

Mountain Goat Trails

Research and Management Update for Southeast Alaska



Fall 2014

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Welcome to ADF&G's Mountain Goat Trails

As a boy growing up in Juneau, I eagerly anticipated my family's periodic visits to the Mendenhall Glacier Visitor Center. Besides the fun of searching for toads on the rocks around the center, my sisters and I found ourselves drawn to the spotting scopes mounted in front of the huge window panes, facing the glacier and its east and west framing mountains. With anticipation we would scan the mountainsides, looking past patches of snow in search of the white specks we knew to be mountain goats. Occasionally we'd be lucky enough to spot one or more of the horned beasts, standing or feeding high on the steep slopes of the rugged mountains. Though only distant glimpses, they were memorable and helped fuel my interest in wildlife and the career I would eventually pursue in wildlife management.

In the ensuing years, I would become involved with goats, as a viewer, a hunter, and a biologist. In 1991, while serving as Fish and Game's wildlife biologist in Ketchikan, I participated in the introduction of 15 mountain goats from Quartz Hill within Misty Fjords National Monument to Mahoney Mountain on Revilla Island, and I was involved in numerous aerial surveys of goats throughout the Southeast Alaska Panhandle. Later, I participated in capturing and collaring mountain goats as part of a study administered by the Alaska Department of Transportation and Public Facilities to understand the ecology of goats living in and adjacent to the proposed road corridor from Echo Cove to the Katzehin River.



© Steve Shrum

A sedated goat is retrieved after darting during the Deer Mountain transplant in 1991.

As a result of my connection with goats, I gained a deep respect and appreciation for the species. Their toughness amidst some of the harshest weather and most rugged terrain Alaska has to offer is nothing short of amazing. Their sure-footedness, aided by specially-adapted hooves, is among the more awe-inspiring phenomenon of the natural world. I have come to appreciate too, however, just how vulnerable goats are to overharvesting by humans and environmental hazards such as avalanches.

Thanks to research efforts in Alaska and elsewhere, biologists have gleaned information that can be used to more accurately assess and manage goat populations throughout their range.

Knowledge of productivity, habitat use, mortality, and movement patterns combine to ensure hunting, heli-skiing, and other influences on mountain goats are managed in a manner that ensures sustainable populations.

I hope you find this edition of Mountain Goat Trails interesting and informative, and the articles inspire you to seek an even greater knowledge and familiarity with this impressive member of Alaska's large mammal fauna.

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P.O. Box 110024
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Basics of biology

General description

The mountain goat (*Oreamnos americanus*) is the single North American representative of a unique group of mountain ungulates called the Rupicaprinae, or “rock goats.” They have relatively short horns and inhabit mountainous terrain in coastal regions of Southeast and Southcentral Alaska. Mountain goat hooves are specially designed for climbing in steep, rocky, and slippery terrain. A close-up look reveals a hard keratinous sheath and a soft embedded pad that enables goats to maintain a foothold on the smallest of granite cracks.

These animals are well adapted for extreme cold. When the first winter snows dust the high country in mid-October, mountain goats have attained their 8 inch long shaggy winter coats. They begin shedding their winter coat in June and once again have a short, sleek summer coat by July.

Adult females weigh about 180 pounds, while adult males are about 40% larger, averaging about 280 pounds (in late summer). Prime-aged males often weigh more than 300 pounds, with the largest males topping 385 pounds. The horns of an average adult female are equal in length to those of an average adult male but are more slender and bend back more sharply at the tip.

Range and habitat

An estimated 24,000–33,500 mountain goats inhabit Alaska, of which 13,500–20,000 are found in Southeast. The mountain goat’s range is restricted to steep and broken terrain from the mainland of the Southeast Panhandle along the Coast Mountains to Cook Inlet. Mountain goats have been successfully transplanted to Kodiak, Baranof, and Revillagigedo (Revilla) islands where populations are now well established. Mountain goats were also introduced to Chichagof Island; however, that transplant attempt failed. For more information about game transplants in Alaska, visit www.adfg.alaska.gov and search “game transplants.”

Growth and reproduction

The breeding season for mountain goats occurs between late October and early December. Males may travel considerable distances in search of receptive females. Typically, prime-aged males (4-10 years old) do most of the breeding, with battles between males occasionally causing horn-inflicted puncture wounds. Adult males usually separate themselves from larger nanny-kid nursery groups, except during the rut. In summer they may form small bachelor groups. Usually a single young (kid) is born in mid-late May after a gestation period of about 180 days. Female mountain goats seek out rugged, isolated sites prior to giving birth but soon join other females with newborn kids to form nursery groups. Kids generally remain with their mothers until the next breeding season; however, some offspring remain nearby for a few years.



Male mountain goat (Billy)



Female mountain goat (Nanny)



Mountain goats on winter range in the Chilkat Valley, near Haines. This photo was taken with a remote camera.

Interestingly, mountain goats typically do not give birth until they are 4-5 years of age; quite old compared to other species such as moose, black-tailed deer, and caribou. Mountain goats may live up to 18 years, but most live for less than 12 years.

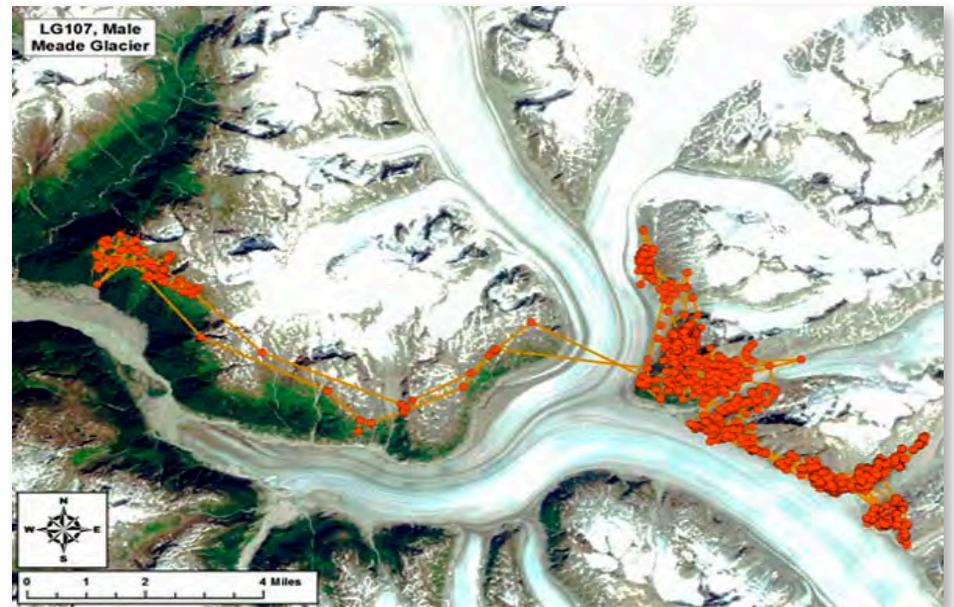
Seasonal movement

Habitat selection

Between 2005-2013, 167 mountain goats along Lynn Canal were captured and marked with GPS radio-collars. The animals are monitored annually to determine reproductive success and survival as well as to estimate population size and composition. GPS radio-collar location data has been used to describe and map habitat selection patterns during both the summer and winter.

