0	37	55	4	2	2	51
	2008	0	45	47	0	3	5	38
Unit 6 Total	2004	8	51	30	1	3	7	76
	2005	2	42	42	7	5	1	85
	2006	7	54	26	12	1	0	74
	2007	4	31	49	4	5	7	81
	2008	7	32	42	7	5	8	60

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

Subunit	Regulatory year	Airplane n	Airplane (%)	Boat n	Boat (%)	3- or 4-wheeler n	3- or 4-wheeler (%)	Snowmachine n	Snowmachine (%)	ORV n	ORV (%)	Highway vehicle n	Highway vehicle (%)	Unknown n	Unknown (%)	Total n
6A	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
	2007	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7
	2008	5	(63)	0	(0)	1	(13)	0	(0)	2	(25)	0	(0)	0	(0)	8
6B	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
	2007	4	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4
	2008	1	(100)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1
6C	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
	2007	0	(0)	3	(17)	4	(22)	3	(17)	0	(0)	8	(44)		(0)	18
	2008	0	(0)	0	(0)	3	(23)	0	(0)	0	(0)	10	(77)	0	(0)	13
6D	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
	2007	15	(28)	24	(45)	2	(4)	1	(2)	0	(0)	7	(13)	4	(8)	53
	2008	12	(32)	22	(58)	0	(0)	2	(5)	0	(0)	2	(5)	0	(0)	38
Unit 6 Total	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
	2007	26	(32)	27	(33)	6	(7)	4	(5)	0	(0)	15	(18)	4	(5)	82
	2008	18	(30)	22	(37)	4	(7)	2	(3)	2	(3)	12	(20)	0	(0)	60

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 7 and 15 (8397 mi^2)

GEOGRAPHIC DESCRIPTION: Kenai Peninsula

BACKGROUND

Mountain goats inhabit most areas of the Kenai Mountains. Goat densities are highest along the coastal mountains and lowest 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.

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, showed that horn growth can be used as a measure of habitat quality (McDonough et al. 2006). Kenai goats showed lower horn growth than Kodiak goats, especially for females.

Management strategy for Kenai goats has changed. Due to a significant population decline from the early 1990s through 2006, we have taken a much more conservative approach to managing goat hunts. 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. Details of this strategy are outlined in McDonough and Selinger (2008).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Monitor population trends.
- Maintain a low proportion of nannies in the harvest.
- 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). Optimally, each area is surveyed once every 3 years. Surveys distinguish kids (<4 months old) from adults. To protect the female proportion of the population, each nanny harvested is counted as 2 goats and each male as 1 when determining permit allocations and sustainable harvest levels.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size and Composition

The overall population has decreased over 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).

Mortality

Harvest

Season and Bag Limit For the past two 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 In March 2009, the board changed the bag limit. If a nanny is taken by a hunter in Units 7 and 15, that hunter is prohibited from hunting any goats in Units 7 and 15 for 5 regulatory years. This changed was proposed by the Alaska Department of Fish and Game in order to reduce the negative impact of nanny harvests and help hunters actively determine management actions.

Hunter Harvest During the past 5 seasons, the annual average harvest was 58 goats during the drawing season and 10 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 30% for drawing hunts and 19% 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 during the drawing season often prevents registration hunts from opening and may decrease future permit allocations. For many years, ADF&G has attempted to educate hunters on how to distinguish males from females. We now have an online test that helps educate hunters on determining the gender of goats (http://wildlife.alaska.gov/index.cfm?adfg=quiz.overview&quiz_id=3).

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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), 2005–2009.

Survey Year	Area	Adults	Kids	Total Goats
2009	334	71	19	90
	338	33	10	43
	339	36	6	42
	342	90	26	116
	345	148	27	175
	357	47	7	54
	363	170	37	207
2008	335	30	5	35
	337	-	-	37
	338	27	6	33
	341	49	11	60
	343	23	5	28
	347	104	16	120
	352	104	27	131
	354	32	7	39
	356	32	6	38
	358	42	9	51
	364	60	16	76
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

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Table 2 continued

2006	356	8	2	10
(continued)	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

Table 3. Harvest totals for mountain goat drawing and registration permits on the Kenai Peninsula (Units 7 & 15), 2005–2009.

Permit Type	Year	Permits Issued	# Hunted	Harvest			% Success
				Males	Females	Total	
Drawing	2005	388	201	48	27	75	37
	2006	362	148	34	18	52	35
	2007	331	164	45	19	64	39
	2008	320	144	34	6	40	28
	2009	317	172	39	20	59	34
Registration	2005	152	62	7	2	9	15
	2006	0	0	0	0	0	0
	2007	90	38	7	5	12	32
	2008	58	26	8	2	10	38
	2009	131	50	17	4	21	42

Table 4. Mountain goat harvest for drawing and registration permits on the Kenai Peninsula (Units 7 & 15), 2005–2009.

		Drawing Hunts						Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success	Billy	Nanny	Total	Permits Issued	# Hunted	% Success
331	2005	0	3	3	3	3	100				0		
	2006				0						0		
	2007				0						0		
	2008				0						0		
	2009				0						0		
332	2005	1	0	1	4	4	25				0		
	2006	2	0	2	4	2	100				0		
	2007	0	2	2	4	4	50				0		
	2008				0						0		
	2009				0						0		
333	2005	2	0	2	15	11	18				0		
	2006	0	0	0	8	3	0				0		
	2007				0						0		
	2008	0	0	0	2	2	0				0		
	2009	0	0	0	2	2	0				0		
334	2005	2	0	2	15	8	25	0	0	0	17	11	0
	2006	4	0	4	15	8	50				0		
	2007	5	1	6	15	13	46				0		
	2008	2	0	2	15	9	22				0		
	2009	0	2	2	15	12	17				0		
335	2005	1	0	1	6	4	25				0		
	2006	0	0	0	6	3	0				0		
	2007	0	0	0	3	3	0				0		
	2008				0						0		
	2009				0						0		

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Table 4 continued.

		Drawing Hunts						Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success	Billy	Nanny	Total	Permits Issued	# Hunted	% Success
336	2005	2	0	2	30	10	20				0		
	2006	2	2	4	30	8	50				0		
	2007	3	1	4	30	10	40				0		
	2008	1	0	1	30	10	10				0		
	2009	3	1	4	30	14	29				0		
339	2005	4	2	6	15	14	43				0		
	2006	2	3	5	15	12	42				0		
	2007	4	1	5	10	9	56				0		
	2008	1	0	1	10	7	14				0		
	2009	0	2	2	6	6	33				0		
340	2005	1	0	1	20	4	25	0	0	0	11	1	0
	2006	1	0	1	20	4	25				0		
	2007	2	0	2	20	9	22				0		
	2008	0	0	0	20	3	0				0		
	2009	0	0	0	20	4	0				0		
341	2005	1	1	2	4	3	67				0		
	2006	0	0	0	2	1	0				0		
	2007	1	0	1	2	2	50				0		
	2008	0	0	0	2	1	0				0		
	2009	1	1	2	2	2	100				0		
342	2005	1	1	2	15	7	29	5	1	6	43	25	24
	2006	1	1	2	15	9	22				0		
	2007	3	0	3	15	5	60				0		
	2008	4	0	4	15	11	36				0		
	2009	2	0	2	15	11	18	2	3	5	12	11	45

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Table 4 continued.

