Idaho Mountain Goat Management Plan

2025-2030

Prepared by IDAHO DEPARTMENT OF FISH AND GAME
February 2026

Recommended Citation:

Idaho Department of Fish and Game. 2025. Idaho Mountain Goat Management Plan 2025-2030. Idaho Department of Fish and Game, Boise, USA.

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Costs associated with this publication are available from IDFG in accordance with Section 60-202, Idaho Code. Approved July 2025. Idaho Fish and Game Commission Meeting. Printed 2/2026/PCA 41918/GGR

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Executive Summary

Mountain Goats CCBY IDAHO FISH AND GAME

Mountain goats (*Oreamnos americanus*) are an iconic alpine species that are highly valued by both consumptive and non-consumptive enthusiasts. These striking animals are found in some of the most rugged terrain across the state. Hunters and other outdoor recreationists enjoy watching these sure-footed animals balance on cliff ledges and forage in alpine meadows.

Idaho Department of Fish and Game (IDFG) was established to preserve, protect, perpetuate, and manage all of Idaho's fish and wildlife. Idaho's prior mountain goat management plan (IDFG 2019) prioritized working with land management agencies to improve and protect mountain goat habitat, improving population monitoring methods, and using new harvest guidelines to stabilize declining populations.

This plan is designed to provide guidance to IDFG staff to manage Idaho's mountain goat habitat and populations over the next 6 years. The plan directs IDFG to sustain or increase mountain goat populations across the state. To accomplish this goal, IDFG has identified statewide management direction and strategies, as well as specific strategies for each Population Management Unit (PMU). IDFG will engage partners interested in mountain goat management, including hunters, federal and state agencies, conservation organizations, tribes, and other interested individuals and groups. Partnerships can help IDFG accomplish goals to maintain sustainable populations, healthy habitat, and hunting opportunity.

Mountain goats live in isolated, high-elevation areas with harsh weather conditions. They will forage in meadows and forests, but prefer to be close to steep slopes that often include cliff faces that they can use to escape threats. Availability of high-quality habitat limits mountain goat distribution in Idaho. Most challenges impacting mountain goats are changes that degrade their habitat or activities that cause them to leave preferred habitat. Habitat alteration caused by actions such as road building, mining, or changing climate, may reduce the amount of currently available habitat. Being on the southern periphery of their range, mountain goats in Idaho may be more likely to be affected by increasing summer temperatures and reduced snowfall than herds in core mountain goat range. Mountain goats are susceptible to disturbance by recreational activities, both motorized and non-motorized, and may abandon preferred, high-quality areas because of disturbance.

Historically, there were many more mountain goats in Idaho than there are today. Open harvest seasons with unlimited tags through the 1950s reduced mountain goat populations in many areas. Increasingly conservative hunting season structures with controlled hunts has helped stabilize some populations, but others continue to decline. Besides overharvest, there may be other factors driving mountain goat population declines and changes in distribution including changing climate, changes in habitat quality, and human-caused disturbances, but the influence of each factor is not understood. Some mountain goat populations translocated into unoccupied areas quickly increased and provided new hunting and viewing opportunities. Other translocations failed to establish or increase populations.

Idaho offers limited mountain goat hunting tags; tags are highly sought after and demand has increased over time. Hunters may harvest only 1 mountain goat in Idaho in their lifetime. Mountain goats are polygamous, so more harvest can be placed on males than females. However, male mountain goats cannot be harvested at rates as high as other ungulates, such as deer (*Odocoileus spp.*) and elk (*Cervus elaphus*), because they live in low-density populations isolated from one another. Small populations are inherently susceptible to random events, such as a severe winter or wildfire, which means some of Idaho's mountain goat populations may decline even without harvest. Furthermore, adult females generally do not bear kids until they are 4–5 years old. This low reproductive rate means populations grow slowly. Mountain goat populations are very sensitive to female harvest. More hunting opportunities can be offered when hunters select billies instead of nannies. This mountain goat management plan presents harvest guidelines based on a population model to help wildlife managers determine appropriate harvest levels based on population size, kid:adult ratios, and percent females in the harvest. These harvest guidelines are intended to maintain and increase mountain goat populations while offering maximum hunting opportunities.

Statewide mountain goat management direction includes:

- Maintain stable to increasing mountain goat populations in all PMUs.
- Manage for populations that support sustainable hunting opportunities.
- Continue to offer controlled hunts and work with hunters to reduce harvest of nannies.
- Increase our knowledge of mountain goat survival, recruitment, habitat use, genetics, and impacts of disease, habitat changes, and recreational activities.
- Collaborate with land management agencies to incorporate conservation measures which benefit mountain goats in land use and resource management plans.
- Provide educational materials about mountain goat biology and behavior to encourage appropriate human behavior when recreating in mountain goat habitat.
- Continue to collect mountain goat population monitoring data to evaluate population trends.

Introduction

Mountain Goat CCBY IDAHO FISH AND GAME

Mountain goats are found only in North America and occur in Idaho on the southern periphery of their range. They select steep slopes and adjacent alpine areas, typically occupying subalpine and alpine habitats where trees are either absent or scattered (Smith 1978). Habitats selected by mountain goats are often characterized by harsh climate with frequent strong winds, significant snow accumulation, and snowpack that persists >8 months annually (Figure 1).

Males, females, and offspring are typically referred to as billies, nannies, and kids. Both billies and nannies have horns, and most horn growth occurs during an individual's first 3 years. Adult males are generally 10–30% larger, appear stockier or heavier in the chest and shoulders, and have beards that are heavier and broader than those of adult females (Brandborg 1955, Houston et al. 1989).

Breeding season occurs between early November and mid-December (Geist 1965) followed by a gestation period of approximately 180 days. Although nannies in some populations reach sexual maturity at age 2 and produce their first kid at age 3 (Peck 1972, Stevens 1980, Bailey 1991), most nannies do not have their first offspring until 4-5 years old (Adams et al. 1982, Swenson 1985, Festa-Bianchet et al. 1994, Côté and Festa-Bianchet 2001, Hamel et al. 2006). This delay in breeding dramatically reduces potential for rapid growth in most mountain goat populations (Lentfer 1955, IDFG 1990). High mountain goat densities can lead to cascading effects on population dynamics, including prolonged reproductive intervals of 2–3 years, delayed breeding, and reduced kid survival and recruitment rates. Twinning rates are generally low (2% in Alberta; Festa-Bianchet et al.1994), but can be higher in expanding or introduced populations with high quality habitat (Holroyd 1967, Hibbs et al. 1969, Houston and Stevens 1988). A twinning rate of 22% was documented in the introduced Palisades population during the early 1980s (Hayden 1989).

Mountain goat kids are precocious and begin to forage and ruminate within days after birth (Brandborg 1955, Chadwick 1983). Nursery groups (females and their offspring, including yearlings) are formed when kids are approximately 2 weeks old. During this period, 2-year-old billies usually leave nursery herds and remain solitary or form small groups. Kids remain with their mothers through their first winter, and although presence of the mother is thought to increase survival of kids, orphaned kids can survive (Foster and Rahs 1982). After sexual maturity, reproductive success generally increases until peaking at 8 years old (Stevens 1980, Smith 1984, Bailey 1991).

Nursery groups typically move greater distances daily (2–5 km) than males (<1 km/day) (Singer and Doherty 1985, Côté and Festa-Bianchet 2003). Seasonal movements may result in animals moving to lower elevations at or just above treeline or slopes with southern exposures during winter (Brandborg 1955, Hjeljord 1973, Smith 1976, Rideout 1978, Smith 1978). In summer, males may venture into forested areas away from steep slopes to feed, while females and kids usually feed on or in immediate proximity to steep slopes used to escape potential predators.

Documented predators of mountain goats include mountain lion (*Puma concolor*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), and golden eagle (*Aquila chrysaetos*). Other potential predators and observed scavengers are coyote (*Canis latrans*), bald eagle (*Haliaeetus leucocephalus*), wolverine (*Gulo gulo*), and black bear (*Ursus americanus*) (Festa-Bianchet and Côté 2008). Of all age classes, kids are most susceptible to predation. Mountain goat kids are more susceptible to predation when foraging on open slopes and avalanche chutes, or when separated from or abandoned by nannies. However, overall annual survival in kids is 64%, higher than documented in other ungulate species (50%) (Festa-Bianchet and Côté 2008). Predation also occurs on adults, mainly during dispersal events and on mountain goats >8 years old (Festa-Bianchet and Côté 2008).

Most mountain goat mortality occurs between autumn and spring, similar to other ungulate species in Idaho (White et al. 2011). The extremely steep, rocky habitats mountain goats inhabit are treacherous, and mountain goats of any age can die from falls or in avalanches (Festa-Bianchet and Côté 2008, White et al. 2011, White et al. 2025). Mountain goat survival declines with increasing winter snowfall and increasing summer temperatures (Harris et al. 2024, White et al. 2025). Severe winters decrease kid survival and negatively impact reproduction (Vogel et al. 1995). Deep snow limits mountain goat mobility and ability to acquire limited food resources. Expending additional energy during severe winters can increase mortality due to malnutrition, particularly when individuals enter winter in poor body condition (Forsyth et al. 2005). Above average summer temperatures can cause heat stress in mountain goats as they forage and accelerate desiccation of forage plants (White et al. 2011, White et al. 2025).

Mountain goats are intermediate browsers, primarily feeding on grasses, sedges, and alpine shrubs during summer and autumn. They select plants based on high nutrition value and availability of minerals, such as sodium. In areas where grasses are covered by snow, mountain goats readily switch to a diet of browse, including mountain mahogany (*Cercocarpus ledifolius*) and conifers (*Picea englemannii*, *Abies lasiocarpa*). Mosses and lichens may also be consumed where available (Côté and Festa-Bianchet 2003). Smith (1976) reported a correlation between female nutrition and kid:nanny ratios, and Bailey (1991) reported availability of summer forage was related to pregnancy rate. Winter forage is critical to adult over-winter survival and fetal development (Fox et al. 1989).

The mountain goat is recognized as a Species of Greatest Conservation Need in the Idaho State Wildlife Action Plan (SWAP, IDFG 2023). The SWAP provides strategic and voluntary guidance on priority conservation actions needed for at-risk species and emphasizes prevention of future species listings under the Endangered Species Act. Mountain goats are categorized as near-obligates in alpine tundra and cliff habitat and dependent on subalpine, high montane forests and mesic meadows and whitebark pine (*Pinus albicaulis*) forests. Voluntary actions, programs, projects, and best management practices intended to address stressors in these habitat types are described in SWAP and may benefit mountain goats if implemented.

SWAP broadly addresses how to protect and improve habitat or gather information for 137 SGCNs and 132 species of greatest information need. This management plan provides additional detail and specific guidance for the management of mountain goats and associated habitats. Actions listed in SWAP apply to several sections within this management plan including subalpine-high montane forest, alpine tundra, cliff, scree, and rock vegetation, residential and commercial development, outdoor recreation, climate change, and forestry.

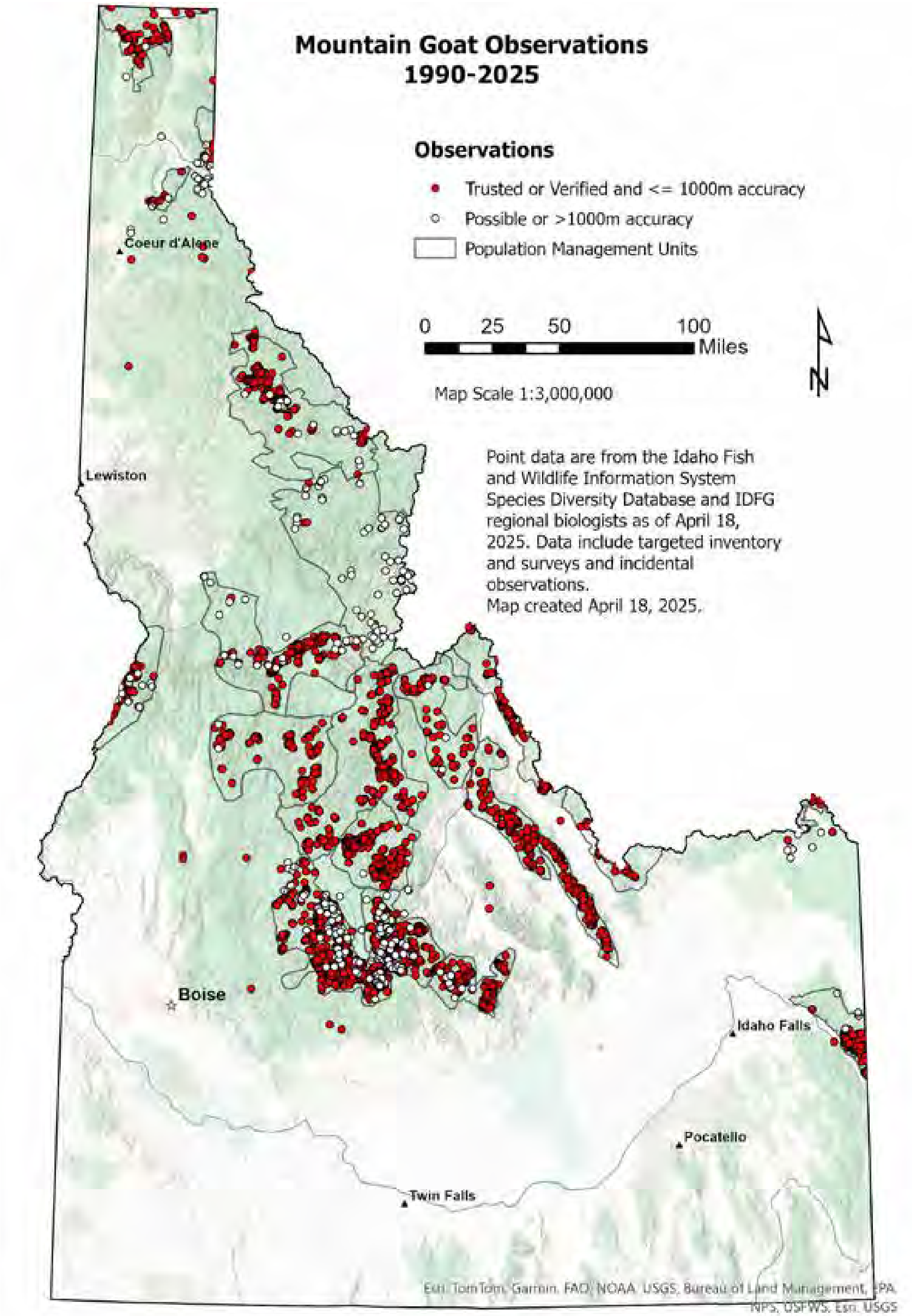

Figure 1. Known mountain goat locations in Idaho, 1990–2025.

Results From Previous Planning Period

Idaho's most recent mountain goat plan (2019) provided direction for management and research from 2019 through 2024. IDFG achieved or made progress on the following goals of the previous statewide management plan.

Habitat

Management Direction – IDFG will collaborate with land management agencies (e.g., United States Forest Service [USFS]) to incorporate habitat protection and mitigation measures and strategies in land use and resource management plans.

- Collaborated with multiple national forests to provide mountain goat seasonal habitat use information that was used to inform national forest plans and over-snow vehicle travel management plans to minimize the effects of disturbance on mountain goats and their primary habitat.
- Commented on USFS projects to outline how activities such as road building, timber harvest, and prescribed burning, could affect mountain goat behavior and habitat.

Management Direction – IDFG will work to better delineate seasonal distribution and movement patterns of mountain goats.

- Identified several areas to prioritize opportunistically radio-collaring mountain goats during capture efforts for other species and collected habitat use data from 2 radio-collared mountain goats in Black Snow PMU.

Management Direction – IDFG will work with land management agencies and other entities to develop education material describing safe and ethical behavior in mountain goat country.

- Provided guidance and information about mountain goat biology and habituation to Friends of Scotchman Peak Wilderness volunteers who educate hikers along a popular trail with frequent human-mountain goat conflicts.

Management Direction – IDFG staff will work to better understand existing and potential effects of changing climate, specifically changes in severity of winter and summer temperatures, on mountain goat recruitment rates, survival, and distribution, as well as alpine habitat responses.

- Coordinated with University of Idaho researchers on projects applicable to mountain goats to improve snow depth and other microclimate data modeling at more appropriate scales than typical climate data.

Health and Disease

Management Direction – IDFG will increase knowledge of mountain goat health and disease status in Idaho by collecting and analyzing more data to create population infection and exposure profiles.

- Collected disease, biological, and DNA samples from mountains goats that were harvested by hunters, captured by staff, and found dead to document the presence of diseases and to gather genetic information from across the state.
- Monitored for presence of *Mycoplasma ovipneumoniae* (Movi) and worked with land and livestock owners on education and prevention of contaminated livestock to wild populations.

Population Monitoring

Management Direction – IDFG will improve quality of mountain goat data to evaluate population trend and viability.

