Mountain Goat Management Report and Plan, Game Management Unit 1A:

Report Period 1 July 2013–30 June 2018, and

Plan Period 1 July 2018–30 June 2023

Ross Dorendorf

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Alaska Department of Fish and Game Division of Wildlife Conservation

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Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Stephen Bethune, Acting Management Coordinator for the Division of Wildlife Conservation.

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Cover Photo: This collared billy was part of on-going mountain goat research on the Cleveland Peninsula near Ketchikan. ©2009 ADF&G. Photo by Stephen Bethune.

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Purpose of this Report

This report provides a record of survey and inventory management activities for mountain goats (*Oreamnos americanus*) in Unit 1A for the 5 regulatory years 2013–2017 and plans for survey and inventory management activities in the following 5 regulatory years, 2018–2023. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010–30 June 2011). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game's (ADF&G) Division of Wildlife Conservation (DWC) launched this 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the mountain goat management report of survey and inventory activities that was previously produced every 2 years.

I. RY13–RY17 Management Report

Management Area

Unit 1A encompasses 5,252 mi^2 of the southern mainland and adjacent islands south of Lemesurier Point, including all drainages into Behm Canal, excluding all drainages into Ernest Sound. The unit is bounded to the east and south by the Canadian border and to the west by Clarence Straight. Larger islands included in the unit include Revillagigedo, Annette, and Gravina islands (Fig. 1). The Ketchikan Gateway Borough has an estimated population of 13,865 (U.S. Census Bureau 2018). Smaller outlying communities include Metlakatla (estimated population of 1,375), Hyder (87), and Meyers Chuck (25). Mean temperatures range from a low of 30°F (–1°C) in January to a high of 64°F (18°C) in August with 141 inches (358 cm) of rain annually (U.S. Climate Data 2019). The dominant habitat type in Unit 1A below about 2,000 ft (~600 m) elevation is temperate rain forest consisting of Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), red cedar (*Thuja plicata)*, and Alaska yellow cedar (*Callitropsis nootkatensis*). Other lower elevation habitats include muskegs and stands of red alder (*Alnus rubra*) and black cottonwood (*Populus balsamifera trichocarpa*) along major rivers and riparian areas. Old-growth forests are interspersed with a patchwork of even-aged forest stands at different successional stages resulting from extensive clearcut logging and a few natural windthrow events. Areas above 2,000ft. (~600m) elevation are predominately rock, ice, and open alpine. Alpine vegetation in Unit 1A includes mountain heath (*Phyllodoce spp.*), sedges (*Carex spp.*), avens (*Dryas spp.*), various grass species (*Poa spp.*), lichens (Cladoniaceae), and mosses (*Sphagnum spp.*).

Most land in Unit 1A is administered by the U. S. Forest Service, including the 2.3 million-acre Misty Fjords National Monument. This monument is the largest wilderness area in Alaska and the second largest in the nation. There are also state lands, Alaska Mental Health Trust lands, private lands, several native corporation inholdings, federal Indian reservation lands, including Annette Island and surrounding marine waters, and one large private mining parcel, inside but not included in Misty Fiords National Monument.

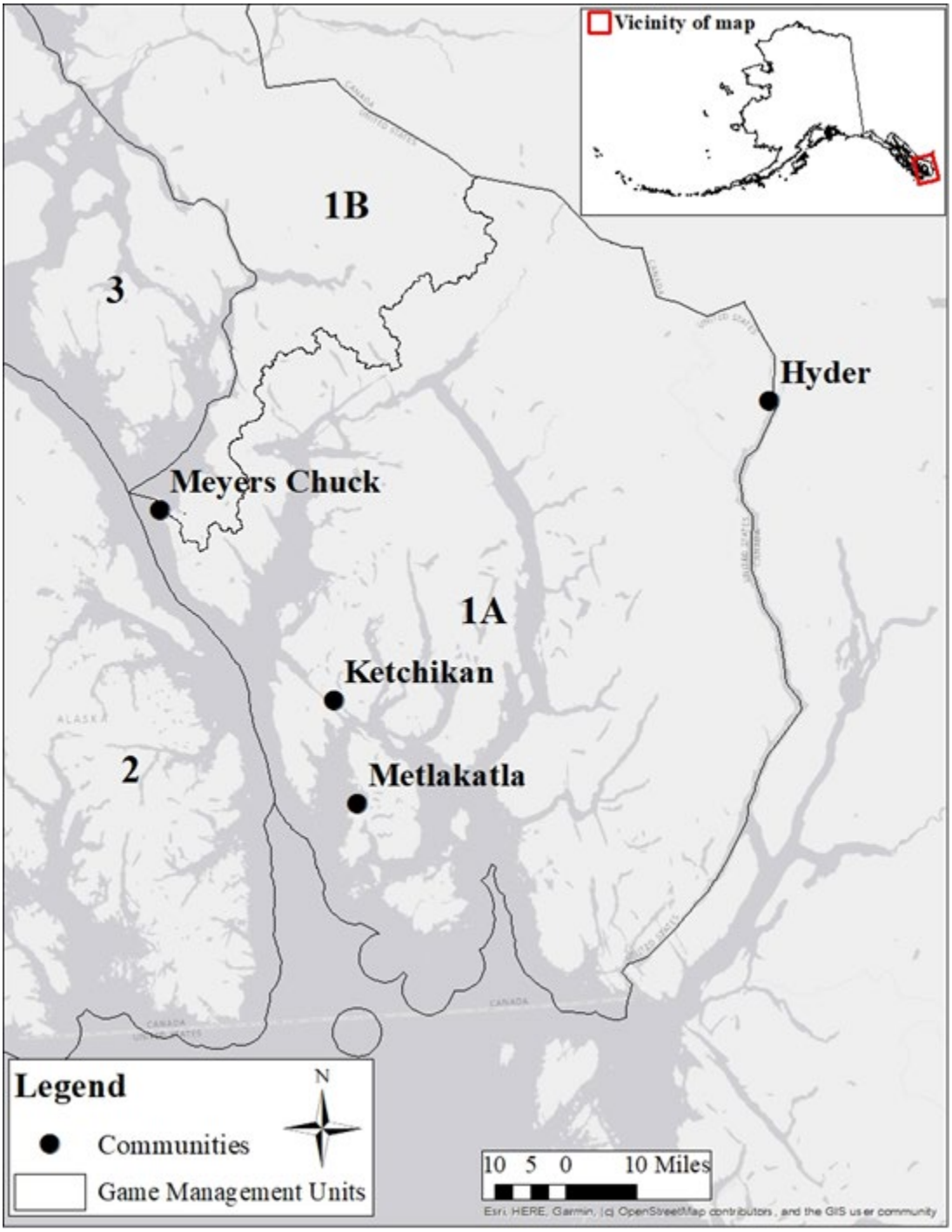

Figure 1. Map of Game Management Unit 1A boundaries, Southeast Alaska.

Summary of Status, Trend, Management Activities, and History of Mountain Goats in Unit 1A

Severe winter weather conditions during 1968–1975 resulted in up to 90% reductions in Unit 1A mountain goat (*Oreamnos americanus*) populations (Smith 1984). Subsequent moderate weather enabled populations to recover to present moderate to high densities throughout Unit 1A.

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 from snow accumulation and winter weather and provide shrubs and evergreen forbs goats can browse on during energetically stressful winter months.

Mountain goats are distributed throughout the mainland in Unit 1A and present on Revillagigedo Island. Although goats historically inhabited only Unit 1A 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 (Paul 2009). Populations on the mainland maintain a low but stable abundance compared to Revilla goats, whose numbers have steadily increased since introduction. Mountain goat distribution has spread throughout all suitable habitat on Revilla.

To monitor population changes, ADF&G completes aerial surveys of established trend count areas (TCAs) annually or biannually during late summer and fall. Typically, half of the 14 TCAs are surveyed each year. Aerial survey success varies depending on weather, habitat, time of year, observer, survey aircraft, etc. Aerial mountain goat surveys conducted on Caw Ridge in Alberta resulted in observers seeing 55–84% of goats present (Festa-Bianchet and Côté 2008). It is particularly difficult to spot mountain goats in Southeast Alaska. In one study, aerial surveys on the Cleveland Peninsula resulted in observers viewing only 36% of the population on the peninsula (White et al. 2016). Using a sightability correction model developed by ADF&G aids managers in estimating goat populations (White et al. 2016).