		Drawing Hunts						Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success	Billy	Nanny	Total	Permits issued	# Hunted	% Success
343	2005	0	2	2	10	7	29				0		
	2006	0	0	0	10	3	0				0		
	2007	1	0	1	2	2	50				0		
	2008				0						0		
	2009				0						0		
344	2005	1	1	2	10	6	33				0		
	2006	0	0	0	10	3	0				0		
	2007	0	0	0	5	3	0	0	0	0	12	2	0
	2008	0	0	0	5	2	0				0		
	2009	2	0	2	10	4	50				0		
345	2005	2	1	3	25	9	33	1	0	1	13	1	100
	2006	1	2	3	25	7	43				0		
	2007	2	0	2	25	11	18	1	0	1	11	4	25
	2008	4	0	4	25	8	50				0		
	2009	4	0	4	25	11	36	2	0	2	20	7	29
346	2005	10	7	17	40	31	55				0		
	2006	3	4	7	40	19	37				0		
	2007	7	6	13	40	24	54				0		
	2008	5	3	8	40	24	33				0		
	2009	12	2	14	40	32	44				0		
347	2005	3	2	5	20	13	38				0		
	2006	3	1	4	20	9	44				0		
	2007	3	1	4	20	14	29				0		
	2008	2	1	3	20	8	38				0		
	2009	1	3	4	20	13	31				0		

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Table 4 continued.

		Drawing Hunts							Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success		Billy	Nanny	Total	Permits Issued	# Hunted	% Success
352	2005	3	1	4	30	16	25		0	0	0	5	0	0
	2006	7	0	7	30	10	70					0		
	2007	0	6	6	30	15	40					0		
	2008	3	0	3	30	12	25		0	0	0	14	1	0
	2009	2	0	2	30	13	15		2	0	2	20	4	50
354	2005	0	0	0	8	2	0					0		
	2006	1	0	1	2	2	50					0		
	2007	0	0	0	2	1	0					0		
	2008	0	0	0	2	1	0					0		
	2009	0	0	0	2	1	0					0		
355	2005	0	0	0	2	2	0					0		
	2006	0	0	0	2	2	0					0		
	2007				0							0		
	2008				0							0		
	2009				0							0		
356	2005	1	0	1	5	1	100					0		
	2006	0	0	0	2	0	0					0		
	2007				0							0		
	2008				0							0		
	2009				0							0		
357	2005	1	0	1	5	2	50					0		
	2006	0	0	0	2	0	0					0		
	2007	0	0	0	2	1	0					0		
	2008	0	0	0	2	0	0					0		
	2009				0							0		

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Table 4 continued.

		Drawing Hunts						Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success	Billy	Nanny	Total	Permits Issued	# Hunted	% Success
358	2005	0	0	0	8	0	0				0		
	2006	0	0	0	8	5	0				0		
	2007	1	0	1	8	3	33				0		
	2008	1	0	1	4	1	100				0		
	2009	0	1	1	2	2	50				0		
359	2005	1	0	1	10	4	25				0		
	2006	1	0	1	10	2	50				0		
	2007	0	0	0	10	1	0	1	0	1	1	1	100
	2008	3	0	3	10	4	75				0		
	2009	1	0	1	10	3	33				0		
360	2005	2	1	3	25	10	30				0		
	2006	1	0	1	25	8	13				0		
	2007	3	1	4	25	11	36	1	3	4	7	4	100
	2008	3	1	4	25	16	25				0		
	2009	3	1	4	25	12	33				0		
361	2005	2	2	4	15	7	57				0		
	2006	3	0	3	15	10	30				0		
	2007	0	0	0	15	3	0	0	0	0	12	5	0
	2008	2	0	2	15	8	25				0		
	2009	1	5	6	15	9	67				0		
362	2005	2	0	2	18	5	40				0		
	2006	2	3	5	18	9	56				0		
	2007	5	0	5	18	8	63				0		
	2008	2	1	3	18	6	50				0		
	2009	2	2	4	18	9	44				0		

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Table 4 continued.

		Drawing Hunts							Registration Hunts					
Area	Year	Billy	Nanny	Total	Permits Issued	# Hunted	% Success	Billy	Nanny	Total	Permits Issued	# Hunted	% Success
363	2005	5	3	8	30	18	44				0		
	2006	0	2	2	30	11	18				0		
	2007	5	0	5	30	12	42				0		
	2008	1	0	1	30	11	9	0	0	0	20	8	0
	2009	5	0	5	30	12	42	0	0	0	20	3	0
364[1]	2005	1	1	2	14	10	20				0		
	2006	1	0	1	14	3	0				0		
	2007				0			3	0	3	10	8	38
	2008				0			3	0	3	10	6	50
	2009				0			5	0	5	10	7	71
365[1]	2005	5	1	6	30	11	55				0		
	2006	8	1	9	29	16	0				0		
	2007				0			1	2	3	28	10	30
	2008				0			5	2	7	14	11	64
	2009				0			7	1	8	49	18	44

[1]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), 2005–2009.

Year	August	September	October	Unspecified
2005	21	46	33	0
2006	16	50	34	0
2007	28	44	27	2
2008	25	45	25	5
2009	24	49	25	2

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

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

GEOGRAPHIC DESCRIPTION: Kodiak and adjacent islands

BACKGROUND

The mountain goat population in Unit 8 originated from 11 females and seven 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; managers change the number of permits available and the areas open for hunting 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 opened 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 5-20% of the population, 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. Current goat populations on the southern portion of the island are increasing and are above our management objective. In March of 2009 the Board of Game adopted a proposal to expand hunting opportunities in this area by creating a new registration hunt open to residents and nonresidents. Based on data from comprehensive aerial surveys, we estimated that the goat population of Unit 8 in 2008 was 2,145 goats.

MANAGEMENT DIRECTION

Management Objectives

Maintain a prehunting population of 700–1,000 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 2007 covered approximately 75% of the goat range, yielding a total count of 1,674 goats. In 2008, we surveyed about 85% of the goat range and classified 1,975 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 2008 was 2,145 goats, with the virtually all suitable habitat being used.

Population Composition

During the past five years, the kid:adult ratio ranged from a high of 23:100 in 2008 to a low of 20:100 in 2007 ($\bar{x}$ = 23; Table 1). We did not collect data on the sex composition of the population during this reporting period.

Distribution and Movements

During the first three 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. A registration hunt (1 November–15 December) following the drawing permit hunt was initiated in 2003–04 for Alaska residents only, with permits available during a limited time prior to the hunting season in the villages nearest the hunt area and floatplane access restricted to saltwater. The bag limit was 1 goat (either sex) for all areas, but nannies with kids could not be legally harvested.

Game Board Actions and Emergency Orders. During its March 2009 meeting, the Board of Game adopted a proposal from the Kodiak Fish and Game Advisory Committee to combine the drawing and registration goat hunts on the south and west portions of Kodiak Island (DG 475, DG477, RG475 and RG477) into a single registration hunt (RG480) that is open to both resident and nonresident hunters, from 20 August–15 December. For the first time for a Kodiak hunt, permits will be available through the Internet, as well as at local villages and Alaska Department of Fish and Game offices. The new hunt area was initiated coincident with other registration areas in November 2009 because drawing permits had already been selected for the first part of the season. No emergency orders were issued during this report period.

Permit Hunts. All goat hunting in the unit was by either drawing or registration permit. During this reporting period, there were 9 drawing permit hunt areas with a total of 500 permits issued in 2007–08 and 499 in 2008–09 up from the previous 5-year average (2002–03 through 2006–07) of 348.6 permits (Table 2). There were also 9 registration permit hunt areas open, with a total of 178 permits issued in 2007–08 and 212 in 2008–09 (previous 4-year average = 136.5 permits; Table 3).

Hunter Residency and Success. Annual hunter success declined from a previous 5-year average of 63.4% to 50% in 2007–08 and 48% in 2008–09 (Table 4). As the number of drawing permits available increased, the percentage of nonresidents participating in the hunts also increased (previous 5-year average = 10.6%; 2007–08 = 14.5%; 2008–09 = 17.8%) and the proportion of local residents decreased (previous 5-year average = 46.5%; 2007–08 = 24.4%; 2008–09 = 32.1%). As a group nonresidents have been the most successful hunters, with most harvesting a goat (previous 5-year average = 78.0%; 2007–08 = 71%; 2008–09 = 72%; Table 4).