- Conducted a total of 13 aerial surveys in 10 PMUs and 5 ground count surveys in 3 PMUs to assess population status.

- Studied alternative population monitoring methods and found that double-observer ground surveys worked to effectively estimate mountain goat occupancy and abundance in typical mountain goat habitat. Remote camera surveys did not yield enough photos of mountain goats to allow estimation of occupancy or abundance.

Harvest Management

Management Direction – IDFG will provide maximum harvest opportunity possible through once-in-a-lifetime controlled hunts while working to maintain stable to increasing mountain goat populations. Harvest models were created to assist managers with the development of appropriate harvest guidelines across various populations in Idaho. Managers should annually assess mountain goat population and harvest data in relation to harvest tables. Harvest rates, population size, kid recruitment, and female survival will be used to inform harvest guidelines.

- PMU tag allocations were adjusted based on harvest guidelines that took into consideration total population size, recruitment rates (kid:adult ratios), and percent females in the harvest in order to maintain stable to growing mountain goat herds.
- Mountain goat tags were offered in 19 hunt areas that are part of 10 different PMUs. A new hunt was opened in Targhee PMU. Hunt areas with declining populations, such as the Palisades PMU, were closed. Total number of controlled hunt tags offered decreased from 44 in 2019 to 40 in 2025.
- Monitored harvest through mandatory checks of all harvested mountain goats.
- From 2019-2024, hunters averaged 85% success in mountain goat controlled hunts.

Management Direction – IDFG will conduct outreach and education to mountain goat hunters to reduce harvest of females.

- Annually mailed sex identification information, including the impacts of harvesting females on population growth, to mountain goat tag holders.
- Commission adopted a mandatory sex identification test for all mountain goat hunters starting in 2023.
- Statewide 2019-2024, the percentage of nannies in the harvest dropped from 27% to 20% compared to the previous 6-year average. Since the mandatory sex identification test was implemented, statewide nanny harvest dropped to 18% in 2023 and 17% in 2024.

Mountain Goat Viewing Opportunities

Management Direction – IDFG will provide information to the public about the value of Idaho's wildlife resources, including mountain goats.

- Provided educational information about mountain goats on the IDFG website, in the IDFG Wildlife Express magazine, and during presentations to Idaho Master Naturalists.

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Habitat

Habitat was described by Caughley and Sinclair (1994) as the suite of resources (e.g., food, shelter, etc.) and environmental conditions that determine presence, survival, and reproduction of a population. Mountain goats have adapted to exploit an ecological niche in Idaho and other parts of North America that generally require cliffs and other rugged topography which provide escape terrain (Sarmento and Berger 2020). Physical characteristics of these habitats are more important than vegetation found within them (IDFG 1990). These habitats are rare, and are generally associated with extreme temperature conditions, precipitation, soils, and growing-season length.

Mountain goats inhabit alpine and subalpine regions of the most rugged mountains in Idaho. One limiting factor in mountain goat distribution is the availability of high-quality winter range. Winter ranges are composed of cliffs and high alpine ridges where deep snow does not accumulate, thus providing access to winter forage. Because physical characteristics are more important than vegetative characteristics, habitat generally cannot be treated to produce quality winter habitat. This situation makes management and conservation of quality winter range crucial to maintaining current populations and distribution of mountain goats in Idaho. Winter-range habitats are found in relatively isolated areas of the Panhandle, central Idaho, Hells Canyon, and the Snake River Range (Figure 2).

Most mountain goat habitat in Idaho occurs on lands managed by USFS. Management of USFS lands provides opportunities for multiple uses where appropriate. However, conflicting interests compete for land that currently provides quality habitat for mountain goat populations. Disturbance and development of mountain goat habitat will likely result in fewer mountain goats in Idaho. Therefore, IDFG's coordination with land management agencies to identify and evaluate potential threats and enable more informed land- management decisions is important to mountain goat management.

Food Habits

Mountain goats are intermediate browsers (Hofmann 1989) because they eat a variety of forages, including mountain mahogany, conifers, sedges, rushes, mosses, lichens, and grasses. Their diets vary by season and between populations (Brandborg 1955, Laundrè 1994, Harris et al. 2017). A summary of 10 studies showed summer diets of mountain goats averaged 52% grass, 30% forb, and 16% shrubs, but shifted to 60% grass, 8% forb, and 32% shrubs in winter (Laundrè 1994). Variability between populations is large and mountain goats generally eat what is available. Laundrè (1994) reported the percentage of grass in summer diets, for example, varied from 11% to 97%, and summer shrub consumption varied from 0% to 79%. During the summer, localized strategies for seeking summer thermal refugia have been found to dictate forage availability and duration of active feeding (Michaud et al. 2024). Winter diets also show high variability in forage selection.

Carrying capacity of alpine and subalpine habitats is limited and mountain goats can deplete food resources (Reed 1983). Alpine environments have a short growing season and vegetation can become scarce, especially if mountain goat numbers are high. Alpine vegetation also takes longer to recover from overgrazing than that in lower-elevation habitats. Winter-range habitat is most vulnerable because mountain goats concentrate into smaller areas during winter (Vogel et al. 1995). Mountain goat population growth is particularly sensitive to resource limitations as females are more likely to pass the cost of reproduction on to their offspring rather than experience a decrease in survival (Festa-Bianchet et al. 2019).

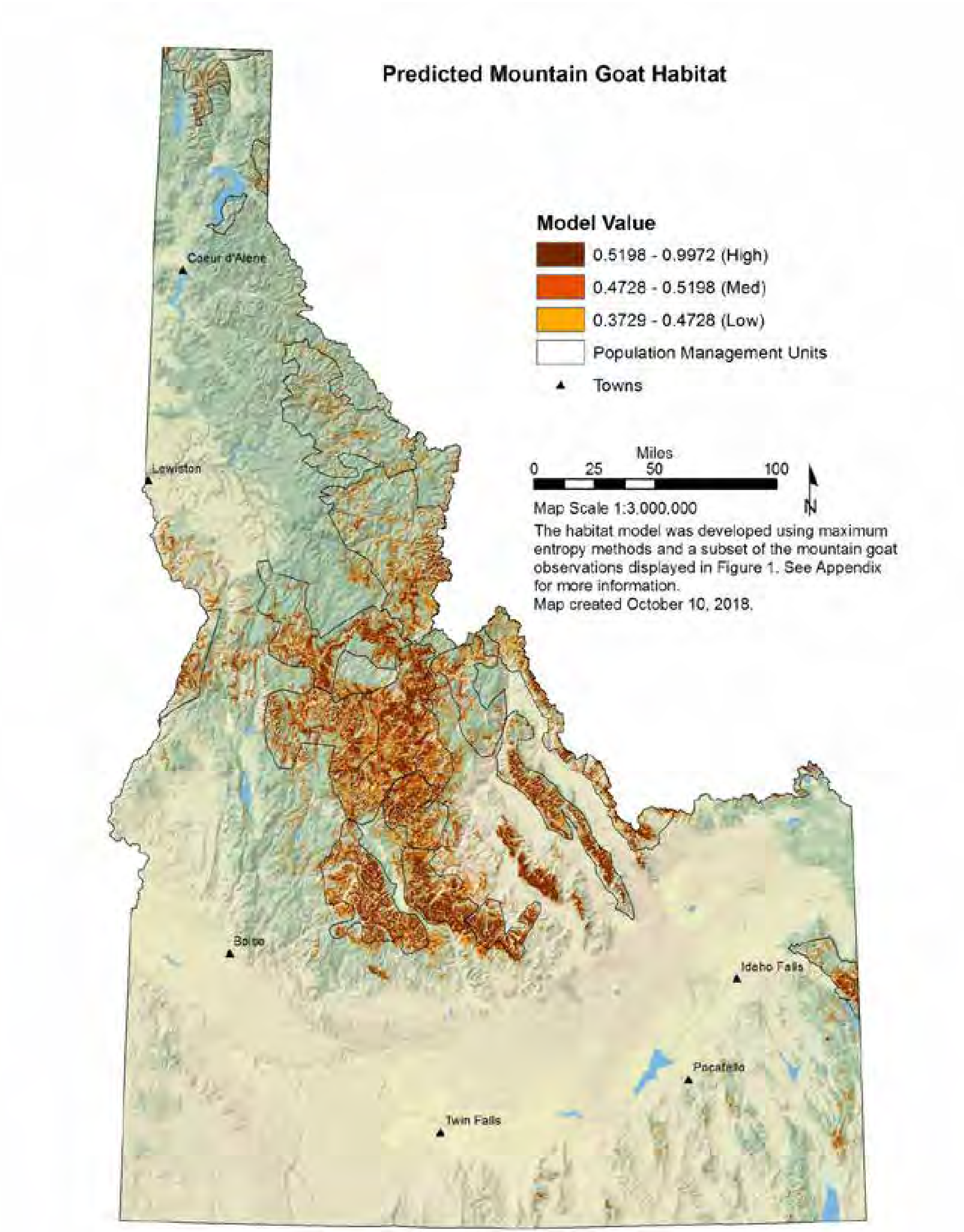

Figure 2. Predicted mountain goat habitat using maximum entropy model based on known locations (see Appendix C for modeling methods).

Mineral Licks

Mountain goats have been observed traveling several miles to use artificial and natural mineral licks. Use of mineral licks appears to peak during summer months (Brandborg 1955, Rice 2010). Mountain goats use licks because minerals are limited in vegetation of alpine habitats and eating spring vegetation decreases sodium retention (Hebert and Cowan 1971, Feldhamer et al. 2003). Although there is no evidence artificial sources of salt satisfy any physiological requirements (Brandborg 1955), mountain goats appear to have an appetite for mineral deposits, as evidenced by their willingness to expend energy, cross dangerous terrain, and tolerate interspecific and intraspecific aggression near licks (Feldhamer et al. 2003). Mountain goat populations that use artificial sources of salt have a higher prevalence of some infections and diseases (Samuel et al. 1975). The presence of artificial salt can lead to individuals becoming "salt-conditioned" wherein mountain goats routinely display risky behavior to seek out human sources of salt (See Habituation, page 15). Such instance can result in increased mortality due to direct human conflict or collisions with vehicles (Harris et al. 2023). Northern Wild Sheep and Goat Council (2020) recommends that activities that cause disturbance should not occur on or near mineral licks during peak use, generally between May 1 and Aug. 31.

Impacts to Mountain Goat Habitat

Development and activities in mountain goat habitat may have direct or indirect effects on mountain goat populations (Festa-Bianchet and Côté 2008). For example, road construction, timber harvest, mining, energy development, infrastructure, climate change, wildfires, and fire suppression may reduce the health and connectivity of mountain goat habitat and adversely affect mountain goat populations. Some actions may have indirect effects if they displace mountain goats from available habitat and reduce use of available forage or increase vulnerability of mountain goats to predators and human disturbance. For example, Joslin (1986) determined kid production and survival were negatively correlated with seismic surveys in Montana.

In Idaho, warmer summer temperatures and drier conditions are leading to more frequent, intense, and geographically widespread wildfires (Halofsky et al. 2020, Holden et al. 2018). These fire events pose both direct and indirect risks to mountain goat populations (Johnson 1983; Nietvelt et al. 2018; Sanderfoot et al. 2022). For instance, smoke and associated air pollutants can negatively affect respiratory health and overall physiology (Sanderfoot et al. 2022). Wildfires also have the potential to eliminate key forested winter range habitats, which can reduce local population numbers. Winter ranges in British Columbia that experienced severe fire effects were 75% less likely to be occupied and supported 80% fewer mountain goats compared to similar unburned areas (Nietvelt et al. 2018). In fire prone areas, the removal of forest canopy reduces snow interception, resulting in deeper winter snowpacks that add further energy expenditure during winter months (Johnson 1983, Nietvelt et al. 2018). Conversely, the loss of isolated tree stands on summer range could result in a loss of thermal refugia (Michaud et al. 2024).

However, not all fire activity is detrimental. Historical fire suppression may have negatively affected mountain goat habitat by preventing late-successional forests from being converted to early successional stages, thereby reducing forage. In some circumstances, low-intensity wildfires or prescribed burns can increase productivity of understory plant communities used by mountain goats (Brandborg 1955, Foster and Rahs 1985, Poole et al. 2010) and support population expansions (Johnson 1983, Houston et al. 1994).

Habitat Management and Restoration

High-quality mountain goat habitat includes a combination of cliffs, steep slopes, and alpine ridges. Additionally, to support healthy mountain goat populations, this terrain must also be remote, in suitable climates, and relatively free from disturbance. Conservation of existing quality mountain goat habitat is one of the highest priorities for effectively managing and maintaining functional mountain goat habitat. Identifying, mapping, and monitoring quality mountain goat habitats are essential for management of currently occupied ranges. Because mountain goat habitats are scattered throughout Idaho, areas supporting movements and migrations should be documented and conserved. Although mountain goats may not have physiological requirements for mineral licks (Brandborg 1955), Glasgow et al. (2003) reported licks appear to be important for many populations. Conservation of mineral licks and the trails that mountain goats use to access them should be a management priority.

Manipulations of mountain goat habitat should be carefully considered. Altering plant communities to increase early successional stages may benefit mountain goats in some areas, but these habitats are vitally important because of their physical attributes and care should be taken to avoid disturbance of mountain goats in those areas. Habitat manipulations in areas of late-successional forests that resulted from fire suppression would be most likely to benefit mountain goats. However, maintaining certain tree stands for summer thermal refugia may prove to be important for mountain goats' feeding durations during the hottest months (Michaud et al. 2024).

Management Direction – IDFG will share information when collaborating with land management agencies (e.g., USFS) to incorporate habitat improvement, protection, and mitigation measures and strategies in land use, resource, and travel management plans.

Strategy – Place conservation of existing quality mountain goat habitat as high priority for habitat management.

Strategy – Identify critical areas, including occupied winter ranges and nursery group areas.

Strategy – Engage land management agencies (e.g., USFS) in collaborative efforts to address direct and indirect threats, such as road building and mining, to mountain goat populations.

Management Direction – IDFG will work to better delineate seasonal distribution and movement patterns of mountain goats.

Strategy – Develop a plan to identify and prioritize research and monitoring needs for all Idaho mountain goat populations.

Strategy – Use point data collected from radio-collared mountain goats to develop and refine habitat maps of summer and winter ranges.

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Human-Mountain Goat Interactions

Recreation

Human interactions with mountain goats can occur in all seasons and by various forms, including all-terrain vehicles (ATVs), motorcycles, helicopters, drones, snowmobiles, snow bikes, backpacking, and backcountry skiing. Negative effects of these disturbances on mountain goats, particularly from helicopters, have been well documented (Côté 1996, Goldstein et al. 2005, Côté et al. 2013, Richard and Côté 2016, Boyd 2020, NWSGC 2020, Balyx 2022). Other research addressing non-aircraft disturbance (Varley 1998, St-Louis et al. 2013) documented negative effects similar to that of aircraft disturbance. Disturbance can cause habitat abandonment, changes in seasonal habitat use, alarm responses, lowered foraging and resting rates, increased rates of movement, and reduced productivity (Pendergast and Bindernagel 1976, MacArthur et al. 1979, Foster and Rahs 1985, Hook 1986, Joslin 1986, Pedevillano and Wright 1987, Dailey and Hobbs 1989, Frid 1997, Duchense et al. 2000, Phillips and Alldredge 2000, Dyer et al. 2001, Frid 2003, Gordon and Wilson 2004, Keim 2004). Wrazej (2024) found that glucocorticoid hormone levels were elevated in mountain goats that were exposed to high use recreation areas. An increase in this stress hormone can result in reduced reproduction (Dulude-de Broin et al. 2020).

Areas used by nursery groups (nannies with kids) and wintering areas are particularly susceptible to recreation-related impacts (NWSGC 2020). Nursery groups typically occupy habitat optimal for kid survival (Fournier and Festa-Bianchet 1995). In addition, nannies are sensitive to disturbance during kidding and post-kidding periods due to energy requirements of giving birth and lactation (Penner 1988). Reproductive success and population viability of a herd hinges on health and success of these nursery groups. Northern Wild Sheep and Goat Council (2020) recommends that disturbance activity should not occur on or near kidding habitat between May 1 and July 15 and helicopter overflights should not occur within 1.5 to 2.0 kilometers of kidding habitat.

Summer recreational activities, such as heli-hiking, heli-touring, motorcycle and ATV riding, and backpacking, are increasing in popularity. Favorite destinations for these activities include high-quality mountain goat habitat. Activities creating the greatest amount of disturbance to mountain goats have been shown to be motorcycle and ATV use. St-Louis et al. (2013) found almost one-half of encounters between ATVs and mountain goats resulted in moderate to strong disturbance. Increased vigilance and fleeing behavior caused by this disturbance may have a significant impact on access to quality forage resources, particularly for nursery groups during a critical period of the year. Non-motorized activities, such as backpacking and mountain biking, may also affect mountain goats Recent work in Alberta and British Columbia indicate that non-motorized disturbance may be more impactful than previously recognized, particularly in areas with high density recreational use. Balyx (2022) and Wrazej (2024) found that mountain goats shifted their habitat use to areas of high human recreational use, likely because of food and salt attractants. This increased the likelihood for human-mountain goat conflicts, attracted mountain goats away from higher quality habitat, and increased chronic stress hormones. In one instance, this resulted in the lethal removal of a potentially aggressive mountain goat (Landers 2017). Another summer activity that may be a source of disturbance is endurance trail races (Newsome 2014). In 2024, there were at least 4 different races, with ≥200 participants per race, which passed through occupied mountain goat range in Idaho over 3 or more days.