The information gathered has been particularly important to identifying areas of conservation concern. The research efforts have added substantially to our understanding of mountain goat reproduction and survival. It also provides key population biology information that is relevant to other populations in the region.

Do mountain goats cross glaciers?



The map illustrates the movement patterns of a GPS radio-collared male mountain goat near the Meade Glacier. The mountain goat crossed the Meade Glacier (about 2.5 miles) in mid-summer in less than six hours.

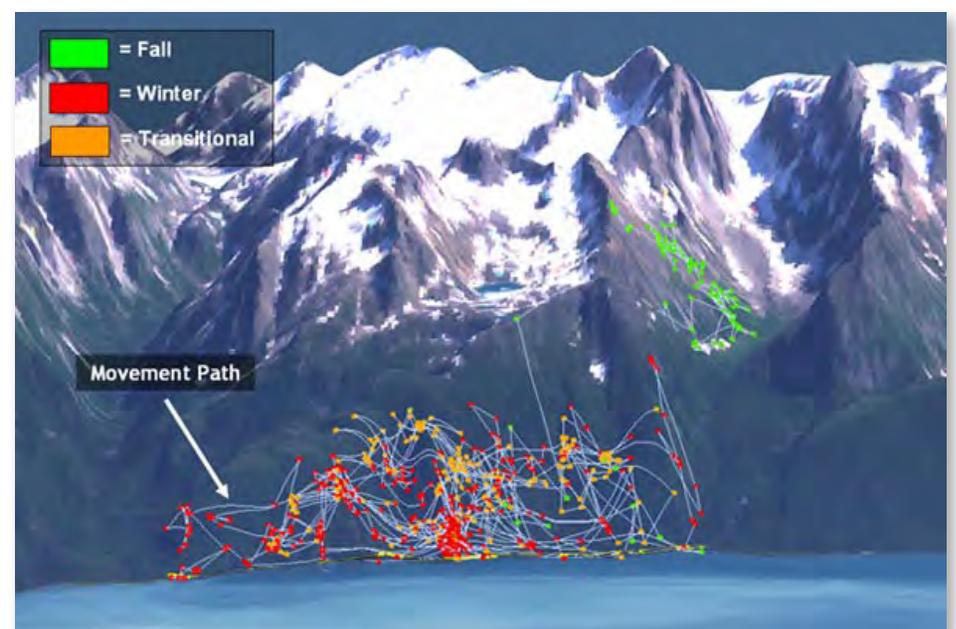
Annual migration

Spring - In spring mountain goats generally forage in south-facing avalanche chutes. As the snow melts they move to high elevation alpine and subalpine to feed on emerging and newly exposed vegetation.

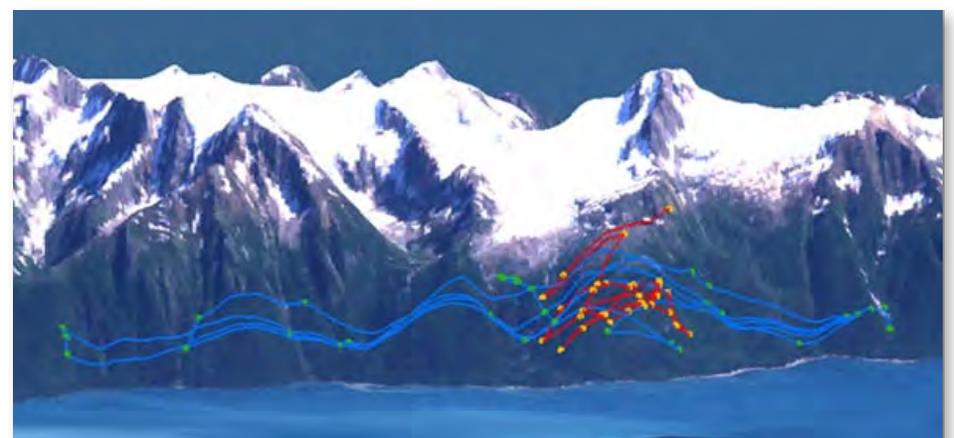
Summer - Mountain goats normally spend the summer in high alpine meadows where they graze on sedges, forbs, and low-growing shrubs. Throughout the summer they disperse to a variety of habitat types with an increase in elevation and greater use of northerly exposures.

Fall - During fall most goats move to lower elevations but still use north-facing slopes and inhabit forest, alpine, subalpine, and cliff habitats.

Winter - Winter is a period of severe nutritional deprivation and food scarcity for mountain goats. As winter advances, feeding habits generally shift to browsing. Blueberry, hemlock, and lichen can be important winter diet items depending on availability. Throughout the winter, goats use a wide range of elevations. Goats in the colder and drier mainland areas of Southeast Alaska occupy steep or windswept slopes with little snow cover, while those in warmer coastal areas typically descend to lower elevation forested habitats during periods of heavy snowfall.



Map describing seasonal movement patterns of a GPS radio-collared female mountain goat in the Lynn Canal area. In this area, mountain goats migrate from high elevation alpine summer range to low elevations during winter to escape the extreme alpine winter snow depths (up to 12 feet).



Map showing movement patterns during the breeding season ("rut") of a GPS radio-collared male (blue lines) and female (red lines). Males move widely across the landscape during the rut in order to find receptive females.

Hunt information

Management objectives

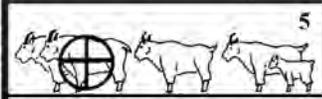
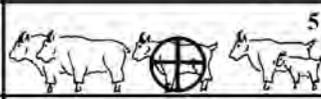
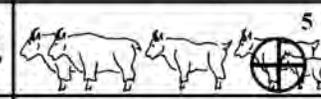
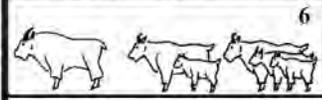
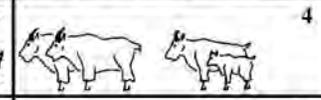
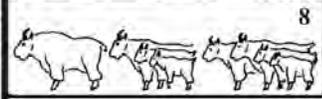
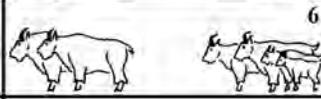
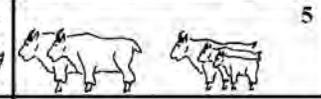
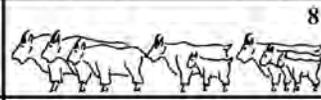
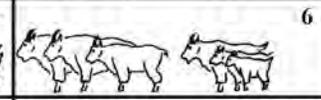
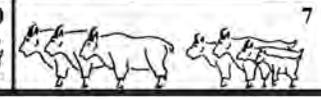
Within each hunt area, biologists establish a point system based on data collected from aerial surveys and harvest data. Male mountain goats count as 1-point and females 2-points towards the allowable harvest quota. These objectives allow for a harvest quota of 5-6 points per 100 goats observed based on the most recent aerial survey and population trends. Once the harvest quota has been reached for a specific goat population, emergency orders may be issued closing the mountain goat hunting season in that area.