Estimated age (horn ring) data was obtained from hunter 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 4.9 years for females (Table 5). The results of a comparative horn growth study between the Kenai Peninsula and Kodiak showed that initial growth may be a useful index of habitat quality (McDonough et al. 2006).

Harvest Chronology. During most years, October has been 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 determine the chronology of harvest.

Transport Methods. Aircraft was the predominant transportation method used by hunters during this reporting period (56% in 2007–08; 53% in 2008–09), exhibiting a similar pattern to the previous 5 years ($\bar{x}$ = 53.6%; Table 7). Highway vehicles and off-road vehicles are the primary means of access for goat hunters for permit areas along the road system near Kodiak city (DG/RG 478 and 479).

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 winter distribution was strongly influenced by snow cover, with goats favoring southerly exposed slopes and cliff faces. The lack of a coniferous over-story 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.

Nonregulatory 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 2,145 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 48% or above. Registration permit hunter success was lower (25% and 30%) due to hunters obtaining multiple permits, harsh winter weather, archery-only hunt areas, and permit access restrictions.

Kodiak Island is currently the most popular goat hunting destination in Alaska, accounting for 35% of the harvest in the state in 2008–09. With the increase in permit numbers and harvest there has been a demographic shift of goat hunters on Kodiak. In 2004–05, local hunters composed 52% of the hunters afield compared to 32% in 2008–09, while numbers of nonresident hunters afield doubled during the same time frame (9% in 2004–05; 18% in 2008–09). The

increased nonresident participation was a result of a notable increase in the number of guides offering goat hunts as hunting opportunities expanded in the unit.

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 2008–09

Hunt Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
All	2002–03	762 (79)	203 (21)	27	965	116	1,400
permit	2003–04	633 (81)	148 (19)	23	781	78	1,460
hunt areas	2004–05	519 (81)	125 (19)	24	644	132	1,560
	2005–06	1,367 (81)	319 (19)	23	1,686	85	1,900
	2006–07	472 (82)	105 (18)	22	577	125	1,780
	2007–08	1,390 (83)	284 (17)	20	1,674	--	1,910
	2008–09	1,607 (81)	368 (19)	23	1,975	88	2,145
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
	2007–08	137 (88)	18 (12)	13	155	--	175
	2008–09	72 (84)	14 (16)	19	86	--	110
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
	2007–08	--	--	--	--	--	40
	2008–09	30 (88)	4 (12)	13	34	--	40
DG/RG 473	2002–03 [a]	60 (82)	13 (18)	22	73	--	90
Hidden	2003–04	44 (81)	10 (19)	23	54	74	100
Basin	2004–05	81 (87)	12 (13)	15	93	48	60
Terror Lake	2005–06	39 (80)	10 (20)	26	49	--	50
	2006–07	30 (86)	5 (14)	17	35	--	60
	2007–08	45 (92)	4 (8)	9	49	49	60
	2008–09	51 (86)	8 (14)	16	59	59	60

TABLE 1 continued

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
DG/RG 474	2002–03 [a]	110 (84)	21 (16)	19	131	76	140
Uganik River	2003–04	102 (87)	15 (13)	15	117	--	120
	2004–05	--	--	--	--	--	120
	2005–06 [a]	91 (81)	22 (19)	24	113	72	140
	2006–07	--	--	--	--	--	130
	2007–08	43 (81)	10 (19)	23	53	--	130
	2008–09	95 (82)	21 (18)	22	116	--	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
	2007–08	504 (84)	98 (16)	19	602	--	600
	2008–09	526 (85)	95 (15)	18	621	--	630
DG/RG 476	2002–03	95 (81)	23 (19)	24	118	--	130
Kiliuda Bay	2003–04 [a]	74 (86)	12 (14)	16	86	--	120
	2004–05	--	--	--	--	--	120
	2005–06	--	--	--	--	--	120
	2006–07	--	--	--	--	--	120
	2007–08	95 (84)	18 (16)	19	113	--	130
	2008–09	82 (86)	13 (14)	16	95	--	140
DG/RG 477	2002–03 [a]	43 (75)	14 (25)	33	57	--	250
Southwest	2003–04	--	--	--	--	--	250
Kodiak	2004–05	--	--	--	--	--	300
	2005–06 [a]	302 (84)	59 (16)	20	361	97	400
	2006–07	--	--	--	--	--	400
	2007–08	319 (80)	82 (20)	26	401	--	430
	2008–09	503 (79)	137 (21)	27	640	--	660

TABLE 1 continued

Area	Regulatory year	Adults (%)	Kids (%)	Kids: 100 adults	Total goats observed	Goats/ hour	Estimated population size
DG/RG 478	2002–03	203 (78)	58 (22)	29	261	--	260
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
	2007–08	117 (80)	29 (20)	25	146	--	175
	2008–09	156 (76)	50 (24)	32	206	--	230
DG/RG 479	2002–03	70 (79)	19 (21)	27	89	--	95
North Road	2003–04[a]	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
	2007–08	130 (84)	25 (16)	19	155	--	170
	2008–09	92 (78)	26 (22)	28	118	--	145

[a] Partial survey

TABLE 2 Unit 8 mountain goat harvest data by drawing permit hunt, 2002–03 through 2008–09

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 [a]	230	39	33	67	61 (66)	32 (34)	0	1	94
	2003–04 [b]	337	44	39	61	67 (60)	45 (40)	0	3	115
	2004–05 [a]	338	39	34	66	88 (67)	43 (33)	1	1	133
	2005–06 [a]	340	38	33	67	84 (60)	55 (40)	0	0	139
	2006–07 [b]	498	43	45	55	95 (62)	59 (38)	1	0	155
	2007–08 [a]	500	47	50	50	89 (68)	41 (32)	1	0	131
	2008–09 [a]	499	46	52	48	80 (63)	46 (37)	2	1	129
DG 471 Wild Creek-Center Mountain	2002–03 [a]	35	40	33	67	9 (64)	5 (36)	0	0	14
	2003–04 [b]	40	49	53	47	7 (78)	2 (22)	0	0	9
	2004–05 [a]	40	42	45	55	6 (50)	6 (50)	0	0	12
	2005–06 [a]	40	58	45	65	6 (55)	5 (45)	0	0	11
	2006–07 [a]	40	38	52	48	7 (58)	5 (42)	0	0	12
	2007–08 [a]	39	28	64	36	4 (40)	6 (60)	0	0	10
	2008–09 [a]	40	45	73	27	5 (83)	1 (17)	0	0	6
DG 472 Crown Mtn	2002–03 [a]	10	90	0	100	0 (--)	1 (100)	0	0	1
	2003–04 [b]	10	40	33	67	2 (50)	2 (50)	0	0	4
	2004–05 [a]	10	60	25	75	3 (100)	0 (--)	0	0	3
	2005–06 [a]	12	58	20	80	2 (50)	2 (50)	0	0	4
	2006–07 [a]	10	60	25	75	3 (100)	0	0	0	3
	2007–08 [a]	10	70	0	100	3 (100)	0	0	0	3
	2008–09 [a]	10	20	50	50	3 (75)	1 (25)	0	0	4