Winter is a time of profound nutritional deprivation for mountain goats (Chadwick 1983, Fox et al. 1989, Shackleton 1999). Deep snow reduces food availability and increases energy expenditure (Dailey and Hobbs 1989). Mountain goats often constrain their movements and

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occupy small home ranges during winter (Schoen and Kirkoff 1982, Smith 1982, Keim 2003). Winter range is important to long-term survival of mountain goats and should be identified and managed to reduce disturbance to mountain goats.

Winter recreation activities occur across mountain goat winter range habitats in Idaho. Heli-skiing is an increasingly popular winter recreation activity that has been identified as an important disturbance factor affecting mountain goat populations (Goldstein et al. 2005, Cadsand et al. 2013, Wilson 2022, Wilson 2023). A comprehensive assessment of winter recreation impacts, including heli-skiing, on wolverines in Idaho revealed the previously unknown extent and intensity of backcountry winter recreation (Heinemeyer et al. 2017). Regan (2020) expanded on this assessment and revealed continued high intensity winter recreation in the Sawtooth and Beaverhead Mountains. While the intensity was similar in both areas, the modes differed slightly. More wheeled off-road vehicles made incursions into mountain goat habitat during the first part of winter in the Beaverhead Mountains compared with more over-snow recreation in the Sawtooth Mountains. Cat-skiing, snowmobiling, snow biking, and non-motorized backcountry skiing are increasingly popular among winter adventure enthusiasts. Rapidly expanding and innovative technology has resulted in lighter equipment and more powerful machines, allowing more people to access remote alpine environments with increasing frequency. In addition, as climate changes and traditional recreation areas receive less snow, more recreation activity and pressure will be placed on higher elevation, remote habitat typically favored by mountain goats.

Several studies have indicated ungulates do not become habituated to repeated, cumulative aerial disturbance, even over multiple years of the same disturbance (Bleich et al. 1994, Frid 2003). Fleeing from disturbance and vigilance can increase with repeated exposure to human disturbance, resulting in sensitization rather than habituation to human presence (Frid and Dill 2002). The long-term result of repeated disturbance by helicopters, snow machines, snow bikes, ATVs, hikers, cross-country skiers, or even logging or road building may be displacement from important winter and nursery areas, which could subsequently lead to declines in mountain goat populations.

Because wheeled and over-snow vehicles are more accessible to recreationists than helicopters or other aircraft, expansion of motorized roads and trails has the highest potential to damage and reduce quality of habitat. Increased ease of access to mountain goat habitat also impacts hunting opportunity. Festa-Bianchet and Côté (2008) reported hunting seasons have been closed in Alberta because they were easily accessible to hunters. In areas that are easier to access, Idaho may change tag allocations and hunt area boundaries to manage harvest. Mountain goats are particularly vulnerable to overharvest and are thought to be the only North American ungulate to be extirpated from parts of their range through regulated hunting (Kuck 1978, Glasgow et al. 2003).

Habituation

Mountain goats normally flee from human disturbance that could result in effects to habitat use and survival. However, there are situations where mountain goats have become habituated to humans and pose a threat to human safety. Habituation can result when humans intentionally feed mountain goats, allow mountain goats to approach too closely or lick salt off of their skin, or when mountain goats seek minerals created from human urine deposits. Once mountain goats become accustomed to acquiring food or salt from people, they can become aggressive, actively approach hikers, and become dangerous.

Habituated mountain goats have caused human safety issues on popular hiking trails in western states. Two hikers had separate encounters with aggressive mountain goats in 2015 on Scotchman Peak trail in northern Idaho, which required medical attention from a bite and goring. This followed a well-publicized incident in Olympic National Park in Washington in 2010 where a male hiker was fatally gored in the leg by a mountain goat (Tsong 2010). Aggressive behavior by this and other mountain goats had been reported by Olympic National Park visitors for 2 summers prior to the fatal encounter. More recently, a hiker shot an aggressive nanny on a popular trail in the Cabinet Mountains Wilderness in Montana (Landers 2017). The hiker reported that the mountain goat was charging her and her two children. There were reports of people feeding mountain goats on this trail prior to the incident and salt attraction was probably at play. Mountain goats have become habituated to people because of salt (urine deposits) attraction on the Hidden Lake trail in Glacier National Park, although no aggressive encounters have been reported (May 2020). In Idaho, encounters like these are limited to very popular, heavily used trails in mountain goat range. However, if trail distribution and use in mountain goat habitat increases, more of these incidents could occur.

Some national forests, national parks, and states are increasing outreach to alert hikers to potential problems and providing simple steps to prevent conflicts with mountain goats. In a case study review of human-mountain goat

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conflict intervention actions, Harris et al. (2023) recommends hiker education, mountain goat hazing, and trailhead toilets as effective methods for reducing conflicts. Social media monitoring was recommended as a means for detecting early signs of habituation. Translocating mountains goats could be used as a tool to resolve habituation issues, but it is very expensive, poses significant logistical challenges, and resulted in high mortality when implemented for Olympic National Park mountain goats (Harris et al. 2024). Vayro et al. (2023) found that education was effective at reducing human-mountain goat-conflicts. They also stated that having trained ambassadors demonstrate safe and ethical behavior was key to educating hikers and other visitors. Following conflicts on Scotchman Peak trail in 2015, Friends of the Scotchman Peaks Wilderness trained trail ambassadors to talk to hikers on the trail about safe and ethical behavior in mountain goat country. Since that time, there have been no additional human injuries on Scotchman Peak trail and more hikers are behaving appropriately by keeping their distance and actively encouraging mountain goats to move away.

Management Direction – IDFG will collaborate with land management agencies (e.g., USFS) to incorporate habitat protection and mitigation measures and strategies in land use, resource, and travel management plans.

Strategy – Identify and evaluate potential threats to mountain goat habitat and assist land managers (e.g., USFS, Bureau of Land Management [BLM], Idaho Department of Lands [IDL], Idaho Department of Parks and Recreation [IDPR]) and recreation groups to address those activities.

Strategy – Work with land managers (e.g., USFS, BLM, IDL, IDPR) and recreation groups to minimize impacts of disturbance in mountain goat habitats by providing best-management practices for recreational activities, including over-snow recreational activities and helicopter-based recreation.

Strategy – Develop a plan to identify and prioritize research and monitoring needs for all Idaho mountain goat populations.

Management Direction – IDFG will work with land management agencies and other entities to develop education material describing safe and ethical behavior in mountain goat country.

Strategy – Provide a brochure and video on IDFG's website describing how mountain goats become habituated to humans and how to avoid conflict while recreating in mountain goat habitats.

Strategy – Assist with volunteer or trail ambassador programs that patrol trails and educate hikers where potential for conflict is high.

Strategy – Design and install signage describing how mountain goats become habituated to humans and how to avoid conflict while recreating in mountain goat habitats at trailheads that intersect occupied mountain goat range. Prioritize trailheads based on historical and current human-mountain goat conflicts.

Strategy – Work with land management agencies to provide educational materials or signage to minimize recreational disturbance of mountain goats in areas with high recreational use.

Climate Change

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Projected Changes to Idaho's Climate

Alpine species are often described as indicators of climate change, as they can be especially vulnerable due to limited range size, geographic isolation, and unique adaptations to alpine habitats which are already sensitive in nature (see Johnston et al. 2012, Frederick 2015). For mountain goats in particular, current research suggests habitat selection, reproductive success, and survival are strongly influenced by changes in both temperature and precipitation (NWSGC 2022, White et al. 2025). While changing climatic conditions may have some beneficial effects for mountain goats, detrimental effects are more likely (see reviews by NWSGC 2022, White et al. 2025).

Mean annual temperature in Idaho increased approximately 0.3° C (0.5° F)/decade from 1979-2024 with summer temperatures increasing faster than other seasons (Hegewisch and Abatzoglou 2025). Further, daily minimum temperatures are rising faster than daily maximums, extreme heat waves are becoming more common, and growing season is lengthening (Kunkel et al. 2013, Abatzoglou et al. 2014, Klos et al. 2014, Hegewisch and Abatzoglou 2025). Statewide, observed precipitation has varied but with no significant recent (1979-2024, Hegewisch and Abatzoglou 2025) or longer (1895-2020, Abatzoglou et al. 2021) trends. However, substantial decadal and seasonal trends are apparent with decreases in summer precipitation, increases in spring and winter precipitation, and decreases in proportion of precipitation falling as snow, particularly at low- to mid-elevations (Kunkel et al. 2013, Abatzoglou et al. 2014, Klos et al. 2014, Lynn et al. 2020). These changes have facilitated upward shifts and compositional changes in alpine and sub-alpine plant communities, including forest encroachment into alpine meadows across the Rocky Mountain states (Elliott and Petruccelli 2018, Hansson et al. 2021, Oldfather et al. 2025).

Based on current trends, projected changes over the next 50–70 years include progressively hotter, drier summers, and warmer, wetter, but less snowy, winters in Idaho (e.g., Kunkel et al. 2013, Wang et al. 2016, Rupp et al. 2017, Catalano et al. 2019, Abatzoglou et al. 2021). Assuming a high-warming emission scenario (Representative Concentration Pathway [RCP] 8.5), an ensemble of 10 general circulation models project mean annual temperatures in Idaho's mountain goat PMUs to increase 3.5–3.9° C (6.3–7.0° F) by mid-century (as compared to 1961–1990 baseline), with summer temperatures rising fastest (4.1–4.4° C [7.3–8.0° F]), particularly for Sawtooth, White Cloud, and Pioneer PMUs (Wang et al. 2016, Table 1). These increases are expected to be accompanied by greater overall variability and extremes in both temperature (e.g., record cold temperatures even as record highs become increasingly frequent) (Meehl et al. 2009) and precipitation (Prein et al. 2017). For example, while central Idaho may not experience a significant increase in the number of extreme heat days (i.e., max. >35° C [95° F]), the number of extreme cold days (i.e., min. <-12° C [10° F]) are expected to significantly decrease (Kunkel et al. 2013). In addition, snow levels are projected to rise in elevation (Catalano et al. 2019) and consecutive years of snow drought become more common (Marshall et al. 2019), particularly in northern Idaho mountains. By mid-century, projected increases in mean annual precipitation range from 15 mm to 83 mm (0.6–3.3 in) in mountain goat PMUs. While all PMUs are projected to experience decreases in summer rainfall and increases in winter rainfall, those in Panhandle and Clearwater Regions are projected to undergo the greatest degree of change in both seasons. Similarly, proportion of precipitation falling as snow is projected to decline in all PMUs (-0.4 m to -2.1 m [-1.3 to -6.9 ft], with the most substantial changes occurring in Cabinet, Black Snow, and Selkirk PMUs. Although model agreement and confidence in mid-century temperature projections are robust, precipitation projections are much more variable, resulting in less certainty. In addition, estimating these trends in alpine habitats is challenging due to substantial local variability in both temperature and precipitation, particularly in complex terrain. Further, observation records at upper elevations are often sparse and not fully representative of current conditions (e.g., Ford et al. 2013, Silverman and Maneta 2016, Nadeau et al. 2017).

Predicted Effects on Mountain Goats

The ability of mountain goats to adapt to ongoing and projected climate changes is uncertain. Increases in temperature appear to strongly influence mountain goat populations (see reviews NWSCG 2022, White et al. 2025). Warmer spring and summer temperatures negatively affect over-winter survival, reproductive success, and juvenile growth, presumably due to direct effects on energy balance and thermoregulatory stress, as well as indirect effects on plant

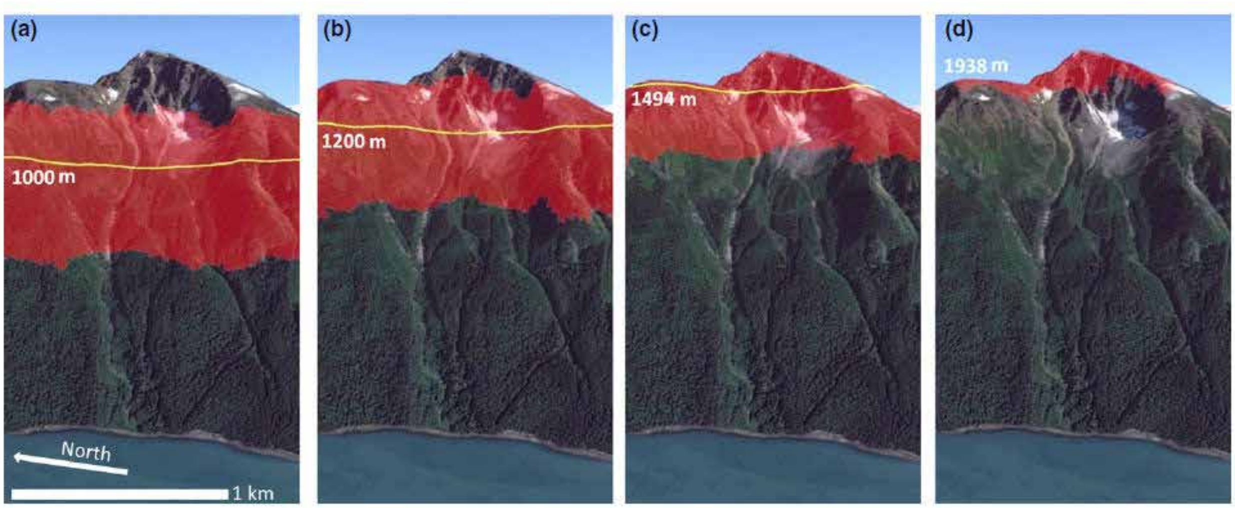

Figure 3. Predicted changes in mountain goat summer habitat distribution in southeast Alaska by 2085 under 4 climate change scenarios: (a) current distribution (2005–2015 baseline), (b) best-case scenario, (c) intermediate scenario, and (d) worst-case scenario (adapted from White et al. 2018).

nutrition, availability, and phenology (Pettorelli et al. 2007, Hamel et al. 2009, Frederick 2015, Harris et al. 2024). Similarly, drought during the preceding year can substantially affect annual adult survival (Harris et al. 2024). During hot summers, mountain goats are susceptible to heat stress and will seek shade, snow patches, or higher elevations to stay cool (Sarmento et al. 2019, Michaud et al. 2024), which can result in reduced time foraging. Warmer summer temperatures can also accelerate vegetation drying and senescence, thus reducing high-quality forage needed to produce adequate fat stores. Conversely, reductions in winter snowfall may increase over-winter survival by increasing access to food resources and reducing costs of locomotion and risk from avalanches (White et al. 2011, Harris et al. 2024, White et al. 2025). End-of-century projections suggest, at least in coastal Alaska, negative effects of increased summer temperatures will outweigh positive impacts of reduced snowfall (White et al. 2018, Figure 3).

Whereas mountain goat distribution in Idaho will likely continue to be dictated by availability of steep escape terrain in the near term, changes in temperature and precipitation patterns may further impact individual populations by mid-century. Projected decreases in snowfall may increase availability of quality winter range that does not accumulate deep snow. Declines in amount or duration of snowpack may also improve dispersal ability (e.g., Poole et al. 2009). However, alpine habitat is already limited in extent and, although largely in public ownership in Idaho, it could become scarcer. Modeling efforts in coastal Alaska, Washington Cascades, and Montana suggest mountain goat ranges will shrink, becoming more fragmented and isolated (Figure 3, Johnston et al. 2012, White et al. 2018, Gude et al. 2022, Young et al. 2022). A similar pattern could be expected for mountain goats in Idaho given they already occur at the highest elevations available across most of the state, particularly in Panhandle, Clearwater, and Southwest regions.

As temperatures rise, mountain goats can adapt behaviorally by altering daily elevational movements, habitat use (e.g., snow/ice patches), and foraging times to select microsites providing cooler conditions as necessary (DeVoe et al. 2015, Frederick 2015, Sarmento et al. 2019, Michaud et al. 2024), although different tactics for coping with warming temperatures may be adopted in different areas (Michaud et al. 2024). Perhaps, as Flesch et al. (2016) argue, at least some individuals or populations possess sufficient physiological and ecological plasticity to deal with projected changes in climate. That said, Idaho populations are small and fragmented, with low intrinsic productivity, highly variable juvenile and yearling survival, and population declines in some PMUs. These characteristics, combined with low to moderate levels of genetic diversity (see Population Monitoring, page 26) and increased potential for exposure to novel parasites, disease, or predators (e.g., Knopff et al. 2014, Wolff et al. 2019), suggest a low adaptive capacity (Beever et al. 2016, Thurman et al. 2020). Given that climate effects on mountain goats are expected to be most pronounced in marginal habitats, during extreme weather years, and when population densities are high (White et al. 2025), a better understanding of ecology, behavior, and physiology of mountain goats with respect to temperature thresholds and drought conditions, as well as how local weather dynamics vary at high elevations, is needed to fully understand and appropriately manage populations under changing climatic conditions.