Often small populations of mountain goats are heavily hunted because of easy access. To avoid localized depletion of goats in these areas, the 5-6 point harvest quota may be applied to smaller geographic areas within a larger registration hunt area. Fine-scale mountain goat management accomplishes 2 goals: 1) protects goats in easily accessible areas from being over harvested, and 2) provides hunters maximum opportunity by closing only small accessible areas while allowing other portions of the unit to remain open to mountain goat hunting.

Harvesting billies makes sense

It's important to determine the sex of a mountain goat before shooting because the sex of the animals harvested affects hunting opportunities for everyone. Mountain goats have relatively low survival and reproductive rates. If substantial nanny harvest occurs when a population is in decline, the local population may be significantly depleted. Reducing female harvest helps to increase population resiliency and provides greater hunting opportunity. Because it is difficult to identify male and female mountain goats in the field, ADF&G created the Mountain Goat Identification Quiz. The guide is designed to help hunters learn the tell-tale characteristics of male and female goats.

BENEFITS OF HUNTER SELECTION

	Hunter Selects Billy	Hunter Selects Nanny	Hunter Selects Nanny with Kid
YEAR 1	 5	 5	 5
YEAR 2	 6	 5	 4
YEAR 3	 8	 6	 5
YEAR 4	 11	 8	 6
YEAR 5	 14	 10	 7

The chart above illustrates the benefits of harvesting billies and passing up nannies.

Mountain Goat Identification Quiz



Pick up a free copy of the Mountain Goat Identification Quiz at your local ADF&G office or visit the new and improved quiz and identification material online at www.hunt.alaska.gov

Registration permits

Hunter participation and harvest is monitored through a registration permit system. All permit holders are required to report within 5 days of harvesting a mountain goat. Information collected includes the general location, the number of days hunted, hunter success, dates of hunts and kills, transport methods, and any commercial services used. In some areas successful hunters are also asked to voluntarily present their goat horns to ADF&G area offices where staff will determine the age of the goat by counting horn growth annuli and collect genetic samples.

Avoid shooting collared goats

ADF&G radio-collars mountain goats to investigate seasonal movement patterns, distribution, and habitat use to ensure long-term harvest sustainability. Each collared animal represents an investment of approximately \$5,000 and a source of useful information. While it is not illegal to harvest a collared animal, we strongly encourage hunters to select one without a collar.

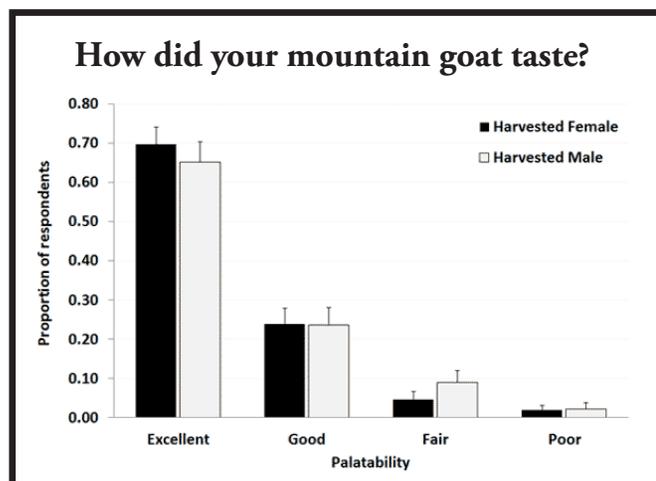
If a collared animal is harvested, hunters are required by regulation to return the collar to any ADF&G office.



Hunter survey

In an effort to evaluate whether or not the Mountain Goat Identification Quiz influenced the likelihood of hunters harvesting male vs. female mountain goats, ADF&G conducted follow-up phone interviews with successful hunters after the season closed. In general, hunters who unintentionally harvested female mountain goats were less experienced, tended to take longer shots, and were less likely to use spotting scopes.

Forty-two percent of hunters who harvested females did so intentionally. Yet, the palatability of meat harvested from male vs. female goats did not differ and was almost always rated as excellent or good quality. The results of this study provided key information needed to evaluate the effectiveness of hunter education materials toward meeting management goals and to provide insights into hunter behavior and the challenges mountain goat hunters face in the field.



Characteristics of hunters who harvested female and male mountain goats		
Topic	Harvested Female ¹	Harvested Male
1 st goat ever harvested	75%	58%
# harvested-lifetime	1.8	2.9
Shot distance		
Average	196 m	176 m
over 200m	44%	38%
over 300m	27%	20%
Average time spent watching		
	54min	50min
Spotting scope used?		
	29%	40%
¹ Only includes unintentional female harvest		

Contagious ecthyma, ORF, Scabby Face

Contagious ecthyma, (CE), also known as ORF is a viral disease caused by direct contact with scabs on infected animals. CE occurs throughout Alaska wherever Dall sheep, muskox, or mountain goats are found. Common symptoms of CE include presence of crusty lesions on the face, ears, and nose which can lead to death in some animals, primarily those in young or old age classes; healthy adults commonly survive the disease.

Meat from an infected animal is suitable for human consumption if affected parts are trimmed off. However, severely infected animals may be in poor condition, reducing the quality of the meat.

Humans can contract CE by touching scabs on an infected animal or by touching anything that has come in contact with the scabs. Special care should be taken when skinning and butchering infected animals. The virus enters through cuts or scratches in your skin or by touching your eyes, nose, or mouth after contacting



scabs or lesions on infected animals. To protect yourself: wear gloves; do not cut into blisters or scabs; and wash your hands, knives, and clothes with hot soapy water after butchering.

If you harvest or encounter a mountain goat that appears to be infected with CE, contact dfg.dwc.vet@alaska.gov or your local ADF&G office.

Prime fur

Over the last decade, the department has observed an increase in the percentage of the annual harvest occurring late in the season. This appears to be the result of an increasing interest by hunters to harvest mountain goats when they have acquired longer winter hair and descended to lower elevation winter range.