TABLE 2 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
DG 473	2002–03 [a]	8	40	17	83	3 (60)	2 (40)	0	0	5
Hidden	2003–04 [b]	8	57	67	33	1 (100)	0 (--)	0	0	1
Basin-	2004–05 [a]	8	0	38	62	3 (60)	2 (40)	0	0	5
E. Terror	2005–06 [a]	8	50	0	100	2 (50)	2 (50)	0	0	4
Lake	2006–07 [b]	10	40	0	100	4 (67)	2 (33)	0	0	6
	2007–08 [a]	10	40	17	83	4 (80)	1 (20)	0	0	5
	2008–09 [a]	10	40	50	50	1 (33)	2 (67)	0	0	3
DG 474	2002–03 [a]	15	36	22	78	3 (43)	4 (57)	0	0	7
Uganik	2003–04 [b]	14	14	33	67	7 (88)	1 (12)	0	1	9
River	2004–05 [a]	15	33	30	70	6 (86)	1 (14)	0	0	7
	2005–06 [a]	15	27	9	91	8 (80)	2 (20)	0	0	10
	2006–07 [a]	20	40	25	75	8 (89)	1 (11)	0	0	9
	2007–08 [a]	21	48	36	64	5 (71)	2 (29)	0	0	7
	2008–09 [a]	20	40	42	58	3 (43)	4 (57)	0	0	7
DG 475	2002–03 [a]	60	43	47	53	13 (72)	5 (28)	0	0	18
Zachar	2003–04 [b]	90	70	50	50	8 (62)	5 (38)	0	0	13
River	2004–05 [a]	90	51	49	51	17 (77)	5 (23)	0	0	22
	2005–06 [a]	90	44	50	50	11 (46)	13 (54)	0	0	24
	2006–07 [a]	179	47	59	41	21 (55)	17 (45)	0	0	38
	2007–08 [a]	180	57	54	46	25 (74)	9 (26)	1	0	35
	2008–09 [a]	180	58	64	36	22 (81)	5 (19)	0	0	27

TABLE 2 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
DG 476	2002–03 [a]	20	50	50	50	4 (80)	1 (20)	0	0	5
Kiliuda	2003–04 [b]	20	55	56	44	2 (50)	2 (50)	0	0	4
Bay	2004–05 [a]	20	63	43	57	4 (100)	0 (--)	0	0	4
	2005–06 [a]	20	50	33	67	5 (83)	1 (17)	0	0	6
	2006–07 [a]	20	50	60	40	1 (25)	3 (75)	0	0	4
	2007–08 [a]	20	30	57	43	5 (83)	1 (17)	0	0	6
	2008–09 [a]	20	65	0	100	5 (71)	2 (29)	0	0	7
DG 477	2002–03 [a]	40	44	23	77	11 (69)	5 (31)	0	1	17
Deadman	2003–04 [b]	60	36	27	73	19 (70)	8 (30)	0	0	27
Bay	2004–05 [a]	60	52	14	86	20 (83)	4 (17)	0	0	24
	2005–06 [a]	60	40	31	69	13 (52)	12 (48)	0	0	25
	2006–07 [a]	110	46	44	56	21 (64)	12 (36)	0	0	33
	2007–08 [a]	110	54	38	62	23 (74)	8 (26)	0	0	31
	2008–09 [a]	110	46	42	58	20 (61)	13 (39)	1	0	34
DG 478	2002–03 [a]	30	10	26	74	14 (70)	6 (30)	0	0	20
South	2003–04 [b]	80	27	36	64	17 (46)	20 (54)	0	2	39
Road	2004–05 [a]	80	14	29	71	24 (52)	22 (48)	1	1	48
System	2005–06 [a]	80	21	31	69	29 (69)	13 (31)	0	0	42
	2006–07 [a]	59	29	37	63	15 (58)	11 (42)	0	0	26
	2007–08 [a]	60	32	42	58	14 (61)	9 (39)	0	0	23
	2008–09 [a]	59	25	50	50	13 (59)	9 (41)	0	1	23

TABLE 2 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
DG 479	2002–03 [a]	10	11	25	75	4 (67)	2 (33)	0	0	6
North	2003–04 [b]	15	13	31	69	4 (44)	5 (56)	0	0	9
Road	2004–05 [a]	15	13	38	62	5 (63)	3 (37)	0	0	8
System	2005–06 [a]	15	0	13	87	8 (62)	5 (38)	0	0	13
	2006–07 [a]	50	34	30	70	15 (65)	8 (35)	1	0	24
	2007–08 [a]	50	32	68	32	6(55)	5 (45)	0	0	11
	2008–09 [a]	50	30	47	53	8 (47)	9 (53)	1	0	18

[a] Season Dates: 1 September–31 October
[b] Season Dates: 20 August–25 October

TABLE 3 Unit 8 mountain goat harvest data by registration permit hunt, 2003–04 through 2008–09

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
All registration permit hunts	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
	2007–08	178	60	75	25	12 (71)	5 (29)	0	0	17
	2008–09	212	61	69	30	19 (76)	6 (24)	0	0	25
RG471	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
	2007–08	12	100	0	0	0	0	0	0	0
	2008–09	10	100	0	0	0	0	0	0	0
RG472	2003–04 [a]	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
	2007–08	5	80	100	0	0	0	0	0	0
	2008–09	7	100	0	0	0	0	0	0	0
RG473	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 [b]	0	0	0	0	0	0	0	0	0
	2007–08	13	77	33	67	2 (100)	0	0	0	2
	2008–09	13	100	0	0	0	0	0	0	0

TABLE 3 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
RG474	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
	2007–08	3	100	0	0	0	0	0	0	0
	2008–09	2	100	0	0	0	0	0	0	0
RG475	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
	2007–08	12	50	83	17	1 (100)	0	0	0	1
	2008–09	13	33	63	37	1 (33)	2 (67)	0	0	3
RG476	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
	2007–08	23	65	63	37	1 (33)	2 (67)	0	0	3
	2008–09	31	44	53	47	5 (71)	2 (29)	0	0	7
RG477	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
	2007–08	29	48	53	47	7 (100)	0	0	0	7
	2008–09	43	51	69	31	5 (83)	1 (27)	0	0	6

TABLE 3 continued

Hunt Area	Regulatory year	Permits Issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Female (%)	Unknown	Illegal	Total harvest
RG478	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
	2007–08	44	56	89	11	0	2 (100)	0	0	2
	2008–09	47	63	81	19	2 (67)	1 (33)	0	0	3
RG479	2003–04 [a]	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 [b]	0	0	0	0	0	0	0	0	0
	2007–08	37	53	88	12	1 (50)	1 (50)	0	0	2
	2008–09	46	52	73	27	6 (100)	0	0	0	6

[a] Hunting areas RG472 and RG479 closed by emergency order 31 October 2003
[b] Hunting areas RG473 and RG479 closed by emergency order 26 October 2006

TABLE 4 Residence and success of hunters participating in Unit 8 mountain goat drawing hunts, 2002–03 through 2008–09

Regulatory year[a]	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
2007–08	30	74	27	131	(50)	34	86	11	131	(50)	262
2008–09	25	67	34	126	(48)	60	65	13	138	(52)	264

[a] –Permits issued: 2002–03 - 230; 2003–04 - 337; 2004–05 - 338; 2005–06 - 340; 2006–07 - 498; 2007–08 - 500; 2008–09 - 499

TABLE 5 Unit 8 mountain goat harvest mean age data from horn rings, 1993–94 through 2008–09

Regulatory Year	Males	(n)	Females	(n)
1993–94 [a]	3.8	(31)	3.7	(16)
1994–95 [b]	4.7	(21)	5.7	(19)
1995–96 [b]	5.9	(18)	6.7	(7)
1996–97 [b]	5.2	(17)	6.2	(9)
1997–98 [b]	5.5	(42)	5.6	(12)
1998–99 [b]	5.3	(40)	5.5	(14)
1999–2000 [b]	4.5	(36)	4.6	(14)
2000–01 [a]	4.0	(24)	4.5	(15)
2001–02 [a]	4.1	(52)	5.3	(15)
2002–03 [b]	3.9	(57)	5.0	(29)
2003–04 [b]	4.4	(52)	4.9	(31)
2004–05 [b]	4.5	(76)	4.9	(30)
2005–06 [b]	4.6	(52)	5.7	(32)
2006–07 [b]	4.6	(68)	4.5	(38)
2007–08 [b]	4.6	(80)	4.4	(30)
2008–09 [b]	4.6	(68)	5.1	(33)