Management Direction – IDFG staff will work to better understand existing and potential effects of changing climate, specifically changes in severity of winter (e.g., snow depth) and summer temperatures, on mountain goat recruitment rates, survival, and distribution, as well as alpine habitat responses.

Strategy – Support collaborative research among partners including university researchers, standardization of methods, and development of opportunities focused on identifying and understanding how changes in climatic conditions could affect mountain goat demographics and population trajectory.

Strategy - Research possible effects of changing habitat and nutritional conditions (e.g., green-up, growing season length, forage quality) on survival and reproduction, particularly in PMUs during or following drought years.

Strategy - Update predicted future summer temperatures and winter snowfall climate data by PMU as climate models are revised (Table 1).

Table 1. Baseline and projected mean summer (Jun-Aug) temperature and total annual snowfall for mountain goat Population Management Units (PMUs) in Idaho. Baseline data represent mean values for 1961–1990. Projected values are based on an ensemble of 10 general circulation models (CMIP5) under a high-warming emission scenario (Representative Concentration Pathway [RCP] 8.5). Total annual snowfall was calculated from modeled precipitation-as-snow values following White et al. (2018). Original data are from ClimateWNA at a 1-km spatial resolution (Wang et al. 2016).

PMU	Acres	Elevation range (m)	Summer Temperature (°C)			Snowfall (m)		
			1961–1990	RCP 8.5, 2050s	Change	1961–1990	RCP 8.5, 2050s	Change
Black Snow	1,002,128	483–2,401	15.0	19.2	4.2	3.3	1.8	-1.6
Cabinet	69,814	708–2,131	13.4	17.5	4.1	4.9	2.8	-2.1
Lemhi	564,497	1,249–3,708	12.9	17.3	4.4	1.9	1.4	-0.5
Lochsa-Selway	1,333,513	520–2,828	13.8	18.0	4.3	3.3	2.0	-1.3
Lost Trail	315,482	1,089–3,153	14.4	18.7	4.3	2.1	1.5	-0.6
Lower Salmon	886,835	492–2,718	13.4	17.7	4.3	2.7	1.8	-0.9
Middle Fork	1,112,843	836–3,059	13.6	17.9	4.3	2.7	1.9	-0.8
Palisades	216,317	1,546–3,044	14.7	19.0	4.4	2.3	1.6	-0.7
Panther Creek	472,631	933–3,031	15.1	19.4	4.3	1.6	1.1	-0.5
Pend Oreille	65,237	627–1,946	15.4	19.5	4.1	2.4	1.2	-1.2
Pioneer	282,328	1,866–3,634	11.6	16.0	4.4	2.7	2.2	-0.5
Sawtooth	726,246	1,292–3,268	13.3	17.7	4.4	3.7	2.5	-1.2
Selkirk	313,110	525–2,346	13.0	17.1	4.1	3.9	2.5	-1.4
Seven Devils	270,326	348–2,632	17.2	21.5	4.3	1.6	0.9	-0.6
South Beaverhead	251,335	1,896–3,471	12.8	17.1	4.3	1.5	1.1	-0.4
Targhee	46,784	1,977–3,173	12.4	16.6	4.2	3.5	2.9	-0.6
Upper South Fork	804,032	862–2,951	12.1	16.4	4.3	3.4	2.5	-0.9
White Cloud	423,617	1,716–3,586	11.9	16.3	4.4	3.1	2.4	-0.7
Yankee Fork	461,388	1,471–3,145	12.5	16.8	4.4	2.6	1.9	-0.7

Health and Disease

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Numerous parasitic, bacterial, and viral pathogens have been documented in mountain goats. Some of these have been found in Idaho, but there has been no documentation of population-level effects. While the following section is not an exhaustive list of all parasites and pathogens that have the potential to affect mountain goats, it provides insight into some of the health issues that managers may need to consider for mountain goat populations.

Respiratory Disease

Pasteurella spp. and *Mycoplasma ovipneumoniae* (Movi) have been documented in Idaho mountain goats sampled from efforts beginning in 1989, but no negative effects on populations have been detected. Research conducted in the East Humboldt Mountain Range of Nevada detected a population decline and attributed increased mortality and low kid recruitment to bacterial pneumonia (Wolff et al. 2014, Wolff et al. 2016, Anderson et al. 2016, Blanchong et al. 2018, Wolff et al. 2019). Subsequent analysis showed bighorn sheep (*Ovis canadensis*) and mountain goats living in the same area had the same strain type of Movi, highlighting potential for disease transmission between mountain goats and bighorn sheep (Kamath et al. 2019).

Bacterial pathogens associated with population-limiting pneumonia in bighorn sheep have been detected in mountain goats (Kamath et al. 2019). How this may impact bighorn sheep and mountain goats living with, or adjacent to, each other remains unclear, but implications of pathogen transfer between bighorn sheep and mountain goats should be considered by managers when evaluating translocations and management of overlapping populations (Wolff et al. 2016, Anderson et al. 2016, Blanchong et al. 2018, Lowrey et al. 2018). Molecular strain-typing suggests domestic and wild goats and sheep can exchange pathogens and analysis of potential impacts to mountain goats should be a priority (Wolff et al. 2014). Determining management actions requires research addressing effects of pneumonia on mountain goat populations, particularly where bighorn sheep populations overlap. Observations referenced above suggest exposure of mountain goats to domestic livestock (i.e., domestic sheep [*Ovis aries*], domestic goats [*Capra hircus*], llamas [*Lama glama*]) may pose a risk to mountain goats and to overlapping or adjacent bighorn sheep populations.

Other Parasites and Pathogens

Gastrointestinal parasites, ticks, and lungworm (*Protostrongylus* spp.) have been detected in Idaho mountain goats. These pathogens are thought to have negative impacts on individuals with high parasite loads, but not to cause population level declines (Côté and

Festa-Bianchet 2003). *Coccidia* spp. is the most detected macroparasite that typically infects the small intestine and may negatively impact juvenile animals. Other parasites documented in Idaho mountain goats include ticks (*Dermacentor* spp., *Otobius* spp.), lungworm, roundworms (*Nematodirus* spp., *Trichuris* spp.), strongyles, and cestodes. One female mountain goat from the Sawtooth PMU was found to have *Echinococcus granulosus* hydatid cysts, the first record of this parasite and in this host species in Idaho (Foreyt et al. 2009).

Blood samples collected indicate most mountain goat populations in Idaho have some level of exposure to numerous bacterial and viral pathogens, including but not limited to Anaplasmosis, Bovine Viral Diarrhea, Bovine Respiratory Syncytial Virus, Infectious Bovine Rhinotracheitis Virus, *Haemophilus somnus*, and Parainfluenza Virus 3. Some of these pathogens may be circulating within mountain goat populations and some may be exchanged with other wildlife or domestic livestock.

Contagious ecthyma is a highly contagious Parapox virus also called sore mouth, orf, and pustular dermatitis (Merwin and Brundige 2000). It has yet to be documented in Idaho mountain goats, but it is a concern. Severe cases can involve sores and scabs, primarily on eyes, ears, mouth, muzzle, and udder. Outbreaks in mountain goats in other areas have resulted in deafness, blindness, and death (Samuel et al. 1975, Hebert et al. 1977, Zarnke 2000). A higher prevalence of infection has been observed in mountain goat populations that use artificial sources of salt (Samuel et al. 1975). Contagious ecthyma can be transmitted to humans from direct contact with affected domestic and wild animals as well as from skinning and dressing affected carcasses (Smith et al. 1982).

Unlike most large ungulates, but like reindeer (*Rangifer tarandus*, Palmer et al. 2004), mountain goats appear to be susceptible to West Nile virus (WNV). Predicted warmer summer temperatures in Idaho could increase the range of mosquitos carrying WNV. No reports of WNV in free-ranging mountain goats are known, but because the disease has been documented in all 44 counties in Idaho, WNV should be considered during health evaluations of mountain goats.

At least 2 mycobacterial diseases have been documented in mountain goats. Johne's disease, caused by *Mycobacterium avium paratuberculosis*, is a chronic condition that usually involves the gastrointestinal tract. Johne's disease has been reported in mountain goats in southern Colorado (Williams et al. 1979). Bovine tuberculosis, caused by *Mycobacterium bovis*, has been documented in captive mountain goats in a zoo (Oh et al. 2002). Both have been detected in other ungulate species in Idaho, but no cases in Idaho mountain goats have been detected. Population level impacts to mountain goats are not a major concern due to mountain goat population densities being relatively low compared to other ungulate species.

Trace Elements

Poor nutrition can predispose animals to disease. Immune function can be compromised by inadequate caloric intake or by deficiency or imbalance in specific nutritional components, including trace elements such as selenium and vitamin E (Kahn 2005) leading mountain goats to concentrate at mineral licks where trace elements are found in greater quantities, as has been observed in previous studies (Kroesen et al. 2020). In Idaho, few populations have been sampled for evaluation of trace mineral levels. Of those tested, levels of most trace minerals are considered adequate based on accepted normal values for domestic goats and sheep, except for below-normal levels of selenium in the Seven Devils PMU. Trace mineral evaluations on additional populations within the state are needed to determine whether low levels of selenium or other minerals are potentially affecting mountain goats.

Other disease issues may be present or of concern in mountain goats and should be addressed when they become apparent or problematic based on information provided by IDFG staff or necropsy examinations. Possible changes in disease exposure due to changes in habitat use, population connectivity, management activities, climate, new pathogens and parasites, etc. emphasize importance of health monitoring to allow for early response to disease issues if needed.

Management Direction – IDFG will increase knowledge of mountain goat health and disease status in Idaho by collecting and analyzing additional data to create population infection and exposure profiles.

Strategy – Continue sampling captured or hunter harvested mountain goats for health data surveillance, including strain typing any Movi detected.

Strategy – Develop a health testing protocol to use when mountain goats are captured.

Strategy – Collect reported sick and dead mountain goats for necropsy and collection of biological samples.

Strategy – Collect and bank mountain goat DNA from captured, necropsied, and harvested animals for future research.

Management Direction – IDFG will work to improve understanding of effects of disease on mountain goat populations.

Strategy – Work with universities and other management agencies to study effects of respiratory disease on mountain goats and subsequent threats to bighorn sheep populations.

Strategy – Work with universities and other management agencies to study possible health effects of mountain goat exposure to domestic livestock. Begin with compiling and analyzing available data from Idaho and other states, focusing on pathogens that could impact mountain goats at a population level.

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Population Monitoring

Mountain goat population monitoring is an important part of management. Data on abundance, distribution, and herd composition all help to inform management decisions. However, these data can be difficult to obtain because monitoring mountain goat populations is particularly challenging. Mountain goats in Idaho are broadly distributed, occur at very low densities, often consist of small groups, and inhabit remote, rugged terrain, including several federally designated wilderness areas. Few populations have been well-studied. Consequently, seasonal movements and distributions are not fully understood. In addition, most mountain goat populations in Idaho contain <150 individuals. Thus, missing a few animals or groups during surveys can dramatically alter population estimates. Furthermore, herd composition is difficult to acquire during aerial surveys because males and females appear similar. Exploring methods to estimate mountain goat populations continues to be an IDFG priority.

Aerial Surveys

IDFG began conducting aerial surveys for mountain goats in the late 1940s (IDFG 1949), generally via fixed-wing airplanes and incidentally to elk and deer surveys. Prior to that, annual estimates of mountain goat numbers by the USFS across 10 national forests provided the only available records from approximately 1917 through 1950 (Brandborg 1955). Brandborg (1955) organized the first mountain goat project in Idaho, documenting life history, distribution, and population size in the Bitterroot Mountains, Selkirk Mountains, and along the Salmon River. Shortly thereafter, regions around the state began directed surveys of mountain goat populations. Mountain goat population data was collected using a variety of techniques across Idaho over the last 70 years. Biologists used ground counts, fixed-wing aircraft flights, helicopter surveys, and helicopter mark-recapture studies to assess mountain goat populations. These include mountain goat-targeted surveys as well as mountain goat observations incidental to surveys for other species. Most surveys occurred during winter or spring, but some have also been conducted in summer and fall.

Not all populations of mountain goats in Idaho are surveyed. Priority is given to PMUs where hunts are offered. Many surveys are conducted in conjunction with elk and deer surveys to decrease cost. On average, aerial surveys are conducted every 5 years in PMUs where hunts occur. Survey duration is 1–6 days depending on size of the PMU. Most surveys are performed using a helicopter with 2 observers and all areas thought to hold mountain goats in a given population's range are flown once. Observers record number of mountain goats, age (kid, yearling, adult) and sex (when possible) of individuals, and habitat type. Efforts are made to collect data quickly to ensure survey efficiency and minimize disturbance to mountain goats.

Surveys typically occur in winter in much of Idaho except for surveys in the Upper Snake Region which are conducted during summer. Surveys are scheduled to occur when sightability is likely highest based on habitat and seasonal movement patterns of mountain goats. Winter surveys are preferably flown within a few days of fresh snow accumulation to help track mountain goats. If fresh tracks are observed, they are typically followed until mountain goats are found. Population level reproductive success is derived from the ratio of kids to adults. An important consideration is the survival and recruitment of kids in relation to timing of aerial surveys. More kids will likely be seen during a summer survey than a late winter survey, However, not all kids seen during a survey are recruited, which occurs approximately 1 June. A population surveyed in summer is likely to incur much higher kid mortality before recruitment occurs, therefore some downward adjustment of kid:adult ratios is necessary. Populations surveyed in winter will also have additional kid mortality and will also need

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some downward adjustment in kid ratios prior to kid recruitment.

Mountain goat sightability models specific to helicopters have been developed in other states and provinces. In Idaho, this method has been successfully used to estimate elk and deer populations since the 1980s. Sightability data for mountain goats were collected using 20 radio-collared mountain goats in the northern Lemhi Range (GMU 29) during 9 aerial surveys from 2008 to 2010. Model variables included habitat, vegetative cover, snow cover, level of snow tracking conducted, group size, and activity. Crude observation rates of groups averaged 85% (83–89%) in 2008, 74% (70–80%) in 2009, and 82% in 2010 (IDFG 2008, IDFG 2009, IDFG 2010). Observation rates in the Lemhi Mountains fall near the upper end of the range of mountain goat sightability estimates developed in other areas. Observation rates averaged 46% in coastal Alaska (Smith and Bovee 1984), 68% in west-central BC (Cichowski et al. 1994), 67% in east-central BC (Poole et al. 2000), 70% (range 55–84%) at Caw Ridge in Alberta (Gonzalez-Voyer et al. 2001), and 63% in southeastern BC (Poole 2007). Washington recently developed a regression-based sightability model with an average sightability of 85% (Rice et al. 2009), but surveys were conducted in summer and applicability to winter surveys will have to be evaluated. A mountain goat sightability model has not been fully developed for use in Idaho as sightability likely varies across the state depending on the population and habitat.

Another technique to estimate animal populations is through mark and recapture or resight (Williams et al. 2002). In 1999, IDFG biologists began a mark-resight study in GMU 18 (Pauley and Crenshaw 2006). Mountain goats were marked with recreational paintball equipment fired from a helicopter. Biologists subsequently conducted resight surveys, recorded number of marked and unmarked mountain goats observed, and used that information to calculate Lincoln-Peterson population estimates. In 2000, biologists marked mountain goats in GMU 10 using similar methods, but with addition of a second marking occasion and resight survey (Pauley and Crenshaw 2006). Estimated abundance for GMU 18 was 171 (95% CI 109–321) and 196 (95% CI 165–245) mountain goats in 1999 and 2000. Estimated abundance in GMU 10 was 97 (95% CI 74–143) and 96 (95% CI 81–128) in April and May 2000. Initial sighting probability for undisturbed mountain goats during this project was 0.59 (SE = 0.068). The effort was repeated in 2002 and 2007 in GMU 18 and in 2002, 2005, and 2010 in GMU 10. This mark-resight method is expensive, labor intensive, and causes biased estimates due to avoidance behavior because it requires repeated surveys in the same area.

Ground Surveys

IDFG has also explored using ground surveys to estimate mountain goat densities. Ground surveys may provide more accurate composition information than aerial surveys because surveyors can often observe animals for longer periods and mountain goats are generally unaffected by observer presence (Belt 2010). Additionally, Belt (2010) showed density estimates were higher for ground surveys than for aerial surveys. However, detection probability may be an issue for ground-based volunteer surveys (Belt 2010). This issue could potentially be overcome with increased site visits, but this method still lacks power to detect a 30% reduction in abundance over 10 years (Belt 2010). Another drawback to ground surveys is the logistical requirement of much time and many observers.