October, November, and December are becoming more popular with goat hunters as more nonresident hunters hire licensed big game guides and schedule hunts later in the season.

During most of Alaska's hunting season, mountain goats do not yet have their thick winter wool. However, the late season goats have grown wool underneath the guard hair, which is used in weaving. If you would like to donate wool contact your local ADF&G office.

Federal subsistence permits allow the Sitka Tribe of Alaska to harvest 3 goats in the spring. The hair is exceptionally long that time of year and is used for spinning and weaving ceremonial robes as a cultural/ education project. The meat is also shared with tribal members.



Mid-summer nanny



Late-season billy



Processed wool from a hide

Research supports management



Map of current mountain goat research areas in Alaska.



Piper Super Cub aircraft used to conduct mountain goat aerial surveys and radio tracking.



Two radio-collared mountain goats in smooth meadow habitat were resighted during this aerial survey.



One radio-collared mountain goat was missed during this aerial survey because it was difficult to see in the very broken and rocky terrain.



One radio-collared mountain goat was missed during this aerial survey because of snow.

Research overview

The study of mountain goats is critical but challenging, and has resulted in the species being among the least studied large mammals in North America.

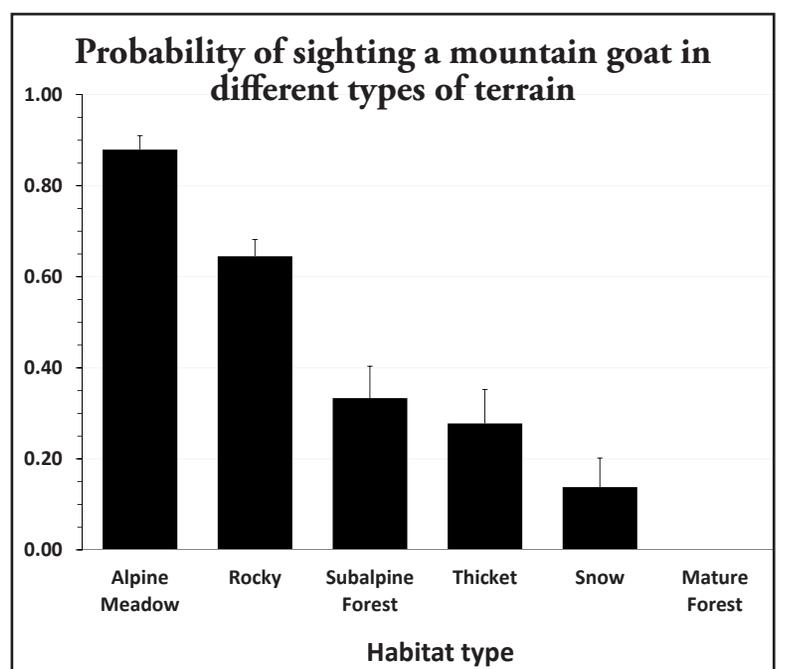
Since the 1970s, the Alaska Department of Fish and Game has been a leader in mountain goat research. In recent years, technological advances in radio-tracking equipment and field techniques have vastly improved our population estimates and understanding of habitat selection and population dynamics. Other technological advances have also provided opportunities to expand into new disciplines such as genetics. Partnerships with other government agencies, universities and private entities have been critical for sustaining the current mountain goat research program. Collectively, these efforts have resulted in substantial advancements in mountain goat conservation and management in Alaska, yet much work remains to be done.

Aerial survey methods

In late summer and early fall, when Southeast Alaska is cool but snow free, biologists take to the sky in fixed-wing aircraft and helicopters to count the number of adult mountain goats and kids within portions of each Game Management Unit (GMU). Information obtained through aerial surveys is used to monitor population trends, make management decisions, and establish harvest quotas. It is nearly impossible for aerial observers to see every animal in a population because of the rugged mountain terrain, vegetation, and challenging flying conditions.

To address mountain goat “sightability” issues and improve the accuracy of the aerial surveys, a new study aims to use radio-collared mountain goats to estimate the number of goats seen vs. the number of goats missed during each aerial survey. That data, along with information about habitat type, terrain ruggedness, group size, sky conditions, and time of day is incorporated into statistical models which allow biologists to adjust population estimates based on survey conditions. By accounting for factors which may alter the observers’ ability to see goats during a survey, biologists are able to estimate populations with a greater level of precision.

Mark-resight probabilities for an aerial survey			
Area	Marked goats seen during survey	Total marked goats in area	Probability of being seen
Baranof Island	39	61	64%
Cleveland Pen.	13	37	35%
Haines-Skagway	66	101	65%
Lynn Canal	92	155	59%
Overall Total	210	354	59%



Capture and handling

Live capturing mountain goats is very difficult and generally involves tranquilizer darting from a helicopter. Safely conducting capture activities requires a highly skilled helicopter pilot and very good judgment. To ensure that mountain goats are not injured during capture activities, capture teams are extremely selective and only attempt to capture animals in areas where dangerous terrain features such as cliffs or ravines can be avoided. Using these techniques, ADF&G has been able to safely capture and handle about 450 mountain goats since 1977.

Once immobilized, mountain goats are fitted with GPS radio-collars and ear tags. Blood, tissue, hair, and fecal pellet samples are collected to assess disease and trace mineral deficiencies, genetic identity, body composition, and diet. Body weight and horn size are also recorded. Once all of the data is collected, the effects of the immobilizing drug can be reversed with a second injection that allows the animal to walk off within about five minutes.

The GPS collars allow biologists to collect information about where mountain goats have their young, how they disperse, and where they spend their summers and winters. Collars can be set to automatically release from the animal just before the battery runs out in about 3 years, eliminating the need for biologists to recapture the animal.



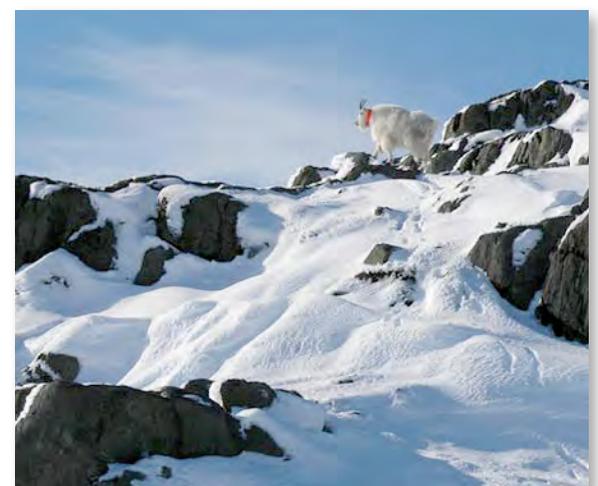
Biologist preparing to dart a mountain goat from a helicopter.