[a] Horn inspections required
[b] Hunters report goat age with report ca

TABLE 6 Unit 8 mountain goat harvest chronology percent by time period, 2002–03 through 2008–09

Area	Regulatory year	Harvest periods					
		Aug	Sep	Oct	Nov	Dec	n
All permit hunts	2002–03	0	49	51	0	0	93
	2003–04 [a]	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
	2007–08	13	34	42	7	4	147
	2008–09	16	32	35	14	3	150

[a] Drawing hunt season changed and registration hunt established

TABLE 7 Unit 8 mountain goat hunter transport method (percent in parentheses), 2002–03 through 2008–09

Regulatory year	Transportation method							
	Aircraft	Boat	3 or 4 Wheeler	ORV	Highway vehicle	Snow-machine	Unknown	Total
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
2007–08	146 (56)	25 (10)	26 (10)	2 (<1)	58 (22)	0 (--)	5 (2)	262
2008–09	140 (53)	33 (13)	14 (5)	2 (1)	69 (26)	0 (--)	6 (2)	264

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi^2)

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. In 1998 a subsistence goat registration hunt was established 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

A total of 59 goats were observed during the 2009 MacColl Ridge goat survey (Table 1). The count was down 20% from the record high of 74 in 1999, although similar to the long-term average of 56 (1980–2009). Count fluctuations between years may reflect the difficulty of surveying mountain goat populations as well as differences in kid production.

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 2008 and 2009 counts of 11 kids each are down 45% from the 2007 count of 20, which was the highest number ever observed on the MacColl Ridge count area. The resulting ratio in 2009 was 23 kids:100 adults (Table 1). The number of kids observed over the last 6 years has averaged 14 (range = 11–20) per year. Recruitment has fluctuated yearly, but on average 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 1 goat by registration permit only (RG580). Hunters killed 10 goats during the 2007 season, and 15 in 2008. The average yearly take since 1980 has been 16 goats (range = 4–30). The 2007 harvest comprised 9 (90%) billies and 1(10%) nanny, while 10 (67%) billies and 5 (33%) nannies were reported in 2009. 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 2009 federal harvest

(FG110) was 4 (100%) billies and has averaged 3 goats (range = 1–5) 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 only. 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–32 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. In 2008 the federal season was increased by 15 days with a season open date of 10 August for that portion of GMU 11 south of the Chitina River and that portion of the unit north of the Chitina River and east of the Kennicott River.

Hunter Residency and Success. There were 86 state registration hunt (RG 580) permits issued in 2008 and 79 in 2007 (Table 1). The number of permits issued in 2008 is a 146% increase over the 2006 figure of 35 and the second highest number ever issued since 97 were issued in 1986. The average number of permits issued yearly is 59 (range = 29–97). The number of federal permits issued in 2008 was also the highest ever reported at 67, up 81% from the 37 issued in 2006. The success rate for state permittees was 18% and 6% for federal subsistence hunters in 2008. Successful state hunters reported spending 4.5 days in the field in 2007 but only 2.7 in 2008. Unsuccessful hunters reported 6.4 and 5.0 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 60% of the goats harvested in both 2007 and 2008 (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 reported taking only 1 goat since 2001 in the state hunt.

Harvest Chronology. For 10 years prior to 2007 more than 50% of the state harvest occurred during the initial 3 weeks of the season (Table 4). In 2007 the harvest was distributed fairly evenly through late September and October. Harvest chronology in 2008 indicated late September and the first week of October were more important than previously reported. The high harvests in the first 3 weeks of September are attributed to hunters combining sheep and goat hunts. A change in harvest chronology may mean more hunters are pursuing goats as their primary objective.

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 declined slightly the last two years, but current counts remain high and within the limit of observed yearly fluctuations. Kid production and/or survival decreased during the last 2 years of this reporting period, but again were within the recently observed range.

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 of 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.

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 have not been a recent 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.

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Table 1. Unit 11 MacColl Ridge trend count area mountain goat composition counts and estimated population size, 2000–2010.

Area	Regulatory Year	Adults (%)	Kids (%)	Unk.	Kids: 100 adults	Total goats observed	Estimated population size[a]
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
	2008–2009	57 (84)	11 (16)	0	19	68	68
	2009–2010	48 (81)	11 (19)	0	23	59	59

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

Table 2. Unit 11 mountain goat harvest data by permit hunt, 2000–2009.

Hunt nr /area	Regulatory year	Permits issued	Percent[a] did not hunt	Percent[a] unsuccessful hunters	Percent[a] successful Hunters	Males (%)	Females (%)	Unk.	Illegal	Total harvest
RG580	2000–2001	39	54	31	15	6 (100)	0	0	0	6
RG580	2001–2002	54	41	38	21	4 (36)	7 (64)	0	0	11
RG580	2002–2003	50	44	48	8	3 (75)	1 (25)	0	0	4
RG580	2003–2004	54	44	37	19	7 (70)	3 (30)	0	0	10
RG580	2004–2005	56	55	34	11	5 (83)	1 (17)	0	0	6
RG580	2005–2006	44	25	48	27	11 (92)	1 (8)	0	0	12
RG580	2006–2007	35	49	34	17	6 (100)	0	0	0	6
RG580	2007–2008	79	49	38	13	9 (90)	1 (10)	0	0	10
RG580	2008–2009	86	53	29	18	10 (67)	5 (33)	0	0	15
FG110	2000–2001	20	70	18	12	1 (50)	1 (50)	0	0	2
FG110	2001–2002	27	50	45	5	1 (100)	0	0	0	1
FG110	2002–2003	28	40	45	15	3 (100)	0	0	0	3
FG110	2003–2004	33	61	29	10	3 (100)	0	0	0	3
FG110	2004–2005	39	58	33	8	3 (100)	0	0	0	3
FG110	2005–2006	41	58	34	8	0	3 (100)	0	0	3
FG110	2006–2007	37	59	34	7	2 (100)	0	0	0	2
FG110	2007–2008	52	61	35	4	1 (50)	1 (50)	0	0	2
FG110	2008–2009	67	67	27	6	4 (100)	0	0	0	4

[a] Percent of total permittees returning hunter reports

Table 3. Unit 11 RG580 mountain goat hunter residency and success, 2000–2009.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] 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
2007–2008	0	4	6	10 (25)	1	21	8	30 (75)	40
2008–2009	1	5	9	15 (38)	3	16	6	25 (62)	40

[a] 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[a] by time period, 2000–2009.

Regulatory year	September				October					
	1–7	8–15	16–23	24–30	1–7	8–15	16–23	24–31	1–30	*n*
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
2007–2008	0	0	20	20	10	20	20	10	--	10
2008–2009	13	13	20	7	47	--	--	--	--	15

[a]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, 2000–2009.

Regulatory year	Percent of harvest							
	Airplane	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Horse	*n*
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	--	--	--	--	--	--	6
2007–2008	50	50	--	--	--	--	--	10
2008–2009	67	13	--	--	--	7	13	15

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MOUNTAIN GOAT MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

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

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. In 1994, 619 goats were observed during a complete survey of Subunit 14C. However, since then no comprehensive survey of the subunit has been completed. 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 Subunit 14C. However, there is anecdotal evidence suggesting goats in Subunit 14C may be expanding their range. The portion of Subunit 14A within the Chugach Mountains has an estimated goat population of 180 to 200 goats, while the goat population in the Talkeetna Mountains (Subunits 14A and 14B) remains chronically low, with an estimate of no more than 50 goats.