IDFG initiated a graduate research project at University of Montana in 2017 to test effectiveness of ground-survey techniques for estimating abundance of mountain goat populations (McDevitt et al. 2021). The project was conducted in the Palisades PMU. Researchers developed methodology that used spatially balanced random sampling combined with double-observer point count surveys to provide unbiased abundance estimates. They found that surveys set up this way could be analyzed using N-mixture models to address the typical violations of statistical assumptions (McDevitt et al. 2021). Additionally, remote camera traps were tested as a ground-based survey method, but did not yield enough photos of mountain goats to be able to estimate occupancy or abundance.

Between 2019-2023, IDFG conducted alpine surveys aimed at detecting and quantifying alpine obligate species. Mountain goats were chosen as one of those species to monitor. The protocol for these surveys was a standard point-count framework that incorporated distance sampling. The use of distance sampling allows for estimates of detection, occupancy, density, and abundance. One hundred sixty-four surveys were conducted in 18 PMUs with a total of 260 mountain goats detected. Data will be evaluated to see if the distance sampling method can used to assess mountain goat occupancy or abundance.

Survival and Movements

Survival, habitat use, dispersal rates, and dispersal distances of mountain goats in Idaho are poorly understood. Across mountain goat range, the most reliable data of this type are generally derived from individuals marked with radio-collars. Location data for radio-marked mountain goats in Idaho are limited to 12 individuals in Palisades PMU, 3 small groups of translocated mountain goats in GMUs 20 and 29, and 2 individuals in GMU 10. Translocated mountain goats were released into unoccupied habitat that historically held mountain goats or to augment existing populations. Data from recently translocated mountain goats likely does not represent true survival or movements of established populations. In addition, small sample sizes of radio-collared individuals in these PMUs are not adequate to produce survival estimates for an entire population.

Genetic Diversity

Mountain goats are polygynous, where only a few males do most breeding, and generally live in small, isolated populations, and are therefore, susceptible to inbreeding (Mainguy et al. 2009). As a result, mountain goat populations display low to moderate levels of genetic diversity. In Idaho, many mountain goat populations occur on isolated mountain ranges, which may limit dispersal opportunities across intervening valleys, resulting in isolation and reduced gene flow between herds (Shafer et al. 2011). Because mountain goats in Idaho occur on the periphery of the species' range, and in isolated areas with small population sizes, they have lower levels of genetic diversity compared to counterparts in core range (Shafer et al. 2011).

In Washington, genetic diversity was higher where alpine habitats were larger and more connected, but declined toward the southern periphery of their range, where alpine habitat was less abundant and more fragmented (Shafer et al. 2011, Parks et al. 2015). Inability of mountain goats to move between herds may further erode genetic diversity and limit the ability of populations to recover (Parks et al. 2015). In small, isolated populations in Alberta, low genetic diversity (heterozygosity) has been associated with reduced juvenile survival (Mainguy et al. 2009). Ortego et al. (2011) observed a decline in genetic diversity in this same mountain goat herd, despite increasing population size. Higher heterozygosity was documented in offspring of individuals migrating to this herd, suggesting an increasing population size inadequately compensated for a small effective population size, and immigration was critical to increase genetic diversity. Isolated populations of mountain goats on the periphery of their range may be at risk of low genetic diversity due to effects of genetic drift and inbreeding (Frankham 1997). Inbreeding depression often significantly affects birth weight, survival, reproduction, and resistance to disease, predation, and environmental stress (Keller and Waller 2002). Retention of gene flow among increasingly fragmented habitat patches is necessary to sustain populations sensitive to inbreeding (Keller and Waller 2002). Small populations are more vulnerable to extinction when they suffer from inbreeding depression or loss of adaptive variation (Lynch et al. 1995).

Maintaining migration corridors and landscapes permeable to individual movements increases effective population size, genetic diversity, and adaptive potential, while providing movement routes for mountain goats to respond to climate change (Sexton et al. 2011). Distance to neighboring escape terrain and landscape changes (agricultural valleys, roads, housing) can limit gene flow (Parks et al. 2015). Considering current landscape changes, limited gene flow from mountain goat immigration into isolated populations may be insufficient to counterbalance consequences of low genetic diversity (Parks et al. 2015).

Gene flow is limited in many mountain goat populations, and further genetic work is necessary to determine negative impacts from founder effects, bottlenecks, and inbreeding. Short-term management of populations at fewer than several hundred individuals virtually guarantees a need for more intensive management for future survival (Lynch et al. 1995). Population augmentation via translocation may be a viable alternative to increase genetic diversity in isolated mountain goat herds in Idaho.

Management Direction – IDFG will continue to collect mountain goat data to evaluate population trend and viability.

Strategy – Conduct population surveys that provide for periodic assessments of population status and distribution. Survey methods may include aerial surveys, double-observer ground counts, or newly developed methods.

Strategy – Develop a plan to identify and prioritize research and monitoring needs for all Idaho mountain goat populations including consideration of PMUs that have not been surveyed in the last 5 years.

Strategy – Develop aerial survey instructions for each PMU to include maps of survey areas and instructions on survey protocol.

Strategy – Compile statewide historical population survey data.

Management Direction – IDFG will examine roles of immigration and emigration in populations with a meta-population structure.

Strategy – Develop a plan to identify and prioritize research and monitoring needs for all Idaho mountain goat populations.

Strategy – Use banked mountain goat DNA to examine connectivity between mountain goat populations. A minimum of 20 samples per population will be needed for an initial analysis of connectivity. IDFG will continue to collect DNA to meet minimum sample-size needs.

Management Direction – IDFG will work to maintain genetically viable mountain goat populations across their range in Idaho.

Strategy – Continue to investigate avenues of mountain goat genetic monitoring for use in population monitoring including opportunistic sampling (e.g., DNA from fecal pellets or hair).

Strategy – Collect and bank mountain goat DNA from captured, necropsied, and harvested animals.

Strategy – Use banked DNA to establish a baseline of genetic diversity in Idaho’s mountain goats. Use this information to devise protocols and genetic “triggers” that would indicate augmenting populations with decreasing genetic diversity may be necessary.

Harvest Management

Mountain goat hunting can be an exciting and challenging adventure because mountain goats live in steep, rocky terrain in subalpine and alpine habitats that are difficult to access. Nonetheless, populations are susceptible to overharvest due to delayed sexual maturation, low productivity, and potential for high natural mortality in adults. However, conservative harvest strategies and improved population monitoring will help maintain this unique opportunity in Idaho for generations to come.

Historical Harvest and Management

Mountain goat harvest peaked in the 1960s and declined as mountain goat populations declined. General season hunts in the 1950s were all converted to controlled hunts by 1967, and tag numbers were reduced through the following decades. For example, in 1963 Idaho offered 7 general-season hunts (over-the-counter tags) and 28 controlled hunts with 192 tags, resulting in a harvest of 171 mountain goats. Controlled hunt tag numbers increased until 1974 when 303 tags were offered. Mountain goat populations decreased under these levels of harvest, some substantially. In response to declines, a more conservative approach to harvest was adopted. All subsequent Idaho mountain goat management plans included a goal of increasing populations. To achieve that goal, tag numbers were reduced and some hunts were closed. Since 1991, IDFG has offered 75-day hunting seasons running from 30 August to 12 November. In 2024, Idaho offered 20 controlled hunts with a total of 41 tags; 35 mountain goats were harvested. Chances of drawing a tag for these hunts ranged between 2% and 8%. In 2025, Idaho offered 19 controlled hunts with a total of 40 tags.

The 1991–1995 IDFG mountain goat plan (IDFG 1990) established criteria for a minimum population size of 50 prior to opening a mountain goat hunt and an annual harvest rate ≤5% of the non-kid segment (IDFG 1990). Harvest has typically been in the 2–4% range for most hunted populations. While many populations were stable under this harvest scenario, others declined. To address concerns with continued declines in some herds, the 2019-2024 Idaho Mountain Goat Management Plan had more conservative harvest guidelines than the 1990 plan, including harvest rates ≤3% in populations ≥100 animals with recruitment rates ≥15 kids:100 adults. This conservative harvest strategy will continue for the duration of this management plan (2025-2030).


Hunter with Mt. Goat CCBY IDAHO FISH AND GAME

Monitoring of low-density mountain goat populations has complicated harvest management (see Population Monitoring, page 24). Idaho plans to conduct aerial surveys on most hunted populations every 5 years. These surveys provide a minimum count, kid:adult ratio, and distribution information. However, complications arise because kid:adult ratios observed from a helicopter are quite variable. Potential causes include greater variability in kid sightability than adult sightability, highly stochastic kid survival and therefore recruitment, or some combination thereof. Furthermore, timing of surveys (summer vs winter) has the potential to count kids before they are recruited into the population creating a wide disparity in kid ratios. Kid survival and kid ratios need a downward adjustment to account for the timing of kid recruitment into the population. Therefore, population surveys generate minimum known population estimates, and, if conducted near the time animals are recruited, a minimum known number of kids recruited.

Current Regulations

Mountain goats are a "once-in-a-lifetime" species, meaning hunters can legally harvest only 1 in their lifetime in Idaho. Hunters who harvested a mountain goat before 1977 are eligible to apply for mountain goat tags, however. Bag limits are either sex, except nannies accompanied by kids cannot be harvested. Idaho requires a mandatory check; hunters must check their mountain goat at an IDFG office where horn length, horn annuli (age), and sex are recorded. In addition to lifetime harvest restriction, application rules and eligibility for controlled hunts are designed to further improve drawing odds. A hunter cannot apply for most other big game controlled hunts the same year they apply for a mountain goat hunt (exceptions include unlimited tag hunts and extra antlerless deer and elk hunts). Additionally, if a hunter draws a tag and does not harvest an animal, they must wait 2 years before they can reapply.

At Commission direction, IDFG conducted 2 surveys in 2021 to gauge public support for mandatory mountain goat sex identification testing, with a goal of reducing the number of nannies harvested. The online survey was on the IDFG website and available to anyone while the email survey was sent to hunters that applied for mountain goat tags in 2016-2021. Results for both surveys were similar, with 80% of 777 email survey respondents and 90% of 153 online survey respondents supporting mandatory sex identification training. Starting in 2023, mandatory training and testing was required for all hunters that drew a mountain goat tag. Since Commission adoption of the 2019 Mountain Goat Management Plan, the implementation of a mandatory sex identification test, and increased efforts to educate the public about the importance of harvesting male mountain goats instead of nannies, there has been an overall reduction of females in the harvest. During the previous planning period (2019-2024), the statewide percent of nannies in the harvest was 20%. This is a decrease from the previous 6-year average of 27%.

Population Dynamics

Hamel et al. (2006) modeled mountain goat population dynamics and potential impacts of harvest for 12 populations in Jasper National Park, Alberta. The authors used vital rates (birth rates as well as survival rates for both sexes and different age demographics) measured on the Caw Ridge population to inform their model. All 12 populations were surveyed annually or biennially from 1973 to 2003 (Gonzalez-Voyer et al. 2001) and these demographic data were used to develop and validate their model. Additionally, they conducted a sensitivity analysis to determine how different vital rates influence rate of population change.

Population projections for 8 of 12 populations were similar to observed values from aerial surveys, but 2 were overestimated and 2 were underestimated, likely due to different survival or birth rates. Sensitivity analysis indicated survival of females $\geq$5 years produced the largest impact on population growth, and proportional change in population growth due to adult survival was 1.5 times greater than that of recruitment. Modeled harvest scenarios indicated nonselective annual harvest rates >1% of mountain goats $\geq$2 years

Hunters with Mt. Goat CCBY IDAHO FISH AND GAME were not sustainable for some populations. The authors produced a comparison of 4 population sizes harvested at various rates and displayed 20-year simulated population growth rates and probabilities of extinction at 40 years for managers to use as guidelines (Hamel et al. 2006).

Modeling Effect of Harvest on Idaho's Populations

We assumed Idaho's mountain goat populations experience similar population dynamics and survival rates as populations studied in Alberta due to similar subalpine forest and alpine meadow habitat types and population sizes are comparable to many of Idaho's PMUs. Thus, we used models from Hamel et al. (2006), but varied recruitment and harvest rates to better represent the range in variability in these rates for Idaho's populations. The large impact of adult female harvest on mountain goat populations is not surprising given low recruitment rates and average age at first reproduction for females (4.7 years; Adams et al. 1982, Swenson 1985, Festa-Bianchet et al. 1994, Côté and Festa-Bianchet 2001, Hamel et al. 2006). Although the model selects sex of harvested individual randomly, most hunters target males. Average statewide harvest of females was 33% between 1990 and 2017. During the life of the previous mountain goat management planning period (2019-2024), the average statewide harvest of females was 20%. However, statewide harvest is not representative of individual hunt areas where the proportion of female mountain goats harvested averaged 0–45% over the same period (2019-2024). Additionally, many populations have sustained a harvest rate of 2–4% over the last 30 years and remained stable. Therefore, we present harvest tables as a reference for all managed populations in Idaho, including introduced populations that might have higher reproductive rates and a larger range of population sizes than modeled in Hamel et al. (2006).

Similar methods to Hamel et al. (2006) were used to produce harvest simulations and generate a set of harvest tables that allow for a wider range of recruitment rates (kid:adult ratios), population size, and proportion of females in the harvest. While generating harvest tables, output was organized to closely mimic data currently collected by IDFG. Vital rates were used to run 2-Stage and 12-Stage models from Hamel et al. (2006, with similar assumptions), but we allowed female harvest to vary (for 12-Stage models) between 10% and 50% (in 10% increments) and only harvest whole animals (i.e., for a population of 50, a harvest rate of 2% = 1 animal and 4% = 2 animals). Fecundity (number of young surviving to become a yearling) was varied by establishing 3 levels, one higher and one lower than those used by Hamel et al. (2006) (0.25, 0.40 and, 0.54). Fecundity of 0.25 closely corresponds to 10 kids per 100 adults (~ 1 Jun) and levels of 0.40 and 0.54 roughly correspond to kid:adult ratios of 15:100 and 21:100. Population sizes from 50 to 250, in increments of 50, were used to approximate the range of population sizes currently in Idaho. All simulations were run 1,000 times to generate probabilities of 10% and 25% declines over 20 years (see Appendix A for a more detailed description and R code for simulations). Probabilities of 10% and 25% declines were included in harvest tables for manager consideration of acceptable risk over the next 20 years given most population growth rate values were at or near stable ($\lambda \approx 1$).

Justification for Harvest Guidelines

This plan identifies guidelines for mountain goat harvest. Justification for each guideline is explained below.

Guideline 1: Allow harvest on populations with average recruitment rates of $\geq$15 kids:100 adults.

In the 2-Stage model (simplest model), we varied kid:adult ratios, population size, and harvest levels (because this model includes only adults and kids, sex of harvest is a random event). A population of 100 mountain goats with 1% harvest will decline 3.8% annually when kid:adult ratios are 10:100, but will increase 2.5% and 7.7% annually when ratios are 15:100 and 21:100. At recruitment levels equivalent to 10 kids:100 adults, all populations show declines, even in absence of harvest.

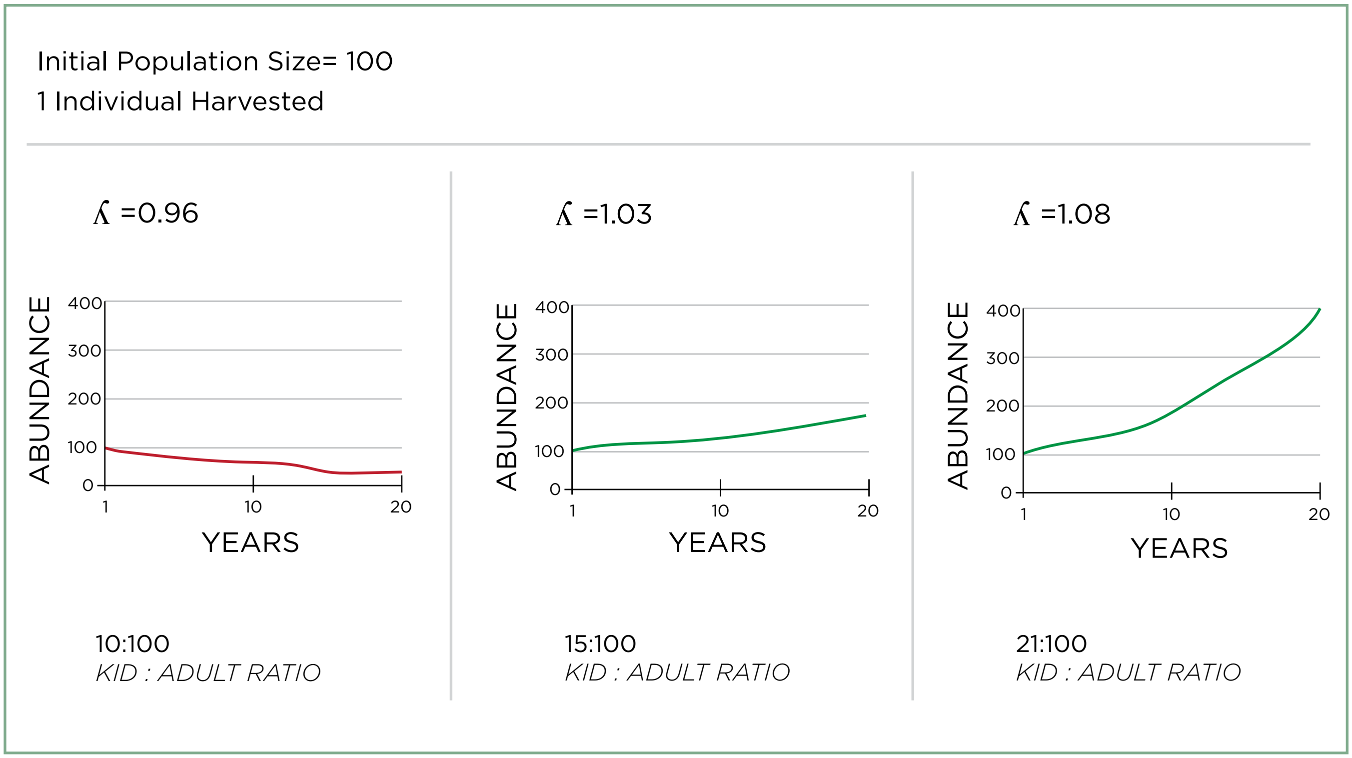

Figure 4. Results of 2-Stage model with various kid:100 adult ratios for a population of 100 with 1% harvest (with random selection of harvested sex of adult) showing change in abundance over time.