Biologists collect morphological measurements of an immobilized mountain goat in the Lynn Canal area.



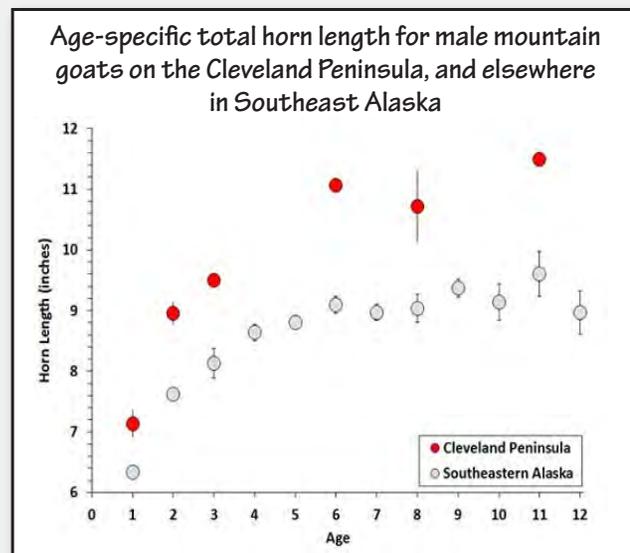
Biologist preparing to administer the reversal agent on a recently collared mountain goat.



A recently radio-collared adult female mountain goat walking away from the capture site.

Cleveland Goats- A Unique Population

The lower Cleveland Peninsula contains a small, unique mountain goat population. The mountain goats in this area are notable due to their particularly large horns. According to Boone and Crockett Club records, 4 of the 10 highest scoring sets of mountain goat horns have come from this small population. The Cleveland Peninsula is comprised of 9 very small patches of alpine habitat separated from the Coast Range Mountains by 20 miles of low elevation, unsuitable mountain goat habitat. In the early 1980s, ADF&G researchers determined that the total alpine complex was inhabited by 50-70 mountain goats comprised of small groups inhabiting each small alpine patch. In recent years, only 5 of the alpine patches were occupied by mountain goats and the overall population is believed to have declined. In 2009, a small-scale research effort was initiated in an attempt to acquire more precise estimates of the distribution and size of the mountain goat population on the Cleveland Peninsula. Twelve mountain goats were captured and fitted with radio-collars (including 5 GPS radio-collars) on the Cleveland which will allow biologists to learn more about fine-scale movement patterns, identify critical winter habitat and estimate population size. Morphological (size and weight) and genetic samples were collected from each of the captured animals, which provided additional information about population genetic structure.



Unraveling genetic mysteries

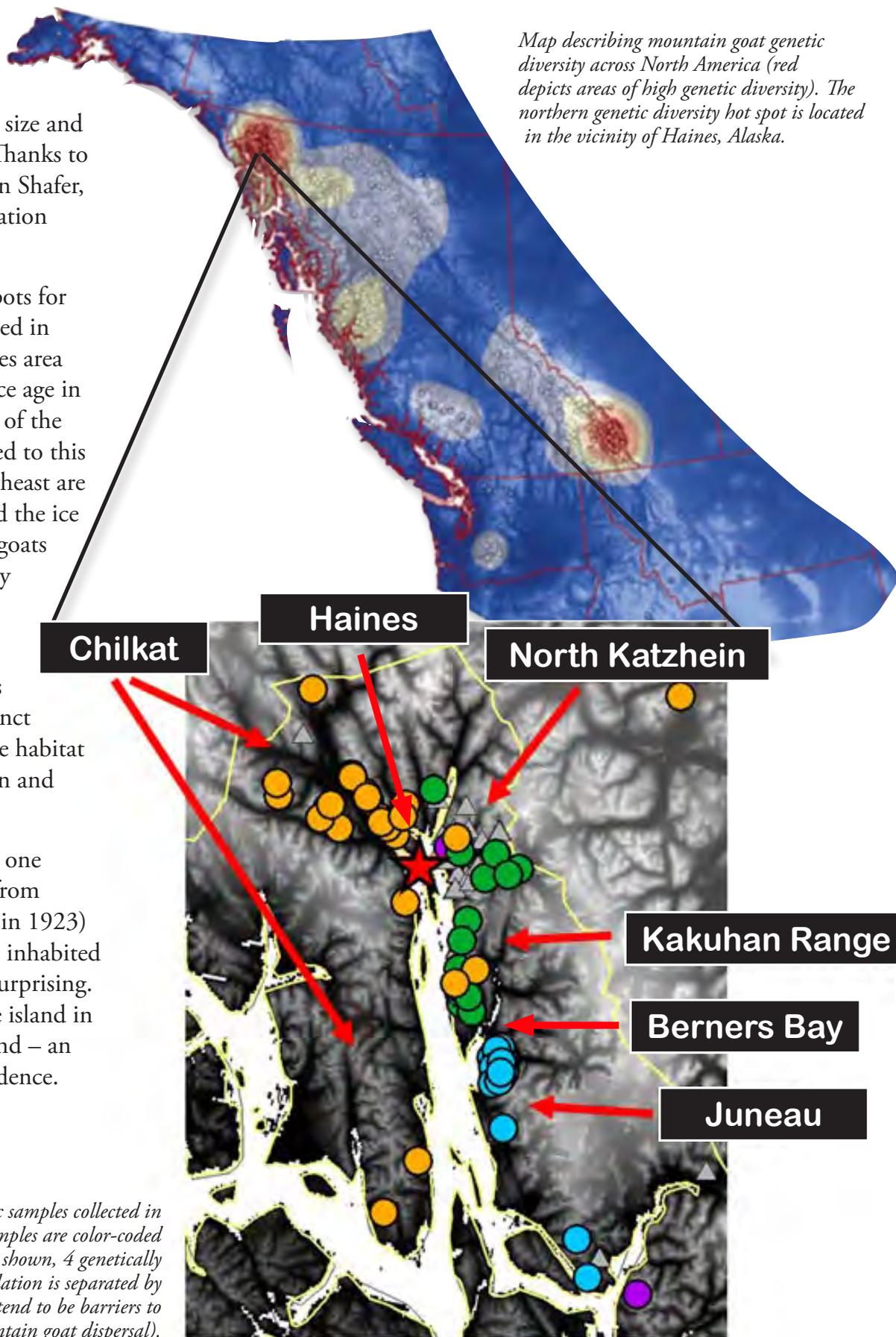
Understanding the genetic structure of a mountain goat population is important for management and conservation. It also helps to explain why we see variation in mountain goat body size and horn shape among different populations in Alaska. Thanks to efforts lead by Canadian population geneticist, Aaron Shafer, biologists have learned some very interesting information about mountain goat genetics in the past few years.