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. From 1984 to 2007 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. 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 continue to recommend that 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.

Beginning in 2002, participation in goat registration hunts in Unit 14 increased dramatically. This increase occurred a year after goat hunts on the Kenai Peninsula were moved to a later time frame, with drawing hunts 10 August–October 15 and a late season registration hunt 1–30 November. As a result, the only early season registration goat hunts available in the area were in Unit 14. Hunter participation, specifically guided nonresident hunters, increased rapidly for these registration hunts. By 2005, most 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 Subunit 14C. As a result, in 2007, the Board of Game approved a department proposal to change the registration goat hunts in Subunits 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 began in the 2008–2009 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 1–3). No surveys were conducted in Subunits 14A and 14B (Talkeetna Mountains) during the reporting period. Partial surveys were conducted incidental to sheep surveys in 2007 and 2008 in Subunit 14A (Chugach Mountains) and 13D. No goat surveys were conducted in Subunit 14C during the reporting period. Due to poor survey conditions, the number of goats observed incidental to sheep surveys in 2007 and 2008 was not reported.

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. 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 and that goat numbers in Subunit 14A range 180–200. Goat numbers in the Talkeetna Mountains (Subunits 14A and 14B) and in Subunit 13D remain chronically low.

Age Distribution

Goats observed were categorized as kids or adults. Kids comprised 17–18 % of observed goats in Subunit 13D during this reporting period (Table 1) and 21–22% in Subunit 14A (Chugach Mountains; Table 2).

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, goats are occasionally observed in the Talkeetna Mountains in Subunit 13A. In addition, 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. Bag limits for 14 and 13D were 1 goat of either sex, with the taking of kids and nannies accompanied by kids prohibited. From 2007–2008, in Subunit 13D goat hunting for residents and nonresidents was 10 August–20 September by drawing permit only and from 1 September–30 November by registration permit only. With the addition of the registration permit hunt in 2007, harvests in 13D increased dramatically to 16 goats in 2007 and 19 goats in 2008 (Table 4).

In Subunit 14A (south of the Matanuska River) the 2007–08 hunting season for residents and nonresidents was 1 September–31 October by registration permit only. In 2008, this registration hunt (RG866) was replaced with a drawing permit hunt (DG866) for the same time period and hunt area. As a result, harvest decreased from 8 goats in 2007 to 3 goats in 2008. Goat harvest in Subunit 14C is managed by both registration and drawing permit hunts for residents and nonresidents. During the 2007–08 season, 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. The Lake George and Twentymile drainage areas supported goat hunting by registration and drawing permits only from 1 September–15 October, and 1–15 November, with a bag limit of 1 goat.

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 Subunit 14C. Beginning in the 2008–2009 season, 1 goat by permit only may be harvested in the following newly established hunts: Subunit 14A (DG866: 1 September–31 October), Subunit 14C Lake George and Twentymile River areas (RG879/RG878: 16–31 August, archery only), Subunit 14C Lake George area (DG859: 1–21 September, DG869: 22 September–15 October), and Subunit 14C Twentymile River area (DG868: 1 September–15 October). If harvest quotas for the Lake George and Twentymile areas (Subunit 14C) have not been met by the end of the draw period, a late season registration hunt may 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, which includes the area south of the Tiekel River and east of a line beginning at the confluence of the Tiekel and Tsina rivers. The new registration hunt began in 2007 with a bag limit of 1 goat. During the reporting period, emergency orders were issued by department staff in 2007 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 212 to 229 during this reporting period (Table 5). The number of drawing permits issued in

Unit 14 is based on the number of goats observed during surveys. With the addition of 4 new drawing permit hunts in 2008, the number of drawing permits increased from 13 in 2007 to 77 in 2008 (Table 5). Thirty-five drawing permits and 78 or 85 registration permits were issued for the eastern portion of Subnit 13D each year during the reporting period (Table 6).

Hunter Residency and Success. The majority of goat hunters in Subunit 13D are nonlocal residents (Table 7). In Subunit 14A and the Lake George area of Subunit 14C the majority of successful hunters during the reporting period are nonresident (Table 8). Other registration and drawing hunts in Subunit 14C overall are dominated by resident hunters.

Overall success rates during the reporting period ranged 36–37% in Subunit 13D (Table 7), 27–60% in Subunit 14A, and 24–31% in Subunit 14C (Table 8). In all units, nonresidents typically experienced higher rates of success than did resident hunters (Tables 7 and 8). 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. Harvest chronology is primarily influenced by the time periods for each individual hunt, as well as the number of permits allotted. This is especially true as additional hunts are created and hunt periods are shortened. However, weather plays an important role in the timing of hunts, and field conditions often deteriorate rapidly during the last weeks of October. Regardless, the majority of goats are harvested within the first week of each hunt period. Season dates and suitable conditions for hunting other big game species also affect timing of goat hunts.

Transport Methods. During the reporting period in Subunit 13D, all successful hunters reporting used either airplanes (40–50%) or highway vehicles (50–60%; Table 9). In Subunit 14A and the Lake George portion of Subunit 14C, aircraft was the primary mode of transport for successful hunters (Table 10). In the Twentymile River drainage of Subunit 14C, the common modes of transport are airplanes, highway vehicles, and boats except in years when boat access is difficult due to low water levels (Table 10).

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 24 goats were harvested in Subunit 14C annually during this reporting period, and goat harvests exceeded 81% males annually. In Subunit 14A, 3–8 goats were harvested annually, and harvests exceeded 70% males. Goat season remains closed

in the Talkeetna Mountains portion of Unit 14. In addition, a pre-hunting population of goats has been maintained in Subunit 13D.

No complete surveys were conducted during this reporting period, and all goats were counted incidental to sheep surveys in Subunits 14A and 13D. No surveys were completed in 14C 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, incomplete surveys were conducted within this reporting period for both subunits. 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 surveys of goats were conducted in Subunit 14C during the reporting period. We recommend dedicated, comprehensive surveys be conducted for goats within Subunit 14C.

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 Subunit 13D aerial mountain goat composition counts, 2004-2008

Regulatory year	Adults (%)		Kids (%)		Kids: 100 adults	Goats Observed	Goats /hour
2004/05[a]							
2005/06[b]	121	(78)	35	(22)	29	156	6.9
2006/07[c]	75	(81)	18	(19)	24	93	10.1
2007/08[d]	54	(82)	12	(18)	22	66	19.4
2008/09	106	(83)	22	(17)	21	128	8.6

[a]No surveys conducted.
[b]Partial surveys conducted incidental to sheep surveys (count areas 2,3,5,6,9,11, and 12).
[c]Partial surveys conducted incidental to sheep surveys (count areas 14 and 18).
[d]Partial surveys conducted incidental to sheep surveys (count areas 1-4).

TABLE 2 Subunit 14A, Chugach Mountains, aerial mountain goat composition counts, 2004-2008

Regulatory year	Adults (%)		Kids (%)		Kids: 100 adults	Total goats observed	Goats /hour
2004/05	118	(75)	40	(25)	34	158	
2005/06[a]							
2006/07[a]							
2007/08	118	(78)	33	(22)	25	151	20.08
2008/09	170	(79)	45	(21)	45	215	20.95

[a] No surveys conducted.

TABLE 3 Subunit 14C aerial mountain goat composition counts and estimated population size, 2004-2008

Regulatory Year	Adults (%)		Kids (%)		Kids: 100 adults	Total goats observed	Goats /hour
2004/05[a]							
2005/06[a]							
2006/07[b]	121	(79)	33	(21)	27	154	
2007/08[a]							
2008/09[a]							

[a] No surveys conducted.
[b] Complete survey of Twentymile River. Additional goats counted incidental to sheep surveys.