Decreasing population growth rate regardless of population size at a kid:adult ratio of 10:100 is the reason 12-stage models were not run with the low recruitment rate. This illustrates the risk of harvesting populations which are experiencing low recruitment (Figure 4).

Guideline 2: Allow harvest in populations of ≥100 mountain goats.

In absence of hunting, a population of 50 mountain goats has a 27% probability of declining 10% in 20 years and 5% probability of declining 25% in that same time frame. Table A-1 (Appendix A) illustrates how stochastic small populations can be, even with a recruitment rate of 15 kids:100 adults and no harvest. Table A-2 (Appendix A) illustrates the impact of adding harvest of 1 individual (2% harvest rate) on that same population. Probability of a 10% decline over 20 years increased to 55% and probability of a 25% decline increased to 29%.

Hamel et al. (2006) reported the greatest effect on population growth was variability in female survival. The only source of mortality that can be easily influenced is harvest. Regardless of population size, increase in percent female harvest has similar negative impacts on population growth (Figure 5). Population growth rate for a population of 100 mountain goats with 2% harvest rate and 50% of harvest being female is the same as a 4% harvest rate and 20% females in the harvest for the same population (Figure 6). This relationship illustrates the need to track female harvest rate through time at a population level to manage harvest. Further, this comparison demonstrates how a reduction in female harvest can lead to more hunting opportunity while maintaining stable or increasing populations. For example, if exclusive harvest of males was possible, all populations would undergo positive growth rates, even for harvest rates up to 5% (Appendix A, Table A-14).

Guideline 3: Allow harvest rates of ≤3% for average fecundity populations (15 kids:100 adults recruited).

Managing for a specific harvest rate should be implemented with caution. (Appendix A, Tables

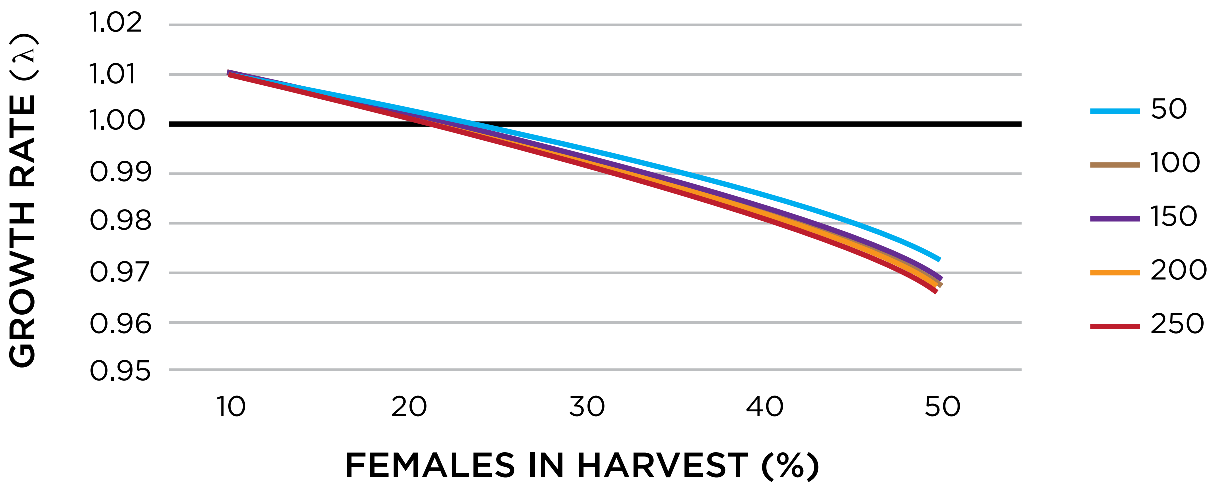

Figure 5. Population growth rates of various-sized mountain goat populations with a 4% harvest rate, kid ratio of 15:100, and a range of percent females in the harvest.

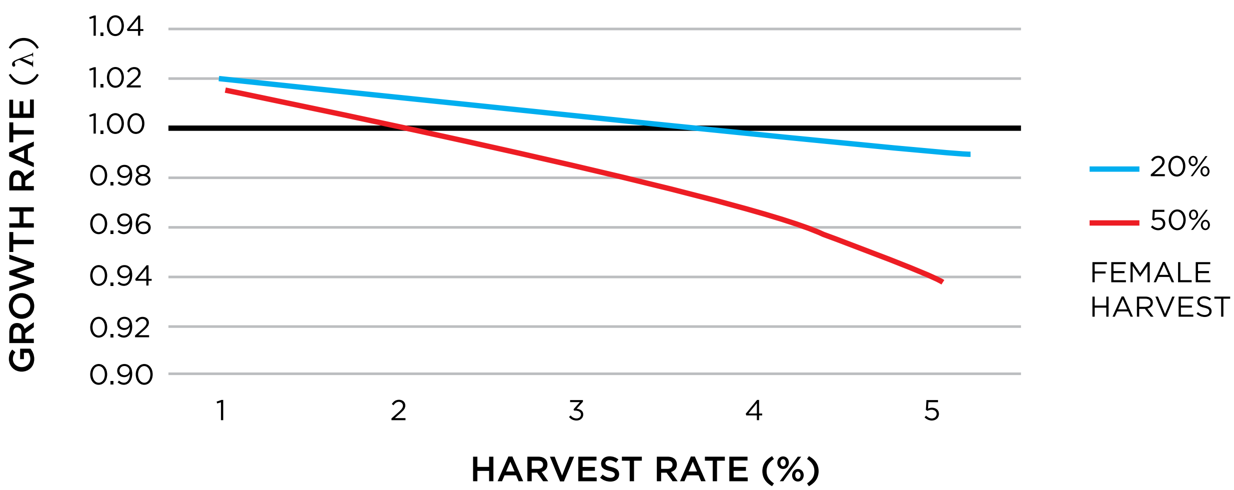

Figure 6. Population growth rates of a population of 100 mountain goats with kid ratio of 15:100 under different levels of harvest intensity when proportion of females in the harvest is 20% or 50%.

A-7–11). For example, regardless of population size, a 3% harvest rate with 30% females in the harvest (and recruitment rate of 15 kids:100 adults) generally maintains a stable population (bold text in Table 2). However, at a harvest rate of 3%, a population of 100 still carries a 31% probability of experiencing a 10% decline over 20 years (Table 2; Appendix A, Table A-8). If recruitment rates were high (21 kids:100 adults), with 3% harvest and 30% females in the harvest, the population would grow 4.5% annually (Appendix A, Tables A-12 and A-13). In addition, the probability of 10% decline in 20 years is only 3% under this harvest scenario.

Management Direction – IDFG will provide maximum harvest opportunity possible through once-in-a-lifetime controlled hunts while working to maintain stable to increasing mountain goat populations. Harvest models were created to assist managers with development of appropriate harvest guidelines across various populations in Idaho. Managers should annually assess mountain goat population and harvest data in relation to harvest tables. Harvest rates, population size, kid recruitment, and female survival will be used to inform harvest guidelines.

Guideline 1: Allow harvest on populations maintaining average recruitment rates of ≥15 kids:100 adults.

In applying this guideline, the model assumes all kids seen during a survey were recruited, which occurs approximately 1 June. A population surveyed in winter is likely to incur additional kid mortality before recruitment occurs, therefore some downward adjustment of kid:adult ratios is necessary for populations surveyed in winter.

Guideline 2: Allow harvest in populations of ≥100 mountain goats.

Modeled populations were not minimum counts but were based on known populations. Therefore, unless a sightability model was used to determine population size, a correction factor of some kind should be applied (see discussion above). Given variability in sightability, a conservative correction to a minimum count would be 0.85, however mountain goat studies have found a range of sightability values (see Population Monitoring, page 26). Consider survey conditions, including terrain and habitat, when correcting for sightability. Total population size is at time of recruitment (~ 1 Jun).

Guideline 3: Allow harvest rates of ≤3% for average fecundity populations (15 kids:100 adults recruited).

See discussions for Guidelines 1 and 2 above. The 3% (or less) would need to be applied to a known population with a recruited kid:adult ratio of 15:100 or higher. Higher harvest rates may be appropriate for growing populations with higher-than-average kid:adult ratios.

Management Direction – IDFG will work to reduce harvest of female mountain goats.

Strategy – Continue to require mandatory sex identification test for mountain goat tag holders.

Strategy – Continue to provide information to mountain goat tag holders outlining importance of reducing or eliminating nanny harvest and how to identify nannies in the field.

Strategy – Monitor annual female harvest rates by hunt area and PMU.

Management Direction – IDFG will identify specific data needs for populations and prioritize projects to gather that data.

Strategy – Estimate survival rates of adult male and female mountain goats.

Strategy – Identify kid survival and recruitment rates via literature or research (e.g. paired summer/winter surveys) to develop an adjustment factor to validate population models and account for variance in kid:adult ratios due to survey timing.

Table 2. Example of harvest tables in Appendix A for a population of 100 with 3% harvest and variable percent females in the harvest (see Table A-8 for full range of variables).

Harvest Rate	Population Size, # Harvested	% Female	Probability of 10% Decline	Probability of 25% Decline	Population Growth Rate
		10	0.18	0.06	1.01
		20	0.27	0.11	1.01
3%	**100, 3**	**30**	**0.31**	**0.14**	**1.00**
		40	0.35	0.18	1.00
		50	0.43	0.24	0.99

Translocation

Mountain goat translocation was a major focus of mountain goat management in Idaho beginning in 1960, with goals of augmenting small populations, reintroducing animals to historical range, or introducing mountain goats into new, unoccupied habitats. Between 1960 and 2016, approximately 270 mountain goats were translocated into or within the state (Appendix B, Table B-1). Sixty-one of those mountain goats were translocated from Washington and Utah. Eleven mountain goats were captured in Idaho and translocated out of the state. Snow Peak (GMU 9) and Black Mountain (GMU 10) were primary source populations for translocations through the mid-1990s.

Most translocations in the 1960s were into areas not previously occupied by mountain goats. Mountain goats were introduced into unoccupied ranges with appropriate habitat characteristics in Palisades (GMU 67), Seven Devils (GMU 18 and 22), and Bernard Peak (GMU 4A). Mountain goat populations introduced into unoccupied ranges of suitable habitat tend to expand rapidly. Palisades population was so productive that it became a source population for translocations from 1989 to 1997 (Appendix B, Table B-1) and provided new harvest opportunities.

Since the 1970s, translocations were primarily used to supplement declining populations and repopulate historical ranges. Success of early translocations to augment existing populations was largely unknown due to lack of radio-collaring to track survival and infrequent or inaccurate population surveys. Newly translocated populations typically experienced a period of initial expansion, followed by temporary stability. After this period of stabilization, populations tended to decline, which led to questions in the early 1990s about efficacy of translocations into declining herds, but introducing mountain goats into all suitable areas was still a priority.

For example, in Selkirk PMU (GMU 1), 31 mountain goats were released between 1981 and 1994. A population survey conducted in 2001 showed a stable population with only 34 mountain goats observed. Idaho's most recent translocation in 2007 fared much worse. The state's largest release of 24 mountain goats occurred into unoccupied historical range in the northern Lemhi Range (GMU 29). Twenty of 23 mountain goats were radio-collared to determine survival and recruitment. Recruitment was poor, with only 1 of 6 kids surviving a full year. Survival was very poor; 17 of 20 adults died within 3 years post-release. Three adults were observed during the 2021 Lemhi survey, indicating a continued presence of mountain goats in the northern Lemhi Range. Mortality causes included mountain lion predation, falls, and malnutrition.

An examination of mountain goat translocations into previously occupied range between 1950 and 2010 in Idaho found 1 successful, 5 failed, and 7 of unknown status (Harris and Steele 2014). Probability of a successful translocation is related to total number of mountain goats released; an average of 17 individuals were released in successful translocations compared to an average of 10 individuals in failed translocations (Harris and Steele 2014). A large-scale mountain goat translocation occurred in Washington in 2018-2020 where 262 GPS collared mountain goats were monitored post translocation from Olympic National Park (non-native range) to the Cascade Mountain Range (native range) (Harris et al. 2020). This monitoring resulted in low estimated annual survival rates of 0.53 for adult females, 0.58 for adult males, and 0.25 for kids (Harris et al. 2020).

A species like mountain goats, found in small, remote populations with low immigration rates can have low genetic variability (Ortego et al. 2011), and low genetic diversity can lead to reduced population viability (Parks et al. 2015). A translocation of a small number of mountain goats may provide additional heterogeneity to an otherwise isolated and inbred population (see Genetic Diversity, page 26). Fewer individuals may be needed for translocations for the purpose of increasing genetic diversity.

Other considerations should be addressed before translocating mountain goats. Appropriate and sufficient habitat, including forage species and impacts to native plant communities, should be assessed in potential translocation areas (see Habitat, page 9). Potential disturbance related to recreational activities should also be assessed to place mountain goats in secure areas (see Recreation, page 13). Possible disease transmission issues between mountain goats and bighorn sheep should be examined, especially in areas with species overlap (see Health and Disease, page 21). Size and health of the donor population should be considered before moving individuals. These potential issues along with the high financial cost of translocating wildlife and the low survival of mountain goats in recent translocations make the feasibility of translocation low in many situations.

Goats Released CCBY IDAHO FISH AND GAME

Translocation Guidelines

IDFG will use the following guidelines when considering a mountain goat translocation in Idaho. Translocation of mountain goats may occur to augment existing populations or into unoccupied habitat when high-quality mountain goat habitat is identified.

1. Use the most current mountain goat habitat map to verify if a proposed translocation site is in high-quality habitat. Determine whether substantial changes in habitat have impacted mountain goat populations in the proposed area and whether current habitat conditions can support desired population levels.
2. Address limiting factors (unrelated to genetic diversity) before populations are augmented to increase the likelihood of success.
3. Assess current and predicted future conflicts within the population's range and collaborate with other agencies to minimize conflicts with newly translocated populations.
4. Prior to any translocation, develop a protocol for health testing of source and recipient (for augmentation) populations.
5. Assess risk of mountain goat translocations to the health of bighorn sheep or other wildlife populations.
6. IDFG wildlife capture and handling protocols will be followed for all mountain goat translocations.
7. Conduct population monitoring for all translocated mountain goats. All animals will be ear-tagged and GPS-radio collared. A population monitoring program will also be implemented to assess whether translocation goals were achieved.

Mountain Goat Viewing Opportunities

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Wildlife viewing is an important resource and is often cited as one of the reasons people choose to live in Idaho. Although there are no estimates specifically for mountain goats, consumptive and nonconsumptive wildlife activities are an important contributor to the economy in Idaho. In 2023, outdoor recreation in Idaho accounted for $4 billion of gross domestic product for the state, with $267 million in current-dollar value added from hunting, shooting, and trapping (Bureau of Economic Analysis 2023).

Mountain goats offer a unique opportunity for wildlife viewing. They occupy discrete alpine habitats, have moderately high site fidelity, and exhibit distinct coloration, which makes them one of the more easily observable and identifiable species. Several populations of mountain goats across Idaho occur in close proximity to population centers and provide relatively accessible viewing opportunities. In addition, certain mountain goat populations do not seasonally migrate, offering a chance for the public to observe them year-round. Some of the best viewing locations include Farragut State Park, Lion Creek in the Selkirk PMU, Scotchman Peak in the Cabinet PMU, Isabella Point in Black Snow PMU, Hells Canyon dam, Sawtooth Mountains, Yankee Fork, Billy's Bridge on Hwy 75, Targhee Creek, Sawtelle Peak, and Palisades.