Harvest has become more restricted over the years as biologists learned about mountain goat phenology. Harvest remained relatively high despite the reduction in bag limit from 2 goats to 1 in 1975 (Wood 1985). Harvest averaged 45 goats annually 1972–1988. This relatively high harvest was aided by mild winters after 1975 (Wood 1985, 1990). Harvest is mainly controlled by access and weather, but other factors contributed to a decrease in annual harvest after 1988. This reduction in mean harvest resulted in part due to 1989 state legislation that required nonresident goat hunters to hire a registered guide. This reduced hunting pressure by increasing the cost to nonresidents who wished to participate in the hunt. Weather severity, predation, and density-related overbrowsing of critical winter habitat are other factors that have contributed to fluctuations in the population through time.

Management Direction

Existing Wildlife Management Plans

There is no specific management plan for mountain goats in Unit 1A, though general guidelines were created for mountain goats in Alaska in 1976 (ADF&G 1976);

1. Control the number and distribution of hunters, if necessary, to maintain aesthetic hunting conditions.
1. Limit harvests of mountain goats to facilitate a population increase to habitat carrying capacity levels.
2. Discourage land use practices that adversely affect mountain goat habitat or the wild character of the area.

Although the overall guidelines of the original plan are still important, the management objectives and harvest management strategies have changed since the plan was written based on public comment, staff recommendations, and Alaska Board of Game actions. These periodic changes in management planning have been reported in earlier species management reports. The plan portion of this report contains the current management plan for mountain goats in Unit 1A.

Goals

No specific management goals exist for Unit 1A, but the 1976 plan identified the following goal, which helps guide mountain goat management in Unit 1A:

- Provide an opportunity to hunt goats under aesthetically pleasing conditions.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game made a positive cultural and traditional finding for mountain goats in 5 AAC 99.025 for Unit 1A during its 2007 meeting. At its 2009 meeting it set the amount necessary for subsistence in Unit 1A at 5–10 mountain goats.

Intensive Management

Mountain goats is not a species subject to intensive management.

Management Objectives

1. Maintain flight surveys that result in 20 goats seen per hour of survey time during fall surveys, and when that is not achieved determine probable causes for the lack of goats seen.

2. Attempt to survey at least 6 established trend count areas (TCA) throughout Unit 1A annually.

3. Monitor sex composition of the harvest and manage based on the strategy outlined in Section 2.1.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count surveys.

Data Needs

These data are crucial for managers to determine the appropriate amount of harvest each season. Preventing overharvest is consistent with the state's mandate to manage on a sustained yield basis.

Methods

We attempt to survey at least 3 to 6 of the unit's 14 established trend count areas (TCAs) each fall as weather and work schedules allow. TCAs vary in size (23–200 mi^2). We generally initiate surveys during late July, August, or September, and begin daily survey efforts during 0500–0800 or 1700–1900 hours. Surveys are conducted with 1 pilot and 1 observer team. Aircraft used for the surveys are preferably Piper Super Cubs; however, logistics have periodically precluded us from this style of plane, so other fixed-wing aircraft or helicopters have been used at times. A minimum goat density of 20 goats per survey hour was established as an objective for Unit 1Ato maintain a huntable goat population (Wood 1990).

Results and Discussion

During this reporting period, surveys were flown in 5 of the 13 TCAs (Table 1). Survey areas included were K-6 Cleveland Peninsula, K-8 Bradfield Canal to Unuk River, K-12A Mirror Lake to Swan Lake, K-12B Swan Lake to Mount Reid, and K-13 Deer Mountain and Mahoney Peak. Conditions were variable and ranged from warm clear days to overcast and cool. Surveys were typically flown in the early morning to allow for other surveys in the evening. ADF&G used Piper Super Cubs almost exclusively for surveys. A helicopter was used to survey K-6 when a Super Cub was not available.

ADF&G surveyors saw a total of 916 goats during the reporting period at an average of 99 goats per hour of survey time. Surveys were flown during 2013, 2014, and 2016 (Table 1). ADF&G surveyors saw 69 goats per hour in 2013, 110 in 2014, and 108 in 2016. The overall mean ratio of kids per100 adults during these surveys was 31.

Although we have data from numerous goat surveys in recent years, the results of these types of aerial mountain goat surveys can be interpreted only as minimum population values (Ballard 1975), and not as population estimates. However, because of our strategy of managing goat harvest conservatively, ADF&G uses these minimum counts as the basis of setting guideline harvest levels.

However, to get a better understanding of the possible goat population levels ADF&G estimated the number of goats currently inhabiting Unit 1A using historical survey data (Porter 2014) and the sightability correction factor Smith and Bovee (1984) developed using radiocollared goats. To derive an estimate, ADF&G first delineated the percentage of each Wildlife Analysis Area (WAA) that we believed contained suitable goat habitat.

Table 1. Unit 1A, Alaska, mountain goat trend count area surveys, regulatory years 2013–2017.

Survey area	Year	Total goats	Adults	Kids	Survey time (hr)	Goats observed/hr	Kids:100 Adults	Sets of twins
K-6	2013[a]	17	12	5	1.8	7	42	–
	2014	20	13	7	1.5	13	54	–
	2016	30	22	8	0.8	40	36	–
K-8	2016	22	19	3	2.2	10	16	–
K-12A	2016	80	65	15	0.8	100	23	–
K-12B	2016	103	78	25	1.3	81	32	–
K-13	2013	131	99	32	1.0	131	32	0
	2014	206	177	29	1.0	206	16	2
	2016	307	236	71	1.0	307	30	2

[a] Year with multiple surveys conducted. Count with highest number is presented here.

Then ADF&G applied the survey-derived estimate of 1.27 goats/mi^2 to these areas, which resulted in an estimate of 3,000–4,000 goats on the mainland in Unit 1A (Porter 2014). This estimate assumes that goats inhabit all suitable goat habitat in the unit at a consistent density which is optimistic. However, without a better method available we believe this is the best overall estimate available of the Unit 1A goat population.

Recommendations for Activity 1.1

Continue with modification:

Currently there are only 13 TCAs in Unit 1A (Fig. 2). The department does not have minimum count data for most of Unit 1A. Much of the area is not hunted; however, understanding trends in counts across the unit will give managers more complete information. Currently, harvest is based on the number of goats ADF&G counts during minimum counts flights in TCAs. Since the majority of Unit 1A is not surveyed, harvest potential is lower because non-surveyed areas are not incorporated into the calculation for the number of animals that can be harvested. That is, the total number of goats is unknown for Unit 1A and currently management is based only from TCAs which limits potential harvest. However, many areas incur little to no harvest, which is why mountain goats are the most under-utilized game species in Unit 1A. Expanding TCAs to cover all Unit 1A will aid managers and increase opportunity. A recently developed sightability correction model should be used for management as well (White 2016). See section II, activity 1.1 for further details on modification.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor hunter harvest through registration permit and draw permits.

Data Needs

Hunt and harvest information is crucial to implement our harvest strategy. Obtaining this information relies on hunters providing harvest information.

Methods

We obtain hunt and harvest information through mandatory reporting associated with the Unit 1A registration permit hunt RG001 and drawing permit hunts DG005, DG006, and DG007 near Ketchikan. Draw hunts near Ketchikan reduce likelihood of overharvest due to ease of access from Ketchikan. Information collected on hunt reports includes the general location hunted, number of days hunted, hunter success, dates hunted, date animal was harvested, transport methods, and commercial services used. Successful Unit 1A hunters are also asked to voluntarily provide their goat horns to the Ketchikan ADF&G office for aging. During the sealing process ADF&G obtains genetic samples, establishes age by counting growth annuli, and takes horn measurements.