The Haines area is one of two genetic diversity hotspots for mountain goats in North America (the other is located in the Canadian Rockies). Mountain goats in the Haines area descended from a population that survived the last ice age in an isolated pocket of ice free refuge. It seems that all of the goats inhabiting northern Southeast Alaska are related to this source population; mountain goats in southern Southeast are descendants from a separate population that survived the ice age in a different, more southerly refuge. Mountain goats found between these two extremes, in areas like Tracy Arm and the Stikine River, are a mixture of the two genetically distinct groups.

Mountain goat populations on either side of Berners Bay (a distance of just 3.5 miles) are genetically distinct from one another. This is because mountain goats are habitat specialists and strongly select for steep, rugged terrain and avoid crossing flat, open habitats.

Goats on Baranof Island show two genetic lineages - one related to goats in the Tracy Arm area (the location from where mountain goats were transplanted to Baranof in 1923) and the other representative of a population that has inhabited Baranof Island since the last ice age. This was very surprising. At the time mountain goats were transplanted to the island in 1923, it was believed there were no goats on the island – an erroneous assumption, based on the new genetic evidence.

Map showing the location of mountain goat genetic samples collected in northern Southeast Alaska, near Lynn Canal. Samples are color-coded based on distinct genetic groupings. In the area shown, 4 genetically distinct populations are described; each population is separated by low elevation areas or marine waters (which tend to be barriers to mountain goat dispersal).



Map describing mountain goat genetic diversity across North America (red depicts areas of high genetic diversity). The northern genetic diversity hot spot is located in the vicinity of Haines, Alaska.

Participate in mountain goat research and management

Successful hunters can participate in mountain goat research by submitting a small sample of muscle tissue from harvested mountain goats to ADF&G staff. Samples will be used for future genetic analyses to investigate the interrelatedness of goat sub-populations.

Bring your frozen tissue sample to your local ADF&G office or call Jeff Jemison at 465-5020.

Size of muscle tissue sample to submit: 

Extreme survival

Mountain goat mortality

Specific knowledge about population size, sex and age composition, reproduction (births), and mortality (deaths) makes it possible for biologists to predict whether a particular goat population is increasing, stable, or decreasing. Such knowledge is important for ensuring that mountain goat populations are managed sustainably. Many of the key questions related to mountain goat survival have been answered using data collected from 279 mountain goats radio-collared across coastal Alaska from 1977 to 2008. These findings highlight both the importance of summer range conditions and winter severity in determining mountain goat survival.

- In general, male mountain goats have lower annual survival than females, and older animals have lower survival than young and prime-aged mountain goats (fig. 1 and 2).
- Winter mountain goat survival tends to be lower following a warm summer. This likely occurs for two reasons: 1) during hot summers food quality is lower. The most nutritious forage occurs at the edge of snow patches, where melting snow allows new vegetation to sprout. A cooler summer therefore extends the growing season for subalpine and alpine vegetation, and 2) warmer weather and associated heat stress can cause animals to reduce foraging rates and use sub-optimal micro-habitats that, while cooler, do not necessarily produce the highest quality forage (fig. 1).
- Mountain goat survival was found to be much lower during severe winters compared to mild winters (fig. 2).

Aerial disturbances

Previous research shows that mountain goats are sensitive to helicopter over-flights such as those associated with helicopter tourism. Goats disturbed and displaced from preferred habitat areas could suffer reduced fitness, which may ultimately play a role in population declines. As a result, land management agencies require helicopters to stay at least 1,500 meters away from mountain goat habitat, particularly at critical times of the year (i.e. winter, kidding season).

Throughout Southeast Alaska, helicopter tourism is a growing activity and precise identification of critical mountain goat habitat is needed to help ensure that local mountain goat populations are not adversely affected by industrial tourism activities. 55 mountain goats have been equipped with GPS radio-collars programmed to collect a geographic position every 3-6 hours in the Haines/Skagway area. The information collected will be used to map important seasonal mountain goat habitat, which can then be interfaced with helicopter tourism use areas to identify areas of conservation priority and assist with land management decisions.

Figure 1. Predicted mountain goat survival based on average daily summer temperatures (July-August)

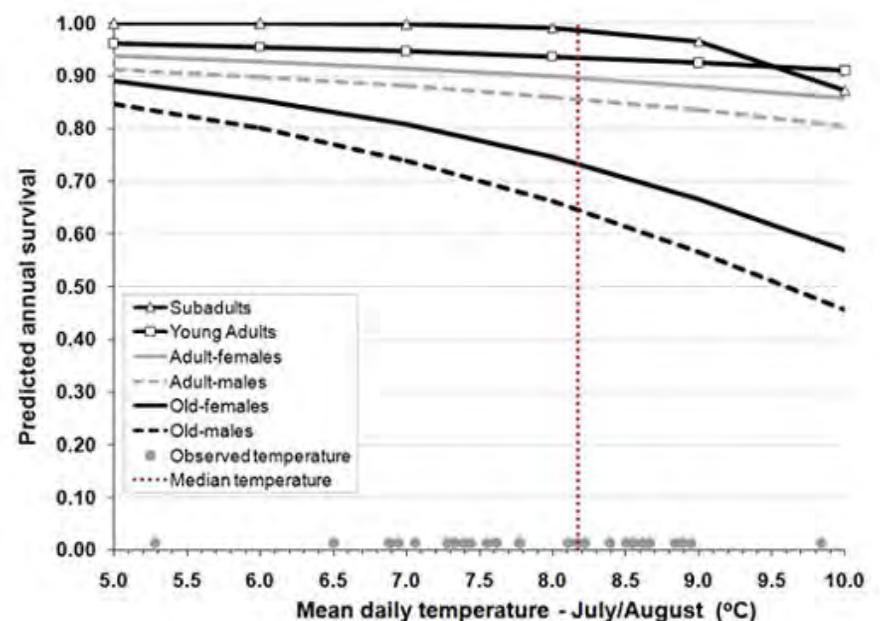
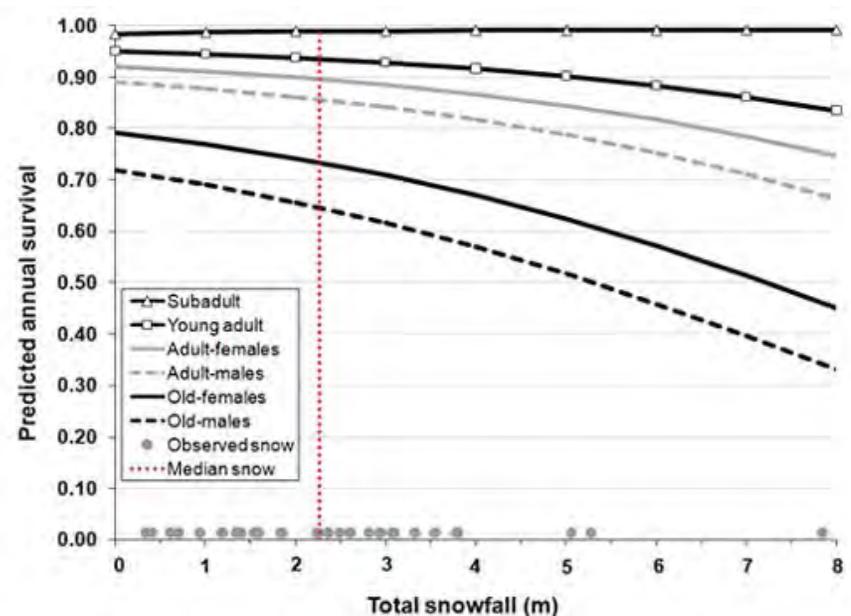