Management Direction – IDFG will provide information to the public about the value of Idaho's wildlife resources, including mountain goats.

Strategy – Provide educational information about mountain goats on the IDFG website, as well as via presentations, brochures, and signs.

Strategy – Develop interpretive viewing sites to educate the public about the value of mountain goats.

Population Management Units

Mountain goat distribution for this plan is defined as the geographic range regularly or periodically occupied by mountain goats. Not all areas within this range have sufficient suitable habitat to support persistent populations and mountain goats occasionally move outside this area. We divided mountain goat distribution into 19 PMUs based on our current knowledge of distribution and connectivity between subpopulations and populations (Figure 7).

Population survey data in PMU tables may not correlate with historical reports due to PMUs occupying only parts of GMUs. In the population survey tables, animals classified as yearlings are included as adults. Animals that could not be classified during the survey are listed as unknown (Unk).

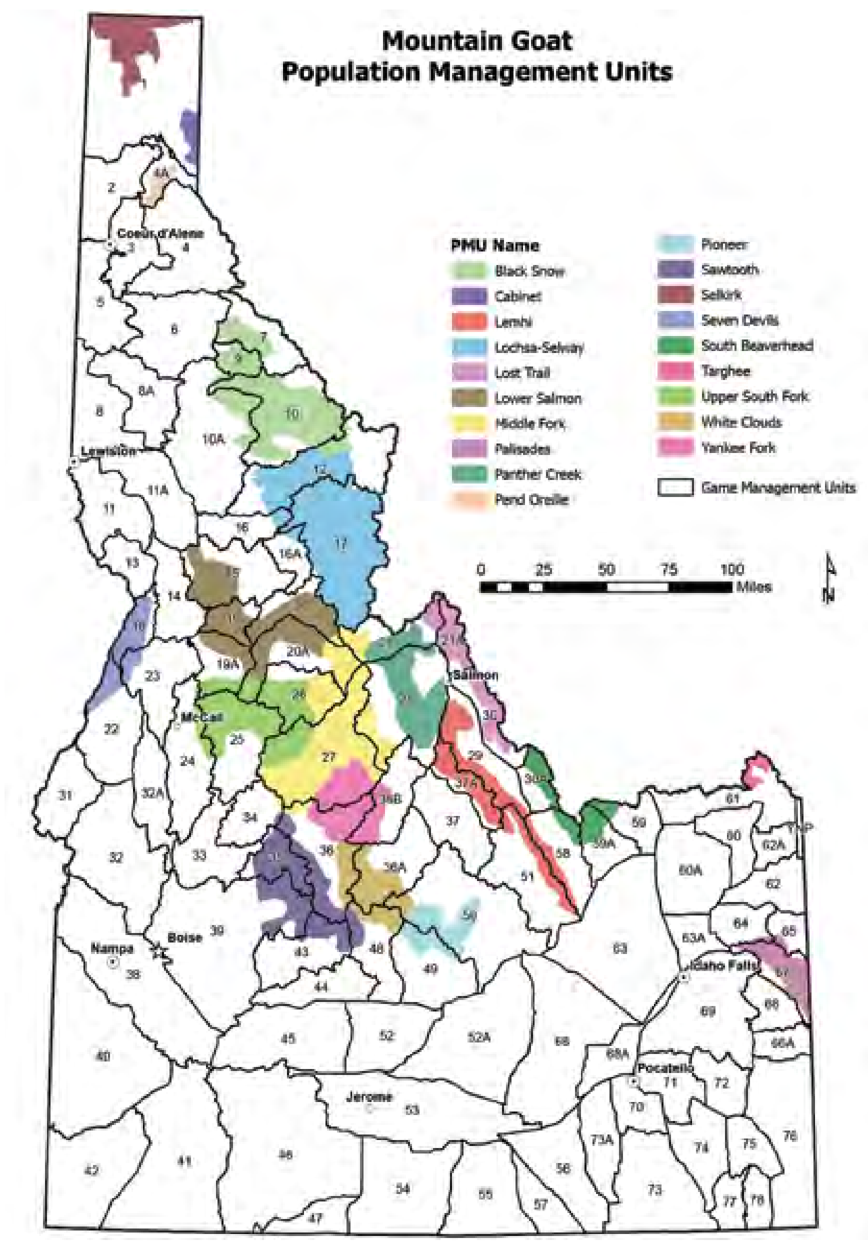
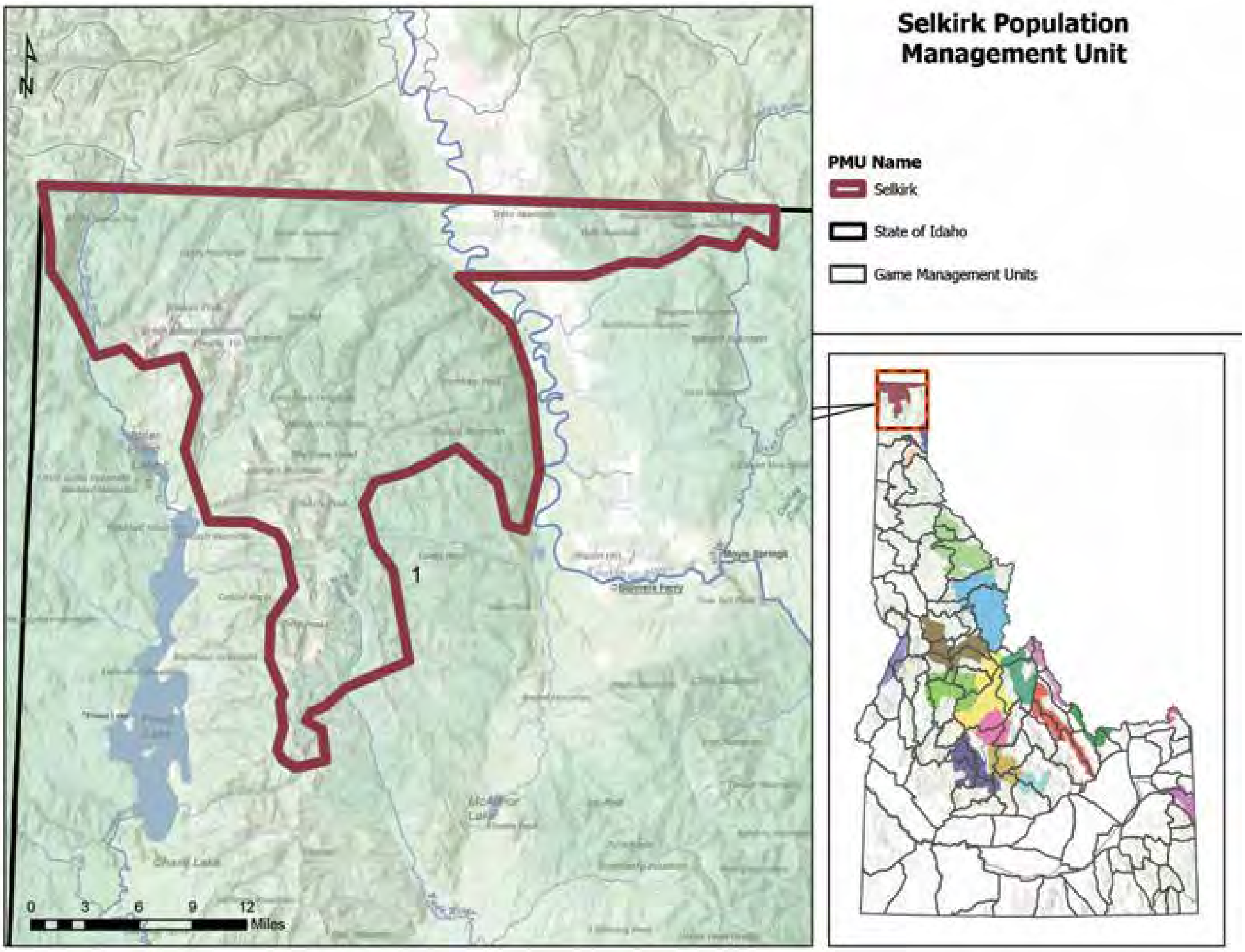


Figure 7. Population Management Units (PMUs) for mountain goats in Idaho.



Selkirk PMU

Selkirk PMU includes mountain goats in the northern Selkirk Mountains and Hall Mountain portion of GMU 1. Land ownership in the northern portion of GMU 1 is primarily Idaho Panhandle National Forest and IDL. Small amounts of BLM and private land occur within the PMU. Mountain goat habitat extends north into British Columbia. Most mountain goats in the Hall Mountain area are found in Canada. Mountain goats occupy the highest rocky peaks and some lower elevation rocky areas along the Kootenai River.

Population

Mountain goats in the Selkirk PMU occupy a core population area primarily along the Selkirk Crest. We know little about historical numbers of mountain goats in the Selkirks. Reports indicate as many as 195 mountain goats resided in the Selkirks in the early 1950s (Brandborg 1955). Aerial surveys in the 1970s found <15 individuals. Most of the population surveys have been aerial surveys; however, 1 ground survey was attempted. There was no consistency in timing of surveys, which ranged from February to August. Mountain goats have been observed from the Canadian border to Hunt Peak. Translocations of mountain goats from Snow Peak in GMU 9 began in 1981 and continued until 1994 (Appendix B). Over 6 years, 19 mountain goats were placed in Lion, Bugle, Parker, and Ball creeks. In 2001, 34 mountain goats were counted in the Selkirk PMU; Hall Mountain was not surveyed. Four alpine ground surveys were conducted 43 within the Selkirk PMU between 2019 and 2023 with no mountain goats detected. The recent aerial survey in 2020 found 58 mountain goats suggesting that the population has been growing.

Populations Surveys- Selkirk PMU								
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Unk**	**Total**	**Kid:Ad***
All PMU	Aerial	2020	Feb	47	6	5	**58**	13
All PMU	Aerial	2001	May	26	8	0	**34**	31
All PMU	Aerial	1995	Feb	30	3	0	**33**	10
All PMU	Aerial	1991	Mar	13	2	0	**15**	15

***Number of kids per 100 adults.**

Harvest

Mountain goats were harvested under a general season from 1957 to 1965. Controlled hunt tags were offered until 1970, after which the season was closed. Overharvest may have led to the decline in the Selkirk PMU mountain goats. In 2011, a hunt was opened with 1 tag that included both Selkirk and Cabinet PMUs. From 2011 to 2017, 4 billies were harvested from the Lion Creek area of Selkirk PMU. The GMU 1 tag was removed in 2019 to follow 2019-2024 Mountain Goat Management Plan harvest guidelines of allowing hunts in populations of at least 100 mountain goats where kid ratios are at least 15.

Current Issues

Much of the Selkirk PMU within Kaniksu National Forest is managed for motorized area closures to protect grizzly bears which likely benefits mountain goats. Core grizzly bear habitat covers much of the Selkirk PMU and the USFS prohibits motorized vehicles during spring to autumn months. The Idaho Panhandle National Forest signed the decision on the Kaniksu Oversnow Vehicle Travel Plan in December 2023. Mountain goat habitat was considered in designating areas open to over-snow vehicle use. Over-snow vehicle use is restricted in the majority of mountain goat habitat on national forest lands in the Selkirk PMU. Increasing use of snow machines, paired with changes in technology and motorized restrictions, could cumulatively affect wintering mountain goats in the Selkirk Mountains outside of Forest Service lands. Furthermore, heli-skiing operations are seeking to expand into the highest peaks of the Selkirks, which could cause disturbance from helicopter flights and backcountry skiing. Hiking and backpacking are popular in summer months.

Management Direction – IDFG will work to maintain a stable to increasing population with secure habitat in the Selkirk PMU.

Strategy – Continue to collaborate with Idaho Panhandle National Forest and IDL to minimize potential impact of recreation on mountain goats in the Selkirks.

Strategy – Work with Idaho Panhandle National Forest to identify ways to improve foraging habitat.

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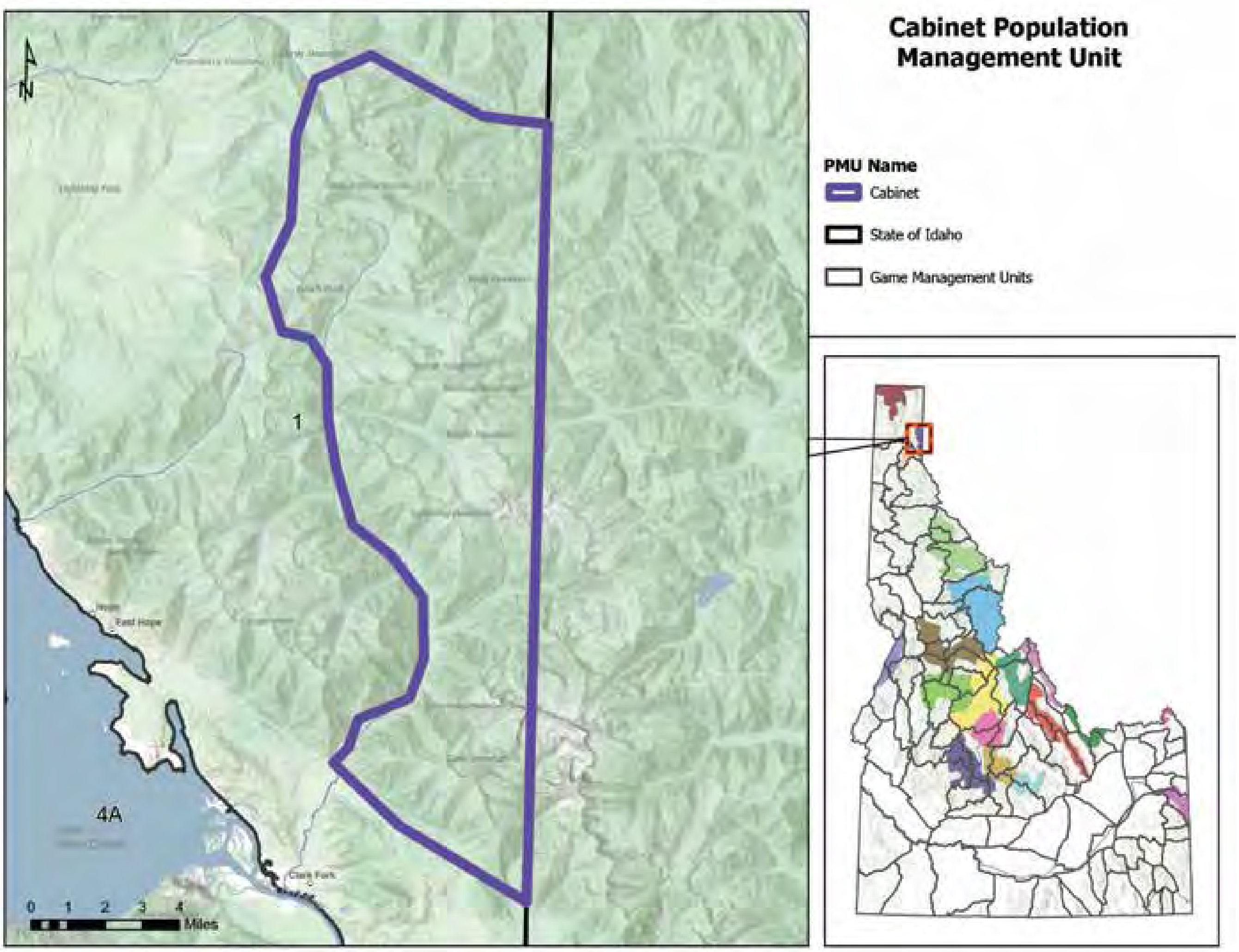


Cabinet PMU

The Cabinet PMU includes mountain goats in the West Cabinet Mountains, specifically between Lightning Creek and the Montana border in GMU 1. Most of this core population resides in Montana, but mountain goats are resident in Scotchman Peaks area. The majority of Cabinet PMU falls under the Idaho Roadless Rule within Idaho Panhandle National Forest. The southern part of the PMU is part of the proposed Scotchman Peaks Wilderness.

Population

All population surveys have been aerial surveys, usually by or in coordination with Montana Department of Fish, Wildlife and Parks. There was no consistency in timing of surveys, which ranged from February to August. During aerial surveys from 1981 and 2001, between 3 and 47 mountain goats were counted on the Idaho side of the West Cabinets. Including the Montana side, total mountain goat numbers have ranged from roughly 50 to 80. A population growth-rate analysis for the Montana portion of the West Cabinets found a declining population from 2000 to 2015 with a growth rate of 0.95 (Smith and DeCesare 2017). Two alpine ground surveys were conducted within the Cabinet PMU between 2019 and 2023 with no mountain goats detected.