Guideline harvest levels are established for goats within each TCA. To accomplish this, ADF&G uses the number of goats observed within a TCA during annual fall surveys, then applies a guideline harvest of 6 harvest points per 100 adult goats observed. This is dependent on the survey conditions being good enough to consider the survey reliable. Harvest points are weighted more heavily for females (2 points) than for males (1 point). A weighted point system is applied

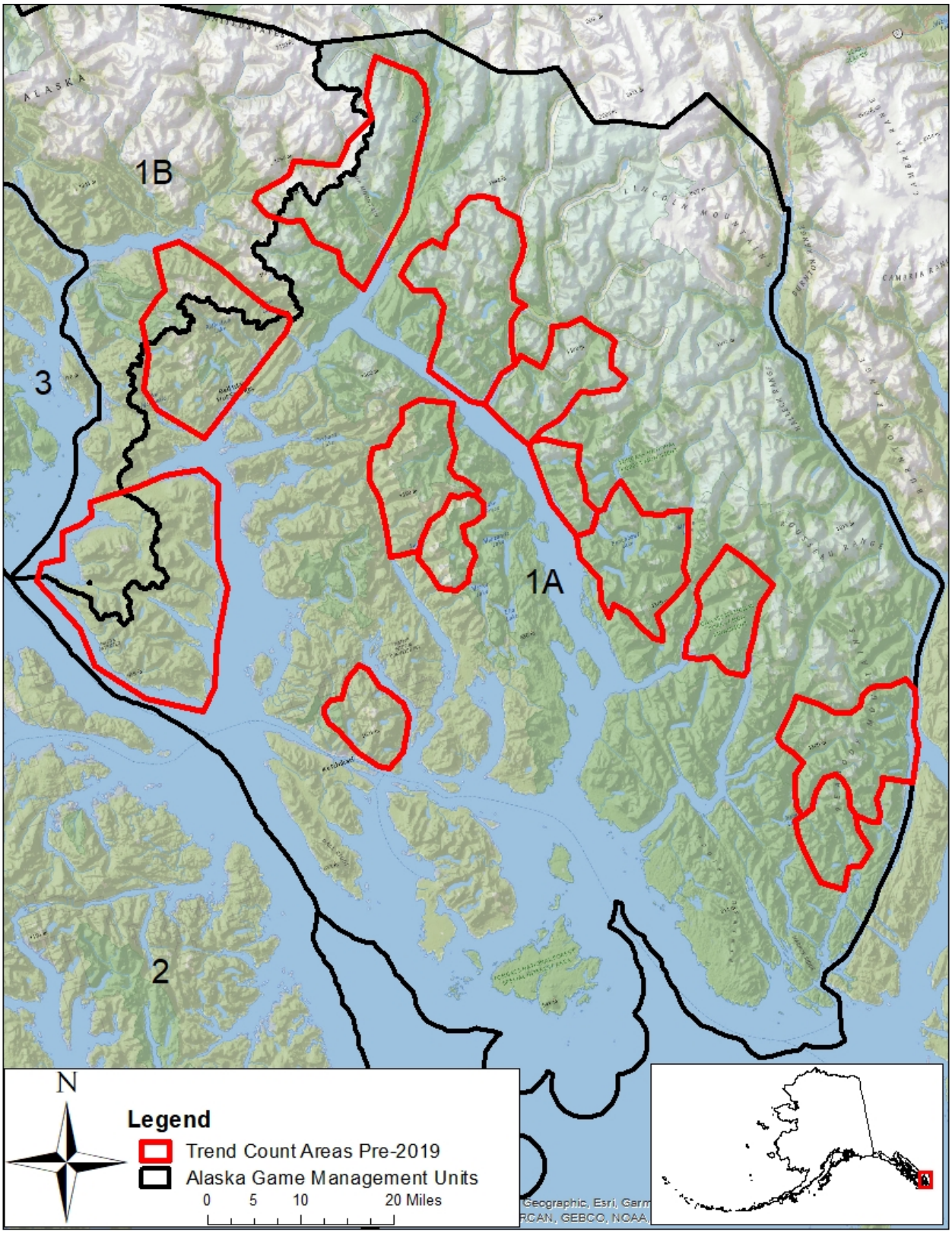

Figure 2. Map of Game Management Unit 1A historic trend count areas for mountain goats, Southeast Alaska.

to the 3-year running average of the annual harvest to determine a guideline harvest level. For instance, if 6 points are allowed in a hunt area, then for any given 3-year period, the cumulative points for an area should not exceed 18. In this way, if 7 points are taken one year, and 8 the next, then the third year point allowance would be reduced to 3. Hunt areas that reach the harvest level are closed by emergency order.

Smith (1983**)** stressed the need to monitor both short- and long-term environmental fluctuations and subsequent variations in population parameters to assist in making management decisions. In the event of a severe winter, The department would assume that some animals die during the winter and consequently fewer animals would be available for the following hunting season. Our management strategy of using 6 points per 100 goats on a 3-year running average and careful monitoring of environmental conditions throughout the unit ensures that we keep hunter harvest and mortality associated with environmental factors at a level the population can withstand.

Season and Bag Limit

Unit 1A	Resident and nonresident hunters
Revillagigedo Island, 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 goat by drawing permit only DG005, DG006, DG007	15 August–31 December
Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet:	No open season
Remainder of Unit 1A: 1 goat by registration permit only.	1 August–31 December

Results and Discussion

Harvest by Hunters

The average harvest of mountain goats in Unit 1A for this reporting period was 32 (Table 2). Total Males made up 75% and females 25% of the harvest that occurred RY13–RY17. This was an increase in the percentage of males taken over this reporting period compared to (Porter 2014). About 53% of hunters who received a permit did not hunt. Approximately 49% of the hunters who did hunt were successful. This is similar to other draw/registration hunts in Alaska where about 50% of people who receive a permit hunt, and of that, 50% of people who participated in hunting are successful. Many hunters that come through the office to receive a permit mention that they get a permit "just in case they see a goat."

Table 2. Unit 1A, Alaska, mountain goat harvest, regulatory years 2013–2017.

Hunt	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Did not report	Harvest					
							Males	(%)	Females	(%)	Unknown	Total
RG001	2013	105	67	26	12	0	9	75	3	25	0	12
	2014	96	55	20	19	2	13	72	5	28	1	19
	2015	140	74	38	24	4	10	42	14	58	0	24
	2016	138	81	39	17	1	14	82	3	18	0	17
	2017	107	66	22	19	0	15	79	4	21	0	19
	Average	**117**	**69**	**29**	**18**	**1**	**12**	**67**	**6**	**33**	**0**	**18**
DG005	2013	4	0	0	4	0	3	100	0	0	1	4
	2014	4	0	2	2	0	2	100	0	0	0	2
	2015	4	2	0	2	0	2	100	0	0	0	2
	2016	4	1	0	3	0	3	100	0	0	0	3
	2017	5	0	0	4	1	4	100	0	0	0	4
	Average	**4**	**1**	**0**	**3**	**0**	**3**	**100**	**0**	**0**	**0**	**3**
DG006	2013	15	3	2	9	1	5	56	4	44	0	9
	2014	15	2	1	12	0	9	75	3	25	0	12
	2015	12	1	4	7	0	6	86	1	14	0	7
	2016	15	0	1	14	0	10	71	4	29	0	14
	2017	18	4	4	7	3	6	86	1	14	0	7
	Average	**15**	**2**	**2**	**10**	**1**	**7**	**70**	**3**	**30**	**0**	**10**
DG007	2013	2	1	0	0	1	0	–	0	0	0	0
	2014	10	8	1	1	0	1	100	0	0	0	1
	2015	6	5	1	0	0	0	–	0	0	0	0
	2016	10	3	5	2	0	2	100	0	0	0	2
	2017	12	5	0	4	3	4	100	0	0	0	4
	Average	**8**	**4**	**1**	**1**	**1**	**1**	**100**	**0**	**0**	**0**	**1**

Hunt	Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Did not report	Harvest					
							Males	(%)	Females	(%)	Unknown	Total
Total	2013	126	71	28	25	2	17	71	7	29	1	25
all	2014	125	65	24	34	2	25	76	8	24	1	34
hunts	2015	162	82	43	33	4	18	55	15	45	0	33
	2016	167	85	45	36	1	29	81	7	19	0	36
	2017	142	75	26	34	7	29	85	5	15	0	34
	Average Annual	**144**	**76**	**33**	**32**	**3**	**24**	**75**	**8**	**25**	**0**	**32**

During this reporting period, the annual number of hunters who harvested goats from registration hunt RG001 ranged 12–24 (Table 2, Fig. 3). Average harvest for RG001 during this reporting period was 18 goats, similar to the previous reporting period (Porter 2014). In most years, most of the goats harvested were males, except that in 2015 females made up 58% of the harvest. Regulatory year 2015 also had the most permits issued and the most hunters participating in the hunt. Increased pressure from more hunters afield may have caused an increase in harvest of nannies due to increased competition for goats from popular access points. Our continued efforts to provide educational materials on goat sex identification seem to be working as for RG001 there was a mean harvest of 67% males and 33% females during RY13–RY17.