TABLE 4 Annual mountain goat harvest by Subunit, 2004-2008

Regulatory Year	Subunit 13D[a]	14A[b]	14B[c]	14C[d]	Total
2004/05	10	8		27	45
2005/06	6	7		36	49
2006/07	6	10		24	40
2007/08	16	8		31	55
2008/09	19	3		24	46

[a] Drawing permit only.
[b] Registration permit only.
[c] Closed to mountain goat hunting.
[d] Both registration and drawing permits.

TABLE 5 Unit 14 mountain goat harvest data by permit hunt, 2004-2008

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total Harvest[b]
	2004/05	48	58	60	40	6	(75)	2	(25)	8
RG866[c]	2005/06	62	52	77	23	7	(100)	0	(0)	7
Subunit 14A	2006/07	33	45	44	56	7	(70)	3	(30)	10
	2007/08	56	46	73	27	7	(87)	1	(13)	8
DG866[d] Subunit 14A	2008/09	12	58	40	60	2	(67)	1	(33)	3
	2004/05	5	20	75	25	1	(100)	0	(0)	1
DG852	2005/06	5	20	25	75	1	(33)	2	(67)	3
Subunit 14C	2006/07	3	0	33	67	1	(50)	1	(50)	2
East Eklutna	2007/08	3	33	50	50	1	(100)	0	(0)	1
	2008/09	3	0	67	33	1	(100)	0	(0)	1
	2004/05	3	33	50	50	1	(100)	0	(0)	1
DG854	2005/06	3	0	0	100	3	(100)	0	(0)	3
Subunit 14C	2006/07	3	67	0	100	1	(100)	0	(0)	1
	2007/08	3	0	0	100	3	(100)	0	(0)	3
	2008/09	3	0	0	100	3	(100)	0	(0)	3
	2004/05	8	25	67	33	2	(100)	0	(0)	2
DG856	2005/06	8	38	60	40	2	(100)	0	(0)	2
Subunit 14C	2006/07	4	0	100	0	0	(0)	0	(0)	0
Glacier Ck.	2007/08	4	50	100	0	0	(0)	0	(0)	0
	2008/09	4	0	100	0	0	(0)	0	(0)	0
DG858	2004/05	5	20	50	50	1	(50)	1	(50)	2
Subunit 14C	2005/06	5	40	33	67	2	(100)	0	(0)	2

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total Harvest[b]
	2006/07	3	67	100	0	0	(0)	0	(0)	0
	2007/08	3	0	67	33	0	(0)	1	(100)	1
	2008/09	3	0	67	33	1	(100)	0	(0)	1
RG868[e]	2004/05	63	59	81	19	5	(100)	0	(0)	5
Subunit 14C	2005/06	18	61	29	71	3	(60)	2	(40)	5
Twentymile	2006/07	48	52	91	9	2	(100)	0	(0)	2
River	2007/08	76	46	80	20	6	(100)	0	(0)	6
	2008/09	60	62	100	0	0	(100)	0	(0)	0
	2004/05	69	65	33	67	16	(100)	0	(0)	16
RG869[e]	2005/06	53	55	25	75	15	(88)	2	(12)	18
Subunit 14C	2006/07	73	53	44	56	14	(74)	5	(26)	19
Lake	2007/08	76	51	46	54	15	(75)	5	(25)	20
George	2008/09	44	50	64	36	6	(75)	2	(25)	8
RG878[e]	2004/05	0	0	0	0	0	(0)	0	(0)	0
Subunit 14C	2005/06	2	0	50	50	1	(100)	0	(0)	1
Twentymile	2006/07	5	60	100	0	0	(0)	0	(0)	0
River	2007/08	4	100			0	(0)	0	(0)	0
(archery)	2008/09	13	69	100	0	0	(0)	0	(0)	0
RG879[e]	2004/05	4	100			0	(0)	0	(0)	0
Subunit 14C	2005/06	10	40	67	33	2	(100)	0	(0)	2
Lake	2006/07	0	0	0	0	0	(0)	0	(0)	0
George	2007/08	4	100			0	(0)	0	(0)	0
(archery)	2008/09	10	80	50	50	1	(100)	0	(0)	1

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent Unsuccessful Hunters	Percent Successful Hunters	Males (%)		Females (%)		Total Harvest[b]
DG859[d] Subunit 14C Lake George	2008/09	20	70	50	50	3	(100)	0	(0)	3
DG869[d] Subunit 14C Lake George	2008/09	20	50	50	50	5	(100)	0	(0)	5
DG868[d] Twentymile River	2008/09	12	42	67	33	2	(100)	0	(0)	2

[a] Includes permittees who did not report.
[b] Includes animals of unknown sex.
[c]Replaced with DG866 in 2008/09
[d]New hunt 2008/09.
[e]Season dates changed in 2008/09.

TABLE 6 Subunit 13D mountain goat harvest data by permit hunt, 2004-2008

Area	Regulatory Year	Permits issued	Percent did not hunt[a]	Percent unsuccessful hunters	Percent successful hunters	Males (%)	Females (%)	Total harvest[a]
DG718	2004/05	10	30	57	43	1 (33)	2 (66)	3
Subunit 13D	2005/06	10	70	0	100	3 (100)	0 (0)	3
West	2006/07	10	40	83	17	2 (40)	3 (60)	5
	2007/08	10	40	67	33	1 (50)	1 (50)	2
	2008/09	10	90	10	0	0	0	0
DG719	2004/05	25	52	42	58	5 (71)	2 (29)	7
Subunit 13D	2005/06	25	44	79	21	2 (67)	1 (33)	3
East	2006/07	25	44	93	7	1 (100)	0 (0)	1
	2007/08	25	48	69	31	3 (75)	1 (25)	4
	2008/09	25	56	64	36	2 (50)	2 (50)	4
RG580	2007/08	78	49	75	25	9 (90)	1 (10)	10
	2008/09	85	53	62	38	10 (67)	5 (33)	15
Totals	2004/05	35	46	47	53	6 (60)	4 (40)	10
For all	2005/06	35	51	64	36	5 (83)	1 (17)	6
Subunit 13D	2006/07	35	57	70	30	3 (50)	3 (50)	6
	2007/08	113	48	73	27	4 (67)	2 (33)	16
	2008/09	120	57	63	37	2 (50)	2 (50)	19

[a] Includes permittees who did not report.

TABLE 7 Subunit 13D mountain goat hunter residency and success, 2004-2008

Area	Regulatory Year	Successful				Unsuccessful				Total Hunters[a]
		Local Resident	Nonlocal Resident	Nonresident	Total (%)	Local resident	Nonlocal Resident	Nonresident	Total (%)	
DG718	2004/05	0	2	1	3 (43)	0	3	1	4 (57)	7
Subunit	2005/06	0	1	2	3 (100)	0	0	0	0 (0)	3
13D W	2006/07	0	2	3	5 (83)	0	1	0	1 (17)	6
	2007/08	0	2	0	2 (33)	0	3	1	4 (67)	6
	2008/09	0	0	0	0	0	0	1	1 (100)	1
DG719	2004/05	0	5	2	7 (58)	1	4	0	5 (42)	13
Subunit	2005/06	0	2	1	3 (21)	3	7	1	11 (79)	14
13D East	2006/07	0	1	0	1 (7)	4	9	0	13 (93)	14
	2007/08	0	4	0	4 (20)	9	7	0	16 (80)	20
	2008/09	0	1	3	4 (36)	0	7	0	7 (64)	11
RG580	2007/08	0	4	6	10 (25)	1	0	8	9 (23)	40
	2008/09	1	5	9	16 (40)	3	15	6	24 (60)	40
Totals	2004/05	0	7	3	10 (53)	1	7	1	9 (47)	19
For all	2005/06	0	3	3	6 (35)	3	7	1	11 (65)	17
Subunit	2006/07	0	3	3	6 (30)	4	10	0	14 (70)	20
13D	2007/08	0	10	6	16 (36)	10	10	9	29 (64)	45
	2008/09	1	6	12	19(37)	3	22	7	32 (63)	51