Figure 2. Predicted mountain goat survival based on total annual snowfall



Biologist handling a GPS radio-collared female mountain goat in the Four Winds mountain area, near the Canadian border, north of Haines. During winter this area is subject to helicopter skiing activity. GPS location data from this mountain goat radio-collar will help land managers identify critical wintering habitat and inform land use decisions.

Highlights from the region

Subunit 1A- Ketchikan area

Approximately 1,100 mountain goats inhabit the mainland and Revilla Island where alpine vegetation provides goats with nutritious forb-sedge meadows. At lower elevations, dense stands of old-growth forest provide goats with important winter cover. Although mountain goats historically inhabited only the subunit's mainland, they now occur on Revilla Island as a result of transplants to Swan Lake (17 goats) in 1983 and Upper Mahoney Lake (15 goats) in 1991. Mountain goat populations appear to be stable throughout most of Subunit 1A.

ADF&G continues to monitor mountain goat numbers on the Cleveland Peninsula, a portion of Subunit 1A west of Ketchikan that remains closed to hunting because of concerns for goat population viability. Sealaska Native Corporation's timber harvest along Jim Creek on the Cleveland Peninsula will have negative impacts on critical winter habitat and the local mountain goats in the near future. Once GPS radio-collars are recovered from goats in the Jim Creek timber harvest area, determinations will be made about how this winter habitat loss may affect Cleveland Peninsula goats in the future.

The new drawing permit hunts, DG005, DG006, and DG007 on Revilla Island remain very popular with about 50% hunter success each year. ADF&G remains concerned about aircraft overflights and associated disturbance to goats within drawing areas. This herd is very close to town and directly in the flight path of high volume tourist flights going to and returning from Misty Fjords National Monument.

Subunit 1B- Petersburg area

Mountain goats are indigenous to Subunit 1B and are well distributed throughout suitable habitat. They have traditionally been hunted for both food and trophies. The subunit-wide population is estimated at around 1,000 goats.

Based on aerial survey data and hunter reports, goat populations appear stable throughout most of Subunit 1B, with the exception of the Cleveland Peninsula. Due to conservation concerns, that portion of Subunit 1B located on the Cleveland Peninsula south of the divide between Yes Bay and Santa Anna Inlet is closed to goat hunting.

The harvesting of females, wounding loss, and the non-reporting of goats mortally struck by hunters but not recovered due to inaccessible terrain remain goat management concerns.

Because of the increased vulnerability of goats during the late season and the potential for localized overharvest in areas easily accessible from saltwater, ADF&G monitors the harvest carefully, particularly within the drainages of Horn Cliffs, Thunder Mountain, LeConte Bay, and Wilkes Range.

The loss of winter range resulting from timber harvest continues to have long-term implications for goat habitat in the subunit. Roads associated with logging activities can increase hunter access, thereby increasing their vulnerability.

Over the last decade, Subunit 1B goat harvest has averaged 15 animals annually, ranging from 6 to 27 goats per year. Most goat hunting effort and harvest tends to be focused near saltwater access points located close

to major communities. Annual differences in fall and winter weather conditions can have a profound influence on goat harvests in the subunit. The largest percentages of goat harvest occur in the drainages of Le Conte Bay, Stikine River, and Thomas Bay.

Traditionally, local residents have represented the largest group of both successful and unsuccessful hunters. During the last decade, however, the number of goats harvested by guided nonresident hunters has regularly exceeded that of Alaska residents. In recent years local residents have experienced 12% success, nonlocal residents 23% success, and guided nonresidents 52% success.

Subunit 1C- Juneau area

Subunit 1C encompasses Lynn Canal; Juneau; Taku; Tracy Arm; and the Chilkat Range, a particularly rugged and spectacular glacially-carved mountain range located in Southeast Alaska between Fredrick Sound and Haines. Winter and summer goat range in the area is extensive and mountain goats appear to be occupying most of this range. Mountain goat populations in the unit vary geographically but have generally declined following a series of severe winters.

There are three main concerns regarding mountain goat management in Subunit 1C: guided hunting, commercial helicopter tourism, and industrial activity. Although goats are distributed throughout the Subunit 1C mainland, hunting efforts are usually concentrated in areas where access is relatively easy.

Construction activities associated with the Kensington Mine as well as the road infrastructure associated with the mine and the proposed Juneau Access Road project have raised some concerns about the disturbance of goats on low elevation winter habitats. Coeur Alaska and the Alaska Department of Transportation (DOT) have provided funding to study mountain goat ecology near the mine and proposed Juneau Access Road corridor. Helicopter traffic in or near goat habitat, and its potential to drive goats away from preferred habitat remains a concern. Sweetheart Lake located in the southern portion of Subunit 1C has been identified as a possible hydroelectric site. Department staff have discussed mountain goat data needs and possible research associated with the project.

Subunit 1D- Haines area

Mountain goat hunting is very popular in Subunit 1D. Unlike many areas of Alaska where goats are hunted as a trophy species, the majority of goats harvested in Subunit 1D are by local residents for consumption. Mountain goat and moose are the only big game species available for harvest in Subunit 1D, which makes goat hunters less selective in taking male goats vs. female goats. An extensive road system in the Haines area provides access to goat hunting areas while a majority of the remaining hunting access occurs by boats. Mountain goat winter habitats vary from high alpine meadows in areas influenced by interior Yukon climate conditions to low elevation forests in coastally-influenced areas.