The number of permits issued for DG005 was 4 for each year except 2017, in which 5 were issued (Table 2, Fig. 4). Harvest also remained steady, ranging 2–4 goats annually with nearly all animals taken males (Table 2). DG005 was the most difficult hunt for hunters to get a permit for during the reporting period, with only 1% of applicants successful in the draw each year (Table 3). DG006 had the most permits allocated compared to other draw hunts, resulting in the highest mean annual harvest (Table 2, Fig. 5). This level of allocation is appropriate for this hunt as, according to our aerial minimum counts, the goat population has increased (Table 1). For each of draw hunts DG006 and DG007 3 people did not report in 2017; failure to report is usually because the hunter did not hunt. DG007 has the lowest mean annual harvest (1 goat, range = 1–4) compared to the other draw hunts and the highest probability for an applicant get a tag (Table 2, Table 3, Fig. 6). ADF&G attributes this to need to access the remote DG007 hunt area via boat or plane. Similar to DG005, the DG007 harvest included only males. This is likely a factor of the small sample size of harvest compared to DG006 and RG001, but is an indication that hunters are taking their time to determine the sex of mountain goats before harvesting.

Federal Subsistence Harvest

The state and federal subsistence hunts for Unit 1A mountain goat are managed under separate permits, including the state registration mountain goat permit (RG001) and the federal registration permit (FG0103). Taking of the first mountain goat must be under the state registration hunt and if a hunter is federally qualified to hunt under federal regulations, the second must be under the federal registration permit. The taking of kids or nannies accompanied by kids is prohibited under federal and state regulations. There was no federal subsistence harvest during this reporting period. However, deciphering if there were active hunters in Unit 1A hunting under the federal permit because the hunt game management unit has historically been labeled as "1Z" in federal reporting, which encompasses all administrative units of Unit 1. This makes it impossible to know which administrative unit mountain goats were harvested in under the federal permit. More recent permits have changed to include the administrative unit and during RY13–RY17 reports indicated that 2 goats were harvested under the federal permit in Unit 1A.

Figure 3. Mountain goat registration hunt RG001 in Game Management Unit 1A, Southeast Alaska.

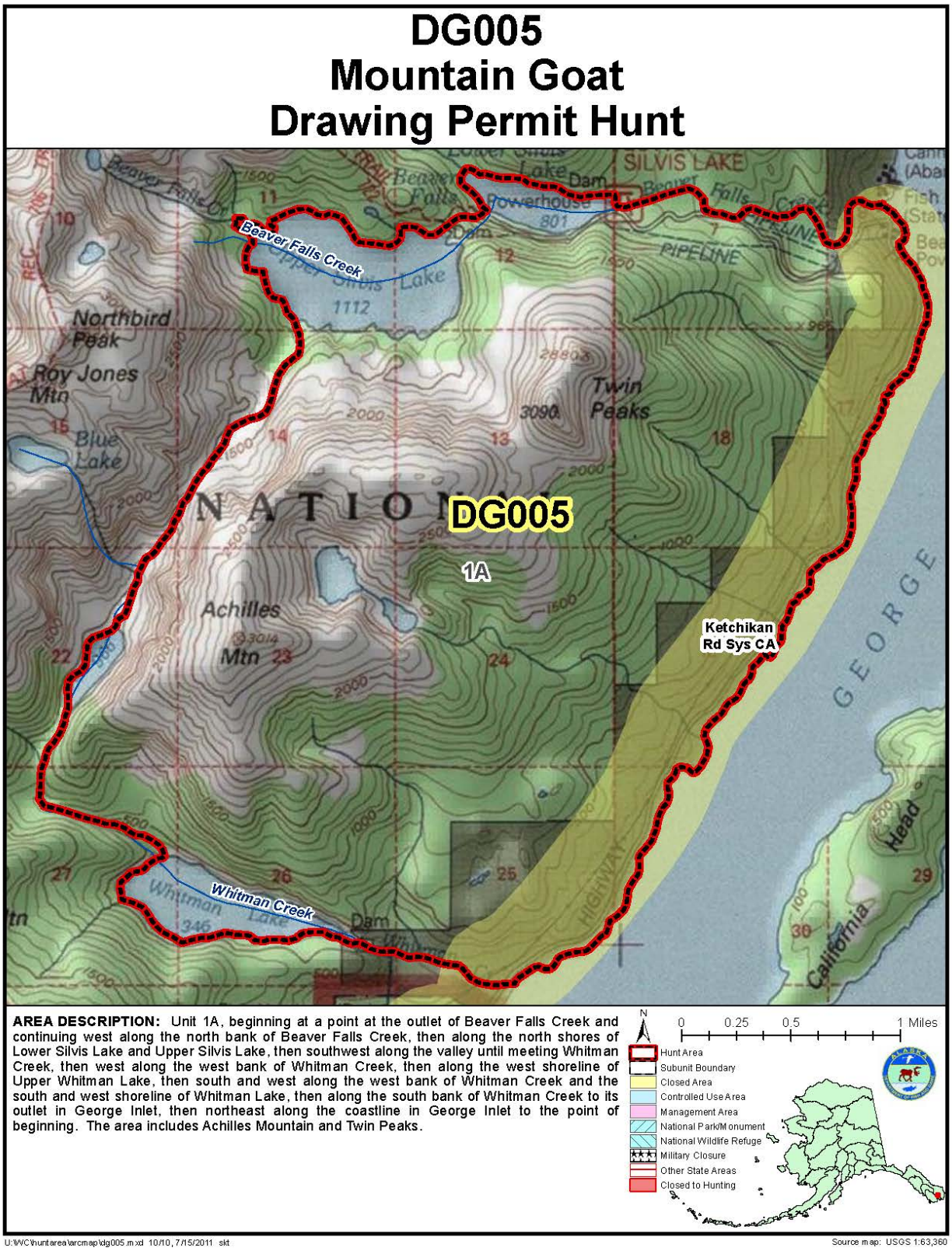

Figure 4. Mountain goat draw hunt DG005 in Game Management Unit 1A, Southeast Alaska.