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

TABLE 8 Unit 14 mountain goat hunter residency and success, 2004-2008

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
RG866[b]	2004/05	0	6	2	8(40)	0	11	1	12 (60)	20
Subunit 14A	2005/06	1	1	5	7 (24)	16	4	2	22 (77)	30
	2006/07	1	2	7	10 (56)	2	5	1	8 (44)	18
	2007/08	1	0	7	8 (21)	15	8	7	30 (79)	38
DG866 Subunit 14A	2008/09	1	1	1	3 (60)	1	1	0	2 (40)	5
DG852	2004/05	0	1	0	1(25)	3	0	0	3 (75)	4
Subunit 14C	2005/06	2	1	0	3 (75)	1	0	0	1 (25)	4
East Eklutna	2006/07	2	0	0	2 (67)	1	0	0	1 (33)	3
	2007/08	0	1	0	1 (50)	0	1	0	1 (50)	2
	2008/09	0	1	0	1 (33)	0	2	0	2 (67)	3
DG854	2004/05	0	1	0	1 (50)	1	0	0	1 (50)	2
Subunit 14C	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
	2007/08	1	1	1	3 (100)	0	0	0	0 (0)	3
	2008/09	2	0	1	3 (100)	0	0	0	0 (0)	3
DG856	2004/05	2	0	0	2 (33)	4	0	0	4 (67)	6
Subunit 14C	2005/06	2	0	0	2 (40)	3	0	0	3 (60)	5
Glacier Ck.	2006/07	0	0	0	0 (0)	4	0	0	4 (100)	4
	2007/08	0	0	0	0 (0)	2	0	0	2 (100)	2
	2008/09	0	0	0	0 (0)	3	1	0	4 (100)	4
DG858	2004/05	1	1	0	2 (50)	2	0	0	2 (50)	4
Subunit 14C	2005/06	0	0	2	2 (67)	1	0	0	1 (33)	3

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		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
	2007/08	1	0	0	1 (33)	1	1	0	2 (67)	3
	2008/09	0	0	1	1 (33)	2	0	0	2 (67)	3
RG868[c]	2004/05	3	1	1	5(19)	17	4	0	21 (81)	26
Subnit 14C	2005/06	0	5	0	5 (71)	0	2	0	2 (29)	7
Twentymile	2006/07	2	0	0	2 (9)	21	0	0	21 (91)	23
River	2007/08	4	2	0	6 (20)	16	8	0	24 (80)	30
	2008/09	0	0	0	0 (0)	17	6	0	23 (100)	23
RG869[c]	2004/05	3	2	11	16 (67)	4	0	4	8 (33)	24
Subunit 14C	2005/06	0	1	17	18 (75)	1	4	1	6 (25)	24
Lake	2006/07	8	1	10	19 (56)	10	0	5	15 (44)	34
George	2007/08	4	0	16	20 (54)	9	5	3	17 (460	37
	2008/09	4	3	1	8 (36)	0	14	0	14 (64)	22
RG878	2004/05	0	0	0	0 (0)	0	0	0	0 (0)	0
Twentymile	2005/06	0	1	0	1(50)	0	1	0	1 (50)	2
River	2006/07	0	0	0	0 (0)	2	0	0	2 (100)	2
(archery)	2007/08	0	0	0	0	0	0	0	0	0
	2008/09	0	0	0	0 (0)	2	2	0	4 (100)	4
RG879	2004/05	0	0	0	0 (0)	0	0	0	0 (0)	4
Lake	2005/06	0	1	1	2 (33)	1	3	0	4 (67)	6
George	2006/07	0	0	0	0 (0)	0	0	0	0 (0)	0
(archery)	2007/08	0	0	0	0	0	0	0	0	0
	2008/09	0	0	1	1 (50)	0	1	0	1 (50)	2

Area	Regulatory year	Successful				Unsuccessful				Total Hunters[a]
		Local resident	Nonlocal resident	Nonresident	Total (%)	Local resident	Nonlocal resident	Nonresident	Total (%)	
DG859[d] Subunit 14C Lake George	2008/09	0	0	3	3 (50)	0	2	1	3 (50)	6
DG869[d] Subunit 14C Lake George	2008/09	2	1	2	5 (50)	2	3	0	5 (50)	10
DG868[d] Twentymile River	2008/09	1	1	0	2 (29)	4	1	0	5 (71)	7
Totals for all Subunit 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
	2007/08	10	4	17	31 (40)	28	15	3	46 (60)	77
	2008/09	9	6	9	24 (28)	30	32	1	63 (72)	87
Totals for all 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
	2007/08	11	4	24	39 (34)	43	23	10	76 (66)	115
	2008/09	10	7	10	27 (29)	31	33	1	65 (71)	92

[a] Includes hunters with unspecified residency or who failed to report.
[b]Replaced with drawing hunt in 2008/09.
[c]Season dates changed in 2008/09.
[d]New drawing hunt in 2008/09.

TABLE 10 Subunit 13D successful mountain goat hunter transport methods, 2004-2008.

Regulatory year	Percent of harvest							n
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	
2004/05	30	0	10	0	0	10	50	10
2005/06	83	0	17	0	0	0	0	6
2006/07	83	0	0	0	0	0	17	6
2007/08	40	0	0	0	0	0	60	5
2008/09	50	0	0	0	0	0	50	4

TABLE 10 Unit 14 successful mountain goat hunter transport methods, 2004-2008

Area	Regulatory Year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
RG866	2004/05	44	0	11	11	0	11	0	22	9
Subunit 14A	2005/06	86	0	0	0	0	0	0	14	6
	2006/07	56	0	0	0	0	0	0	44	9
	2007/08	0	0	0	0	0	0	0	100	8
DG866 Subunit 14A	2008/09	100	0	0	0	0	0	0	0	3
RG868	2004/05	20	0	60	0	0	0	20	0	5
Subunit 14C	2005/06	0	0	60	0	0	0	40	0	5
Twentymile	2006/07	50	0	50	0	0	0	0	0	2
River	2007/08	0	0	17	0	0	0	83	0	6
	2008/09	0	0	0	0	0	0	0	0	0
RG869	2004/05	82	0	0	0	0	0	0	18	11
Subunit 14C	2005/06	89	0	0	0	0	0	0	11	18
Lake	2006/07	89	0	5	0	0	0	0	5	19
George	2007/08	100	0	0	0	0	0	0	0	19
	2008/09	100	0	0	0	0	0	0	0	8
RG878	2004/05	0	0	0	0	0	0	0	0	0
Subunit 14C	2005/06	0	0	0	0	0	0	100	0	1
Twentymile	2006/07	0	0	0	0	0	0	0	0	0
River	2007/08	0	0	0	0	0	0	0	0	0
	2008/09	0	0	0	0	0	0	0	0	0
RG879	2004/05	0	0	0	0	0	0	0	0	0
Subunit 14C	2005/06	100	0	0	0	0	0	0	0	2
Lake	2006/07	0	0	0	0	0	0	0	0	0
George	2007/08	100	0	0	0	0	0	0	0	1

Area	Regulatory Year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
DG859[d] Subunit 14C Lake George	2008/09	100	0	0	0	0	0	0	0	2
DG869[d] Subunit 14C Lake George	2008/09	60	0	40	0	0	0	0	0	5
DG868[d] Twentymile River	2008/09	100	0	0	0	0	0	0	0	2

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.