In some areas of Subunit 1D goat numbers persist at low levels, offering limited opportunities for harvest. To provide additional hunting opportunity, Subunit 1D has been subdivided into smaller, unique geographical hunt areas for management purposes, similar to other

areas in Southeast. Though mountain goat populations appear to be stable in the unit, careful population and harvest monitoring continues to be necessary in Subunit 1D as hunting pressure remains at a high level. Emergency closures may be required to avoid excessive harvest. ADF&G will continue to use a single permit and report for the three hunts (RG023, RG024, RG026) in the subunit. Summer and winter helicopter tourism activities have been increasing annually in Subunit 1D. Our concerns grow over their immediate and long-term effects on mountain goat populations. We continue to work on ways to address agency and public concerns about the effects of these activities on goats in the area.

Unit 4- Sitka area

Mountain goats inhabit most available summer range on Baranof Island north of Port Herbert and Snipe Bay. Goat densities in various alpine areas are unknown, but recent surveys indicate that some goat habitats are densely occupied, especially areas north of Blue Lake and south/southeast of Rodman Creek. Mountain goat survival is higher on Baranof than other areas studies in Southeast Alaska, presumably due to a milder winter climate and absence of black bears and wolves. Winter starvation and accidental deaths due to avalanches represent the most significant documented sources of mortality.

An extensive aerial survey of goat distribution on Baranof Island was conducted during August 2004, resulting in an estimated population of 1,530 goats. Mountain goat populations continued to expand on the island until 2007, when three consecutive severe winters with record snow pack and late, cold spring conditions caused the Baranof population to drop to less than 1,000 goats.

4 Between 28 and 75 mountain goats have been harvested each year since hunting seasons were implemented in 1949. Hunter access to goat habitat and inclement weather during hunting season makes mountain goat hunting on Baranof Island limited and difficult.

Multi-year trends show an increase in the number of guided nonresident hunters. Due to the high level of female harvest on Baranof Island, the 6-point system was modified in 2010 to establish a point total where the female component was capped at a set number. The modified point system would allow significantly more males to be harvested, but if nannies were taken, the points available reduced more quickly. For example, the 2010 hunt quota was established at 56 points OR 18 females; whichever occurred first.

The mountain goat population on Baranof Island is generally productive but in recent years high levels of harvest of female mountain goats has resulted in population declines in local areas, particularly in popular hunting areas directly accessible from Sitka. Current research has focused on gathering detailed field data related to population size, reproduction, survival, and habitat selection/movement patterns in order to inform management strategies for this recovering population. Since 2010, 36 mountain goats have been captured and marked with GPS radio-collars; monitoring these animals is a central aspect of research studies on Baranof Island.

In addition, expansions of hydroelectric projects on the island are predicted to inundate mountain goat winter range in the Blue Lake area. Research objectives also include collection of data needed to precisely

assess the extent to which mountain goat winter range will be affected by development activities. Future plans to expand the hydroelectric network across the island to the Takatz Lake area will require detailed information about mountain goat spatial and population biology, which will assist with planning and mitigation efforts.

Unit 5- Yakutat area

Unit 5 has both a state registration permit hunt and a federal subsistence regulation hunt for mountain goats. The federal subsistence goat hunt is managed by the U. S. Forest Service under a federal subsistence registration permit. Goat hunting has never attracted a lot of outside attention in Yakutat, probably due to the cost and logistical difficulty of hunting there. The mountain goat harvest has been extremely low in Subunit 5B and a harvest point quota has not been established in this subunit. Obtaining mountain goat population information through aerial surveys has allowed for a decent understanding of goat population levels, as well as herd composition and distribution. The Nunatak Bench and areas west of Harlequin Lake will remain closed to hunting until aerial survey results suggest goat numbers have increased to near 80 on Nunatak Bench, and 100 in the area west of Harlequin Lake.

The decline in mountain 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 a factor contributing to the continued decline but numbers began to dip prior to the extreme winter of 2006. In cooperation with the U.S. Forest Service, the department is attempting to survey the area annually to determine current trends for the goat population in the area.



Photograph taken from a remote camera of a radio-collared wolverine scavenging on a radio-collared mountain goat that previously died of malnutrition. Wolverines are the most common scavenger of mountain goats in Southeast Alaska, but are not known to actually kill them.

ADF&G administers all programs and activities in compliance with state and federal civil rights and equal opportunity laws. Obtain the full ADF&G and Americans with Disabilities Act and Office of Equal Opportunity statement online at www.adfg.state.ak.us or from the Division of Wildlife Conservation at 907-465-4190.



Attention Hunters:

All hunters who obtain harvest tickets are **REQUIRED** to report.

Hunt reports must be completed and returned even if you did not hunt or take an animal.

You can report online at hunt.alaska.gov or fill out and mail in the harvest report attached to your harvest tickets.



Help us help you!

Whether it's a harvest report card, a permit report card or a survey—your hunt report provides valuable information on game populations.

When biologists have enough information to determine that game populations are healthy and abundant, they can be more confident in recommending more liberal bag limits and seasons.

The Board of Game makes decisions about wildlife management based on proposals submitted by the public, local advisory committees, and/or ADF&G. ADF&G provides management and research data to the board to help them make their decisions.

The Public



The public can bring concerns to their local advisory committee, submit their own proposals directly to the Board of Game, and provide written comments and oral testimony to the board.

Board of Game meetings are open to the public, and everyone is encouraged to attend.

Local Advisory Committees



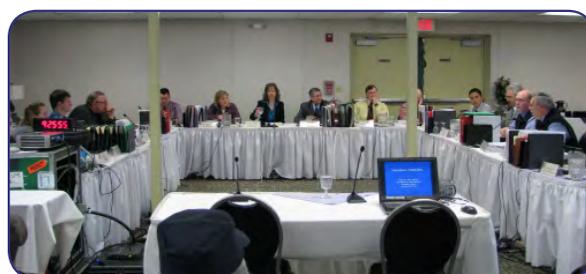
Advisory committees discuss local wildlife observations and issues, seek information from ADF&G, and submit proposals about hunting regulations to the board.

ADF&G



ADF&G provides information to the advisory committees, submits its own proposals to the Board of Game, and provides biological information about wildlife to the board.

Board of Game



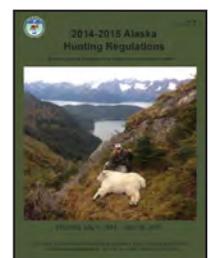
Decisions are reached by a majority vote of the board

Board of Game members are appointed by the Governor. They meet 2–3 times a year. Proposals from each major region are typically considered once every 2 years. Meetings are generally held in the region whose proposals are being considered.

The decisions are given legal review and made official by the Lt. Governor

The hunting and trapping regulations are made available to the public by ADF&G, and are enforced by the Alaska Wildlife Troopers.

Want to know more? Visit www.boards.adfg.state.ak.us



The public is welcome to attend the 2015 Board of Game Meeting January 9-13 in Juneau.