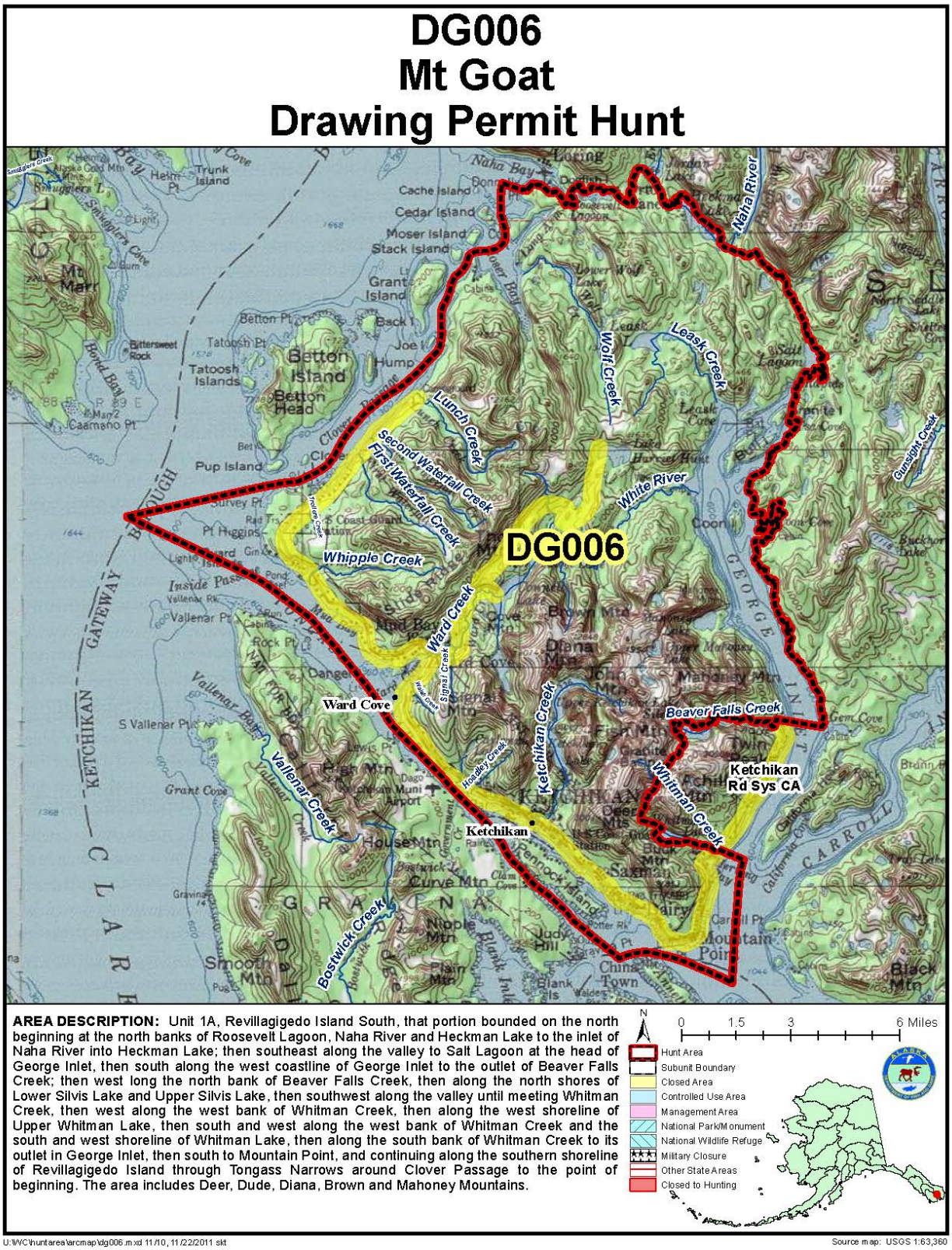

Figure 5. Mountain goat draw hunt DG006 in Game Management Unit 1A, Southeast Alaska.

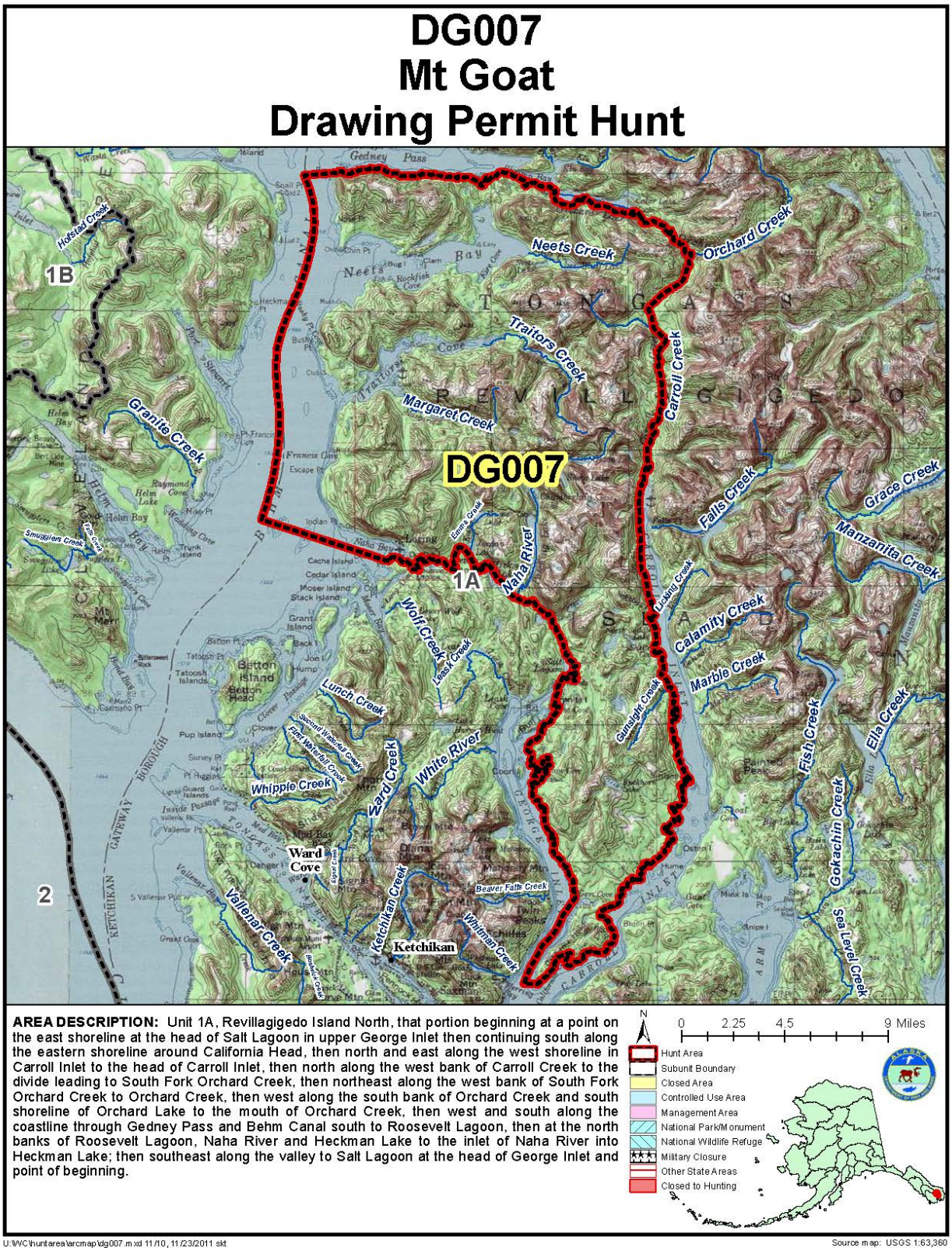

Figure 6. Mountain goat draw hunt DG007 in Game Management Unit 1A, Southeast Alaska.

Table 3. Draw results for Alaska hunts DG005, DG006, DG007, regulatory years 2013–2017.

Regulatory year	Hunt number	Applicants	Permits issued	Percent drawn
2013	DG005	270	4	1
2014	DG005	296	4	1
2015	DG005	408	4	1
2016	DG005	436	4	1
2017	DG005	755	4	1
2013	DG006	324	15	5
2014	DG006	350	15	4
2015	DG006	459	12	3
2016	DG006	525	15	3
2017	DG006	1300	15	1
2013	DG007	126	2	2
2014	DG007	156	10	6
2015	DG007	228	6	3
2016	DG007	233	10	4
2017	DG007	189	10	5

Hunter Residency and Success

Local residents of Unit 1A harvested half the mountain goats taken during RY13–RY17 (Table 4). The high success rate for nonresident mountain goat hunters is due the regulatory requirement that they must have a guide while hunting mountain goats in Alaska. Nonlocal residents had a nearly identical success rate to local residents, 46%. Average annual harvest was split with 50% successful and 50% unsuccessful during the reporting period. This is a slightly higher success rate than (43%, Porter 2014). Success in Unit 1A is largely dependent on weather. Fall can be a difficult time to hunt as rainfall and wind events increase. This poor weather typically dissuades hunters and lowers harvest. During this reporting period, weather was relatively mild, which encouraged hunters to pursue mountain goats.

Harvest Chronology

Ninety percent of harvest occurred from August through October during this reporting period (Table 5). September accounted for the highest month of harvest with 38%, whereas November was the lowest with an average of only 3% of the harvest. Hunters enjoy the late summer conditions of hunting in August when weather is typically at its best for the season. However, September is likely the most popular month to hunt as mountain goats begin to grow their thick winter coats which hunters desire as a part of the trophy value. November and December get the least amount of hunting pressure because winter conditions make hunting in the mountains more difficult. December accounted for 7% of harvest, possibly reflecting natural migration by mountain goats down the mountain to lower elevations where they have access to forage. This makes them an easier target as some make it down to sea level, making it easier to pack the animal out. It may also reflect hunters switch from goats to deer in November, as the rut during the first 2 weeks of November is the most popular time to harvest deer in Unit 1A.

Transport Methods

Airplane (28%), boat (31%), and highway vehicle (30%) were the most popular methods used to access mountain goat hunting locations in Unit 1A during RY13–RY17 (Table 6). A boat or a plane is required to reach mountain goats in RG001 and DG007. Highway vehicles were the most popular method to access DG005 and DG006 from the Ketchikan road system. The ease of access to these hunts is why they are draw hunts due to the likelihood of overharvest if they were included in the registration hunt. Planes allow access to many remote areas on the mainland but the cost limits use; the farther the planes travel the higher the cost. The terrain also limits where planes may land as a suitable lade or ridge line is required, which usually results in hunters being concentrated in the best areas for planes to land. Access to mountain goat hunting is a challenge in Unit 1A. This is likely the reason mountain goats are the most underutilized big game species in Unit 1A.

Table 4. Unit 1A, Alaska, mountain goat hunter residency and success, regulatory years 2013–2017.

	Successful					Unsuccessful					
Regulatory year	Local resident[a]	Nonlocal Resident[b]	Non-resident[c]	Total	(%)	Local resident[a]	Nonlocal resident[b]	Non-resident[c]	Total	(%)	Total hunters
2013	10	10	5	25	46	19	9	1	29	54	54
2014	17	10	7	34	59	11	12	1	24	41	58
2015	14	11	8	33	43	26	16	1	43	57	76
2016	22	6	8	36	44	29	15	1	45	56	81
2017	18	14	2	34	57	14	8	4	26	43	60
Average Annual	16	10	6	32	50	20	12	2	33	50	66

[a] A local resident is a person who lives in Unit 1A.
[b] A nonlocal resident is a person who lives in Alaska outside of Unit 1A.
[c] A nonresident is a person who is a U.S. citizen who lives outside of Alaska.

Table 5. Unit 1A, Alaska, goat harvest chronology percent by month, regulatory years 2013–2017.

Regulatory year	Aug	(%)	Sep	(%)	Oct	(%)	Nov	(%)	Dec	(%)	Unk	Total
2013	9	36	6	24	3	12	1	4	1	4	5	25
2014	4	12	13	38	8	24	1	3	3	9	5	34
2015	8	24	11	33	9	27	2	6	3	9	0	33
2016	13	36	17	47	5	14	0	0	1	3	0	36
2017	11	32	16	47	4	12	0	0	3	9	0	34
Average	9	28	13	38	6	18	1	3	2	7	2	32

Table 6. Unit 1A, Alaska, mountain goat harvest percent by transportation method, regulatory years 2013–2017.

Regulatory year	Airplane	(%)	Boat	(%)	4-wheeler	(%)	Other off-road vehicle	(%)	Highway vehicle	(%)	Foot	(%)	Unk	Total
2013	6	24	7	28	0	0	0	0	8	32	3	12	1	25
2014	7	21	12	35	1	3	1	3	10	29	3	9	0	34
2015	17	52	7	21	0	0	1	3	5	15	2	6	1	33
2016	9	25	9	25	3	8	0	0	15	42	0	0	0	36
2017	7	21	16	47	0	0	0	0	10	29	1	3	0	34
Average	9	28	10	31	1	2	0	1	10	30	2	6	0	32

Other Mortality

Predation by wolves and bears, unreported wounding loss, poaching, accidents, malnutrition, and disease all contribute to mortality. No records exist documenting other sources of mortality for the reporting period.

Alaska Board of Game Actions and Emergency Orders

The Board of Game made no changes to Unit 1A mountain goat regulations during meetings held this period. In 2013 and 2015.

Recommendations for Activity 2.1

Continue monitoring harvest and effort for RG001, DG005, DG006, and DG007.

ACTIVITY 2.2. Measure mountain goat horns to identify trends in growth and size.

Data Needs

Age and horn growth data give us information on age classes being harvested and information to track horn size over time. Age class of mountain goats harvested helps indicate hunter preference and is an index to the age structure of the goats being harvested. Horn measurements help us understand trends in harvest and the overall health of the herd as indicated by annuli measurements.

Methods

When hunters harvest a mountain goat, they are required to present the horns at the Ketchikan area office for measurements. We record days hunted, method of transportation, date of kill, location of kill, age of the goat with an associated certainty index, sex, horn length and basal circumference, length of annuli on the longest horn, whether each horn was broomed, and the width between horns.

Results and Discussion

The average age of goats harvested RY13–RY17 was 5 years (Table 7). Horn length averaged 8.9 inches long with a basal circumference of 5 inches. These averages show that hunters select older animals for their trophy value. Goats harvested from Unit 1A are known for their large size, especially those from the Cleveland Peninsula, where goats have above-average horn development compared to other Southeast Alaska sampled goats (White et al. 2010), though the Cleveland Peninsula has been closed to hunting mountain goats since 2003. Average age and horn size were consistent throughout the reporting period. This suggests stability in harvest from the current management strategy.

Recommendations for Activity 2.2

Continue measuring horns during the next reporting period.

Table 7. Average and range of horn measurements and ages from harvested Unit 1A, Alaska, mountain goats, regulatory years 2013 through 2017.

Year	Age	Length right horn	Length left horn	Basal circumference right horn	Basal circumference left horn
2013	5.0 (1.5–9.5)	9.0 (5.3–10.6)	9.0 (5.3–10.6)	4.9 (2.0–5.9)	5.0 (3.5–6.0)
2014	5.2 (1.5–11.5)	8.7 (5.9–11.2)	8.9 (5.6–11.4)	5.0 (3.9–6.0)	5.1 (4.0–6.0)
2015	5.0 (1.5–10.5)	8.8 (6.1–11.5)	8.7 (6.1–11.8)	4.8 (3.8–6.1)	4.7 (3.5–6.0)
2016	4.9 (1.5–11.5)	8.9 (5.5–11.6)	8.9 (5.0–11.6)	5.3 (3.9–5.9)	5.1 (3.9–5.9)
2017	5.0 (1.5–12.5)	9.2 (5.1–12.1)	9.2 (5.3–11.2)	5.2 (3.3–6.3)	5.1 (3.3–6.0)

3. Habitat Assessment-Enhancement

There were no habitat enhancement activities during this reporting period. ADF&G comments on development and resource extraction activities, noting where there are concerns for mountain goat habitat.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- Data sheets are scanned and stored on the Ketchikan server.
- Original datasheets are stored in file folders located in the office of the Ketchikan Area Biologist.
- Historical survey notes and data sheets are being digitized and scanned for permanent storage on the file server.
- Wildlife management reports and plans for mountain goat in Unit 1A are available on the department's website.
- Memos, data forms, and additional hard copies will be scanned and stored on the internal department file server.

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

Minimum counts continue to provide an index of abundance that is essential to our management efforts and strategy. The department surveyed 5 TCAs during the reporting period. Sighting of 99 goats per hour was well over our objective of a minimum of 20 goats per hour of survey time. Our weighted point system of 6 points per 100 goats seen should be adapted based on current scientific analysis. For instance, minimum counts should be used in conjunction with sightability correction to create a harvest guideline based on a percentage of the population estimate. Our newly created sightability correction model is based on many years of collared goat data gathered in Region 1. This approach will allow for more opportunity for harvest in Unit 1A. Increasing the number of TCAs such that all areas of Unit 1A are in a survey area may provide better data for management and possibly increase opportunity. These changes are detailed in the plan section below.

Mountain goats remain our most underutilized big game resource in Unit 1A. Harvest is limited by access and weather during the long hunting season, from 1 August 1–31 December, with most harvest occurring from August through October. The low average annual harvest of 32 over the reporting period out of an estimated 3,000–4,000 mountain goats with a harvest ratio of 75% males to 25% females demonstrates the current sustainability of the hunt. Each year, the draw

hunts provide easy access for selected hunters who draw tags and the registration hunt outside of the draw areas provides ample opportunity for other hunters to harvest goats.

Many hunters travel to Unit 1A to hunt the trophy goats available in this unit. However, half of the harvest comes from local residents showing their affinity for hunting goats. Accessing mountain goats in the registration hunt requires a plane or a boat, which is why much of the harvest is from locals who own a boat. Hunters who draw a tag for the hunts near Ketchikan typically drive to a trailhead with a highway vehicle. Trophy animals are available throughout Unit 1A which adds incentive to hunt in the unit. Ample opportunity, access, and trophy animals provides high hunter satisfaction for mountain goat hunting in Unit 1A.

II. Project Review and RY18–RY22 Plan

Review of Management Direction

MANAGEMENT DIRECTION

Minimum counts in aerial surveys provide an index of abundance ADF&G uses to determine allowable harvest under registration and draw hunts in Unit 1A. Draw hunts near Ketchikan allow for a sustainable harvest of goats with easy access while the registration hunt allows hunters to harvest goats each year if they choose. ADF&G seeks to maximize opportunity of a sustainable harvest and to collect as much minimum count data as possible. Increasing minimum count coverage and updating management strategies using population estimates will increase our knowledge of Unit 1A mountain goat populations and result in better management.

GOALS

Updated goals below offer a refine plan for what is expected of goat management in Unit 1A.

- Maintain mountain goat densities at a level suitable for sustained use, for both consumptive and nonconsumptive users in Unit 1A.
- Maintain viable mountain goat populations throughout their historic and introduced range in Unit 1A.
- Manage for the greatest hunter participation possible consistent with maintaining viable populations, sustained yield, and interests and desires of the public.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game made a positive cultural and traditional finding for mountain goats in 5 AAC 99.025 for Unit 1A during its 2007 meeting. At its 2009 meeting it set the amount necessary for subsistence in Unit 1A at 5–10 mountain goats.

Intensive Management

Mountain goats are not subject to intensive management.

MANAGEMENT OBJECTIVES

Old objectives:

1. Maintain flight surveys that result in 20 goats seen per hour of survey time during fall surveys, and when that is not achieved determine probable causes for the lack of goats seen.

2. Attempt to survey at least 6 established trend count areas (TCA) throughout Unit 1A annually.
3. Monitor sex composition of the harvest and manage based on the strategy outlined in Section.

New Objectives:

See methods section for details and justification of methods.

1. Maintain huntable populations >50 adult mountain goats per TCA where feasible.

2. Reduce harvest of females to a desired maximum of ≤30% of harvest based on a sliding scale (Table 8).

3. Allow harvest of mountain goats according to a sliding scale (Table 8).

4. Survey 8–10 TCAs per year based on weather conditions, pilot availability, and other constraints between July and October.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count surveys.

Data Needs

These data are crucial for managers to determine the appropriate amount of harvest each season. Preventing overharvest is consistent with the states mandate to manage on a sustained yield basis.

Methods

New TCAs will be added to the current TCAs to cover all areas in Unit 1A where goats are present. More smaller TCAs will increase the likelihood of a unit being surveyed, which will increase comparability among years. It also provides greater resolution to changes in the population of mountain goats. This method will also aid in avoiding localized depletion. Currently, information from 14 TCAs is used for management, but the new method will have a total of 43 TCAs with varied levels of monitoring (Fig. 7, Fig. 8).

Areas with high hunting pressure (e.g., draw hunt areas, areas with easy access, etc.) will be surveyed a minimum of every other year. Areas with moderate hunting pressure will be surveyed every 3 to 4 years, and areas with the least pressure will be surveyed every 5 to 7 years as constraints (weather, pilot availability, etc.) allow. As hunting pressure changes, survey priority will change as well. This will provide a comprehensive minimum count for all Unit 1A mountain goats. ADF&G will attempt to survey 8–10 TCAs each year.

Another change is that harvest caps will be set based on minimum counts corrected for sightability. Previously, harvest caps were set according to minimum counts based on 6 points per 100 goats surveyed, averaged over 3 years (Porter 2014). Sightability correction yields an estimated count that considers both the animals seen in a survey and those that are likely present but not seen. The estimate is derived from a model that estimates how many goats are not being seen and incorporates them into a final count (Rice et al. 2009). After conducting multiple studies, ADF&G created a model that allows managers to estimate the number of goats not seen during the survey based on sightability data collected throughout Southeast Alaska (White et al. 2016). Sightability corrected data will allow more opportunity for hunters and more accurate population estimates for managers.

Sightability corrected minimum counts allow ADF&G to estimate the population and set harvest goals based on a percentage of the estimated population rather than a point system. Mountain goats are sensitive to overharvest, especially native populations of goats (Festa-Bianchet and Côté 2008). Overharvest can occur quickly in small, isolated populations of mountain goats and cause local extinction. To avoid this, harvest of native or introduced populations should be avoided in populations below 50 goats (Hamel et al. 2005, Rice and Gay 2010). Harvest is also suggested for an estimated populations of 50 adults before harvest should occur (Festa-Bianchet and Côté 2008). Additionally, Hatter (2005) recommended that harvest rates for populations greater than 50 be scaled to population level. The harvest strategy for mountain goats in Unit 1A follows these recommendations, with the minimum population count of 50 adding a measure of conservatism (Table 8; Mountain Goat Management Team 2010).

Native and introduced mountain goat populations can be regulated differently based on their population dynamics. Introduced populations typically have an irruptive growth pattern and high twinning rates, leading to high recruitment and population growth following introduction (Caughley 1970, Houston and Stevens 1988, Festa-Bianchet and Côté 2008). Suggested harvest rates for native populations range 1–4%; rates are tied to the proportion of males in the harvest with higher suggested harvest rates when a higher proportion of males is harvested (Hamel et al. 2005, Festa-Bianchet and Côté 2008, Rice and Gay 2010, Mountain Goat Management Team 2010, Idaho Department of Fish and Game 2019, White et al. 2021). This rate contrasts with the higher harvest rates for introduced populations of up to 7–10% where the population has stabilized or increased (Adams and Baily 1982, Houston and Stevens 1988, Swenson 1985, Festa-Bianchet and Côté. 2008). Other studies suggest less than 7% harvest to maintain a sustainable harvest (Festa-Bianchet and Côté 2008). Both scales reflected in Table 8 are within the suggested range of harvest to minimize risk of overharvest.

Another method to reduce overharvest of mountain goats is to reduce female harvest (Côté and Festa-Bianchet 2003). Reducing harvest of females that scales with population aids in reducing probability of overharvest (Table 8, Mountain Goat Management Team 2010). ADF&G created

an online quiz and pamphlet to educate and test hunter knowledge of mountain goat sex identification (ADF&G 2019a). The push for a reduction in female harvest through education and personal communication with hunters has reduced female goat harvest in Alaska (ADF&G 2019b).

Table 8. Mountain goat harvest management strategy for Game Management Unit 1A, Alaska.

Population size	Maximum desired harvest rate (%)		Maximum desired female harvest (%)
	Mainland	Revillagigedo Island	
<50 adults	0	0	0
≥50 adults to <100	2	3	≤25
≥100 to <200	3	5	25–30
≥200	4	7	≤30

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor hunter harvest through registration permit and draw permits.

Data Needs

Hunt and harvest information is crucial to implement our harvest strategy which relies on hunters providing harvest information.

Methods

No changes to RY13–RY17 methods are expected to occur during RY18–RY22.

ACTIVITY 2.2. Measuring mountain goat horns for trends in growth and size.

Data Needs

Age and horn growth data give us information on age classes harvested and allow us to track horn size over time. Age class of mountain goats harvested helps indicate hunter preference and is an index to the age structure of the goats being harvested. Horn measurements help us understand trends in harvest and the overall health of the herd through the measurement of annuli.

Methods

No changes to RY13–RY17 methods are expected to occur during RY18–RY22

3. Habitat Assessment-Enhancement

Department staff will continue commenting on development and resource extraction activities that could affect mountain goat habitat in Unit 1A.

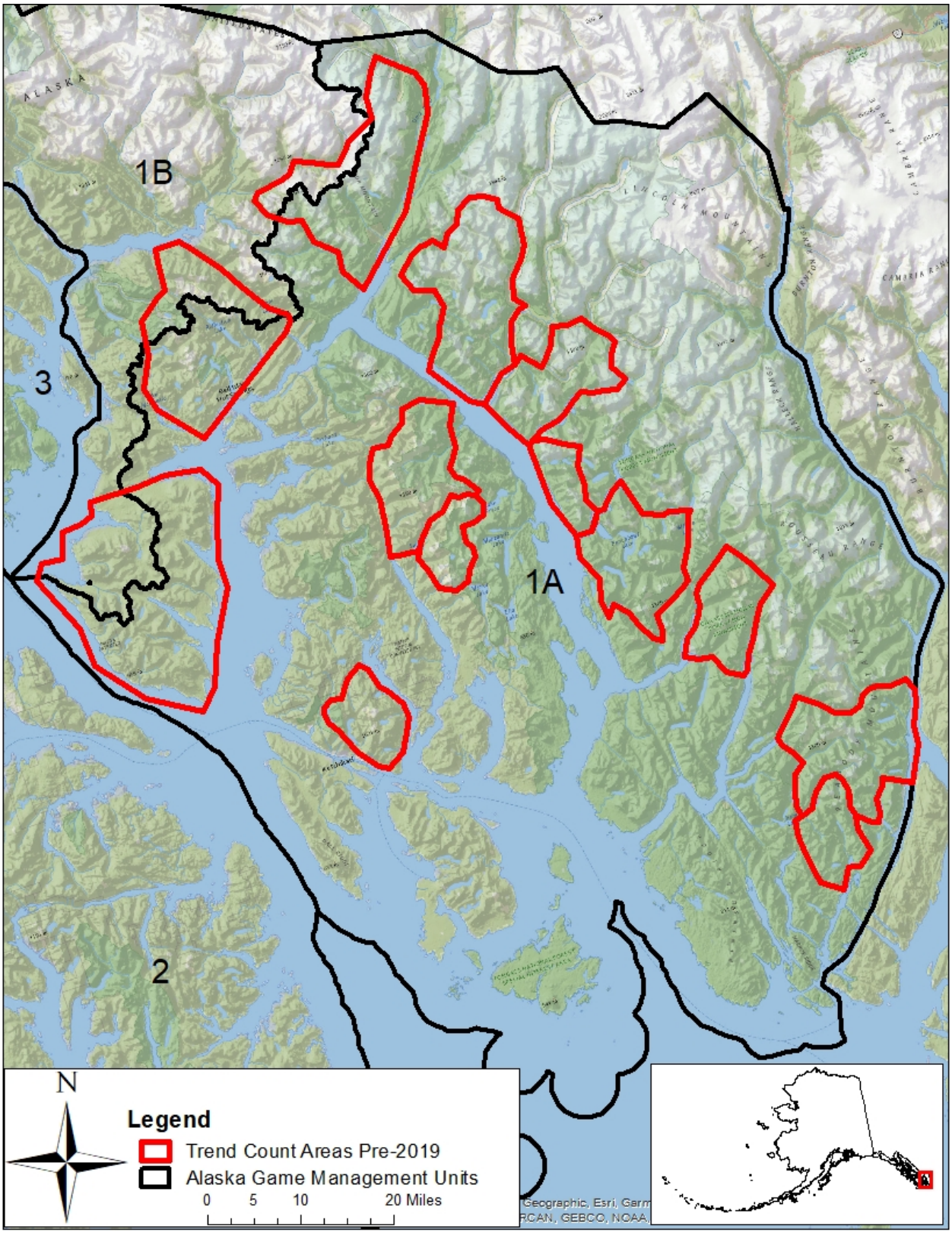

Figure 7. Map of Game Management Unit 1A historic trend count areas for mountain goats, Southeast Alaska.

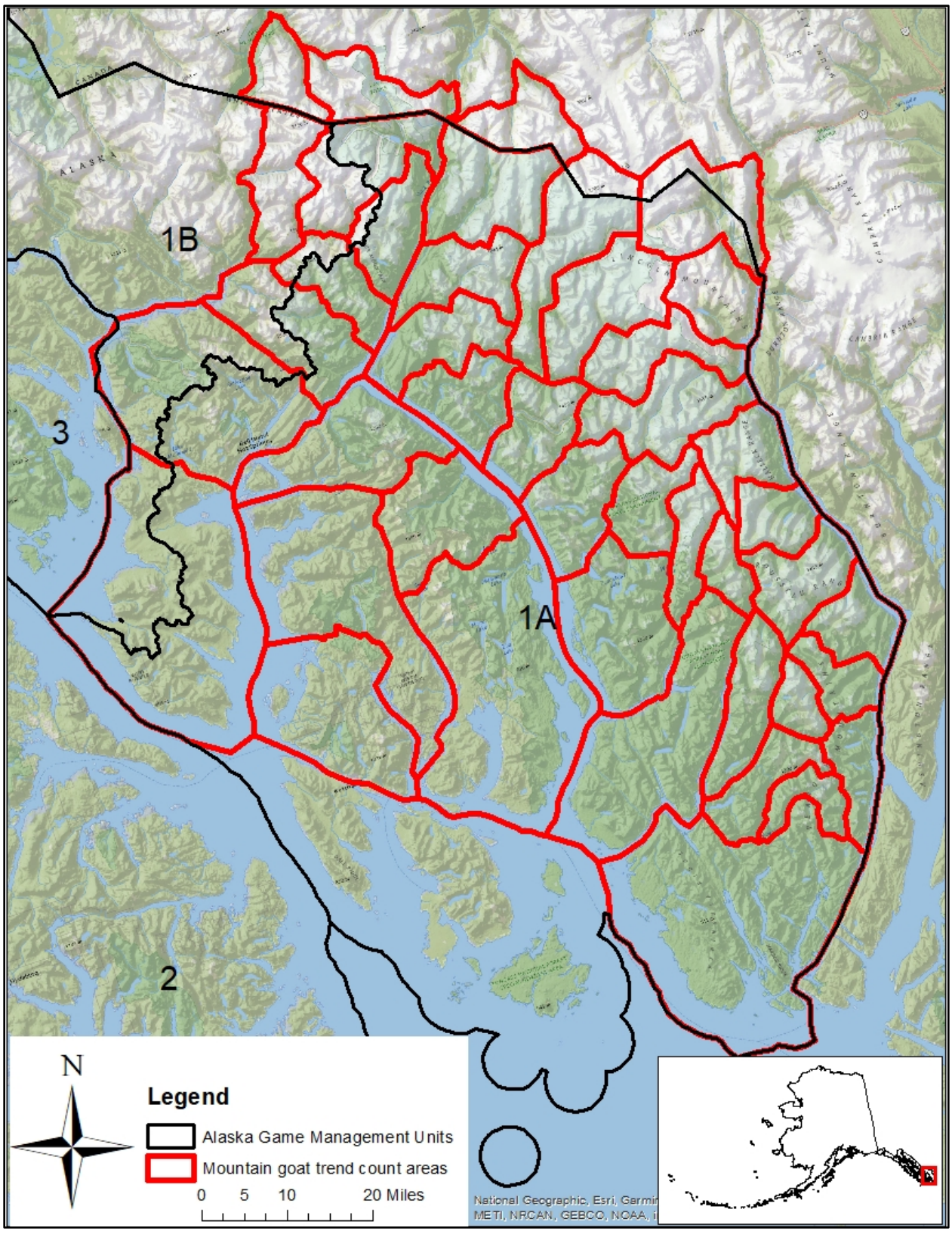

Figure 8. Mountain goat trend count areas, Unit 1A, Southeast Alaska.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No problems or needs have been identified for RY18–RY22.

Data Recording and Archiving

No change from report.

Agreements

No change from report.

Permitting

No change from report.

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