Harvest

Mountain goats were harvested in Idaho under a general season from 1957 to 1965. Controlled hunt tags were offered until 1970, after which the season was closed due to lower population size. Idaho offered 1–2 any-weapon tags from 1989 to 1995. In 2011, a hunt was opened with 1 tag that included both Selkirk and Cabinet PMUs. From 2011 to 2018, 1 billy was harvested out of the Cabinet PMU. The GMU 1 tag was removed in 2019 to follow 2019-2024 Mountain Goat Management

Populations Surveys- Cabinet PMU								
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Unk**	**Total**	**Kid:Ad***
All PMU in ID only	Aerial	2020	Feb	9	1	1	**11**	11
All PMU in ID only	Aerial	2001	May	15	1	0	**16**	7
Includes MT	Aerial	2000	Aug	45	11	0	**56**	24
Includes MT	Aerial	1998	Aug	38	10	0	**48**	27
Includes MT	Aerial	1993	Feb	40	7	0	**47**	16
Includes MT	Aerial	1991	Mar	19	6	0	**25**	32

***Number of kids per 100 adults.**

Plan harvest guidelines of allowing hunts in populations of at least 100 mountain goats where kid ratios are at least 15. As of 2024, Montana Department of Fish, Wildlife, and Parks offered 1 tag for the West Cabinet population.

Current Issues

The main issue for mountain goats in the Cabinet PMU is negative interactions with hikers. Scotchman Peak is a very popular hiking trail into prime mountain goat habitat. Visitors enjoy seeing mountain goats; however, intentional and unintentional feeding of mountain goats, as well as urine left by hikers, has caused mountain goats in this area to become habituated and aggressive towards people. Recent efforts by local volunteers have improved visitor education and negative interactions with mountain goats have decreased.

The roadless nature of the Cabinet PMU protects mountain goats from some motorized disturbance. The Idaho Panhandle National Forest adopted the Kaniksu Over-snow Vehicle Travel Plan in December 2023. Mountain goat habitat was considered in designating areas open to over-snow vehicle use. Over-snow vehicle use is restricted in the majority of mountain goat habitat on national forest lands in the Cabinet PMU.

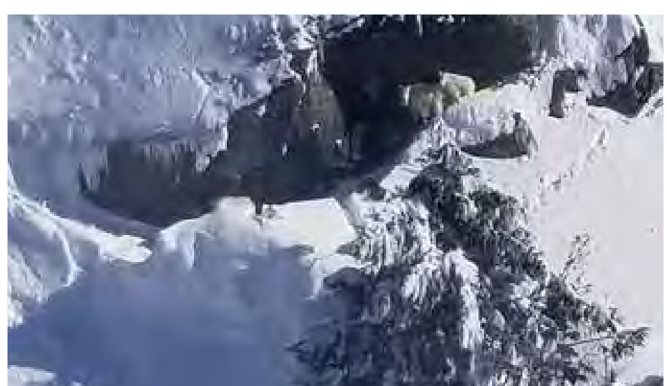
Management Direction – IDFG will work to decrease negative mountain goat-human interactions while maintaining a stable to increasing population in the Cabinet PMU.

Strategy – Continue to collaborate with Idaho Panhandle National Forest and Friends of Scotchman Peaks Wilderness to reduce potential conflicts between mountain goats and hikers using trails in Scotchman Peaks area.

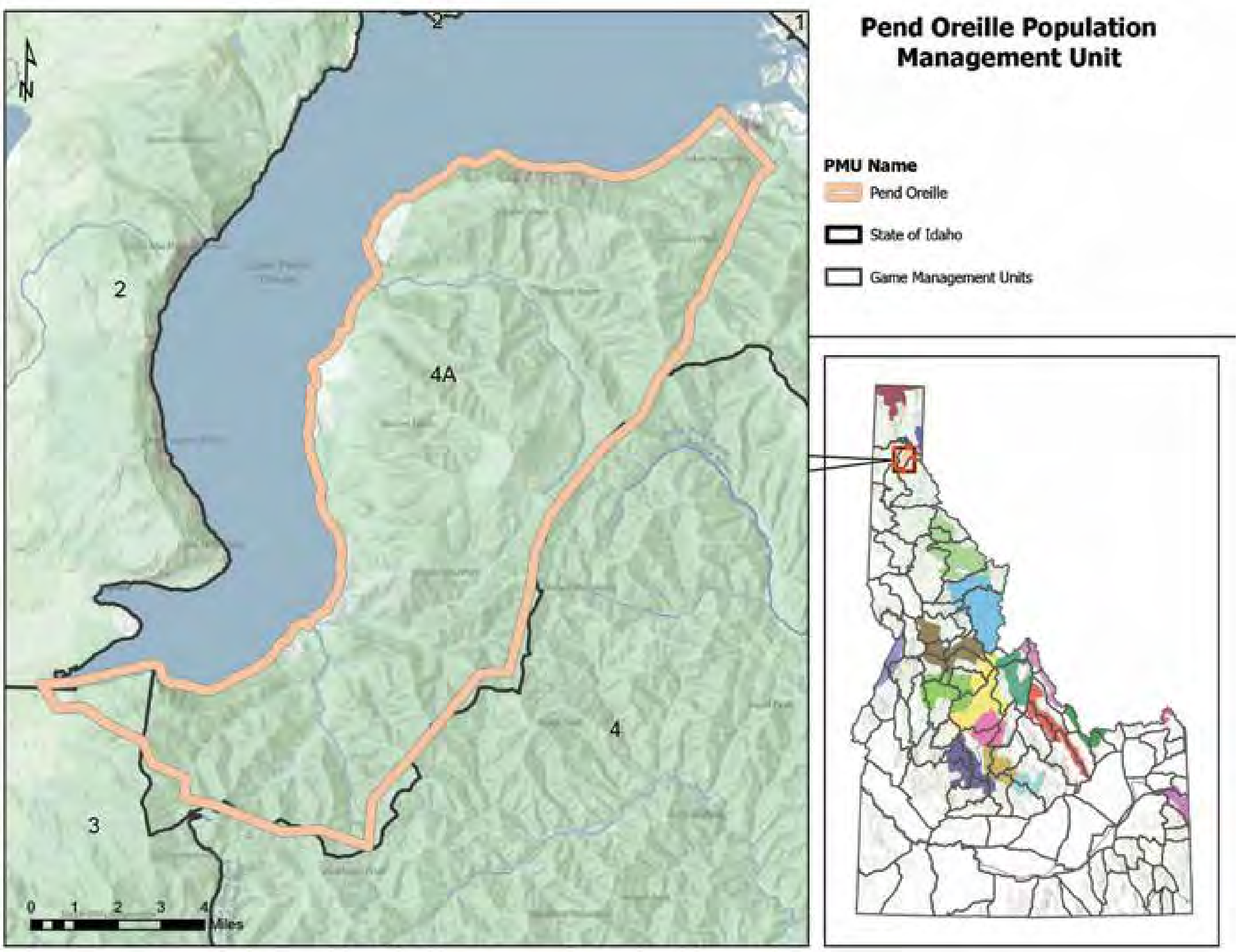
Strategy – Continue to collaborate with Idaho Panhandle National Forest to minimize potential impact of recreation on mountain goats in the Cabinets.

Strategy – Work with Idaho Panhandle National Forest to identify ways to improve foraging habitat.

Strategy – Coordinate with Montana Department of Fish, Wildlife and Parks on surveys, monitoring, and potential harvest.



Mountain Goats CCBY IDAHO FISH AND GAME



Pend Oreille PMU

The Pend Oreille PMU includes an introduced population of mountain goats located in GMU 4A. Mountain goats have been found on Bernard Peak face and in the Green Monarchs. The USFS is the primary land manager in Pend Oreille PMU although there is some private land scattered throughout. Mountain goats inhabit a series of intermittent, precipitous cliffs that drop into Lake Pend Oreille.

Population

Historically, mountain goats were not thought to have inhabited the area south of Lake Pend Oreille. Between 1960 and 1968, approximately 20 mountain goats were translocated from Snow Peak in GMU 9 (Appendix B). Now Pend Oreille PMU has a core population located in Bernard Peak area with some mountain goats found to the east. Most population surveys have been aerial surveys; however, ground and boat surveys have occurred. There was no consistency in timing of surveys, which ranged from February to October. The population increased through the 1970s and 1980s. The highest aerial survey count was 41 animals in 1984. The most recent survey in 2001 found 31 mountain goats. Mountain goats are still regularly observed by boaters on Lake Pend Oreille, but population levels are unknown.

Harvest

The only hunting allowed in Pend Oreille PMU was an archery hunt between Lakeview and Johnson Creek with 2 controlled hunt tags, which opened in 1977. This hunt area excluded the main Bernard Peak population because of popularity with wildlife viewers. The hunt was closed in 1993 due to low numbers of mountain goats.

Populations Surveys- Pend Oreille PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
All PMU	Aerial	2001	May	27	4	**31**	15
All PMU	Aerial	1995	Mar	13	2	**15**	15
All PMU	Aerial	1992	Mar	15	6	**21**	40
All PMU	Aerial	1991	Mar	11	4	**15**	36

***Number of kids per 100 adults.**

Current Issues

Pend Oreille PMU mountain goats are highly visible from a boat on Lake Pend Oreille and across the lake from Farragut State Park. They offer a unique opportunity for non-consumptive viewing by visitors and recreational boaters around Bayview.

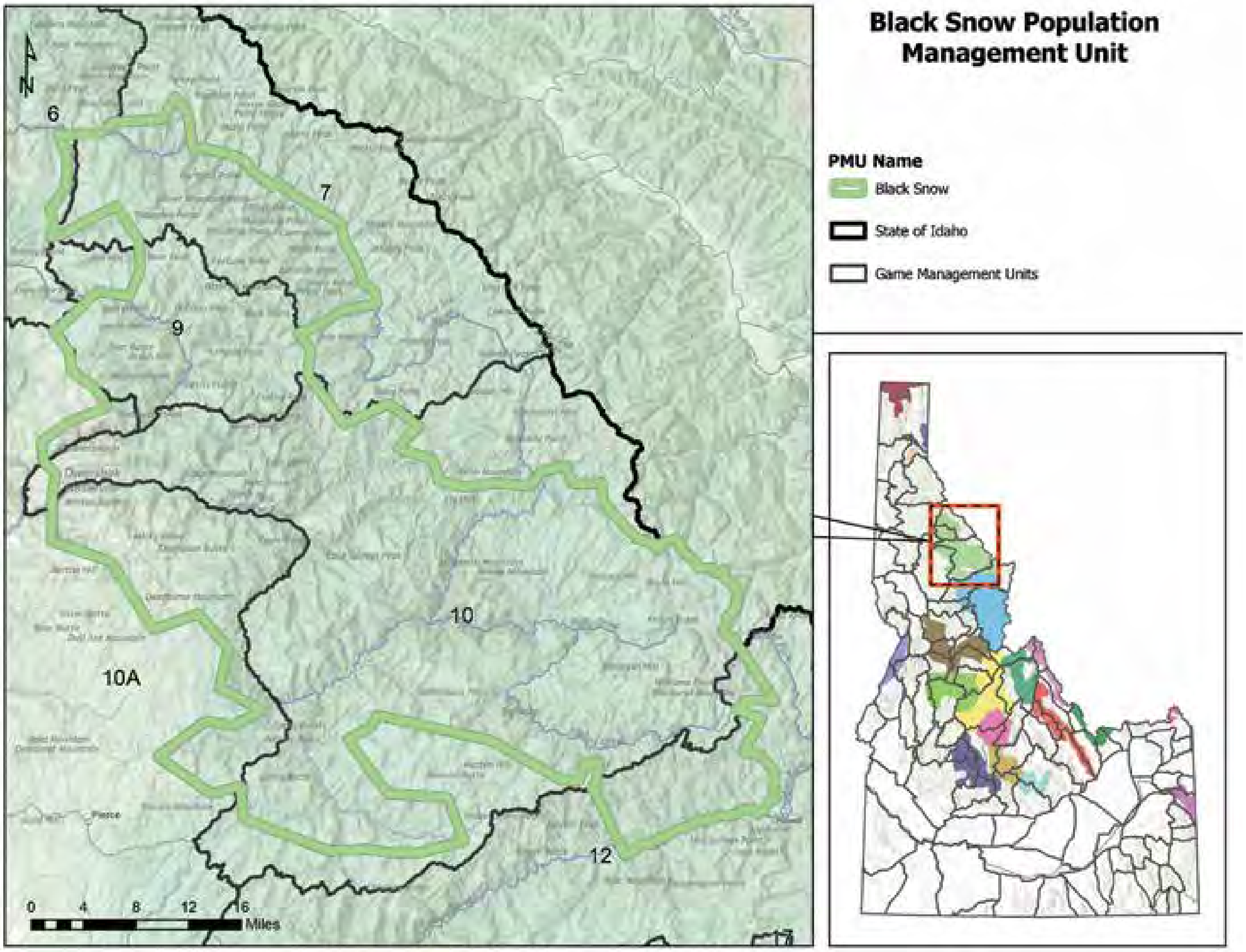
Mountain goats in the Bernard Peak area are not easily disturbed by motorized or non-motorized recreation due to lack of roads or trails. The Idaho Panhandle National adopted the Kaniksu Over-snow Vehicle Travel Plan in December 2023. Mountain goat habitat was considered in designating areas open to over-snow vehicle use. Over-snow vehicle use is restricted in the majority of mountain goat habitat on national forest lands near Bernard Peak. Increasing interest in riding snow machines, paired with changes in technology and motorized restrictions, could cumulatively impact wintering mountain goats in Pend Oreille PMU outside the Bernard Peak area.

Management Direction –IDFG will work to maintain a stable to increasing population with secure habitat in the Pend Oreille PMU.

Strategy – Continue to collaborate with Idaho Panhandle National Forest to minimize potential impact of recreation on mountain goats in Bernard Peak area.

Strategy – Install educational signage regarding mountain goat ecology at Farragut State Park.

Mountain Goat CCBY IDAHO FISH AND GAME



Black Snow PMU

The Black Snow PMU includes mountain goat habitat within GMUs 7, 9, 10, 10A, and 12. Most of this PMU is within the Idaho Panhandle and Nez Perce-Clearwater National Forests along with IDFG Snow Peak Wildlife Management Area in GMU 9. Idaho Department of Lands and private timber company parcels are scattered in GMUs 7 and 10A. Most currently occupied mountain goat habitat is covered under the Idaho Roadless Rule. Mountain goats between Snow Peak and Black Mountain reside in the Mallard Larkins Primitive area. Much of the Black Snow PMU is heavily forested and mountain goats are found on isolated rocky areas, as well as on the highest rocky peaks.

Population

The Black Snow PMU likely has a metapopulation structure with 2 core areas, one in the Black Mountain-Snow Peak area and one in the eastern portion of GMUs 10 and 12, with scattered small groups spread throughout the PMU. Most population surveys have been aerial surveys; however, 1 ground survey was attempted in GMU 7. Surveys occurred in late winter or spring. Historically, there were likely more mountain goats than seen during the first aerial survey in 1957 when the highest count of 93 occurred in GMU 9. Snow Peak and Black Mountain areas provided primary translocation stock for the rest of Idaho. Between 1960 and 1998, approximately 140 mountain goats were translocated out of Black Snow PMU. Counts during 51 aerial surveys in GMU 9 and 10 remained relatively stable during mountain goat trapping, indicating a stable to increasing population. The most recent survey

Populations Surveys- Black Snow PMU								
Area	Method	Year	Month	Adult	Kid	Unk	Total	Kid:Ad*
All PMU	Aerial	2023	April	97	16	4	**117**	16
All PMU	Aerial	2017	May	107	21	0	**128**	20
GMU 10	Aerial	2010	Apr-Jun	39	8	100	**147****	17
GMU 10	Aerial***	2005	Apr-May			101	**101**	±17
GMU 10	Aerial***	2002	Apr-May			98	**98**	±17
GMU 7, 9	Aerial	2001	May	47	13	0	**60**	28
GMU 9	Aerial	1993	Feb	46	14	0	**60**	30
GMU 9	Aerial	1991	Mar	34	9	0	**43**	26

***Number of kids per 100 adults.**
****Includes 100±7 from Isabella-Collins Creek mark-resight population estimate.**
*****Only includes Isabella-Collins Creek mark-resight population estimate.**

in 2023 encountered 117 mountain goats in Black Snow PMU; however, the eastern portion of the PMU showed a substantial decline from the previous survey. Mountain goats in GMU 9 historically appeared restricted to the North Fork of Clearwater River drainage, but in the 1990s observations started coming from Sisters Creek along St. Joe River in GMU 7. This area is mostly forested, with limited small rocky outcrops. Two mountain goats were affixed with GPS collars in GMU 10 in January 2018 for the purpose of monitoring survival, movement, and habitat use. One alpine ground survey was conducted within the Black Snow PMU between 2019 and 2023 with no mountain goats detected.

Harvest

In the mid-1950s, ≥50 mountain goats were harvested during a general-season hunt in Black Snow PMU within a 2-year period, much greater than the average of 5 mountain goats every 2 years from 2017 to 2024. Snow Peak was closed to harvest in 1958 and was managed as a statewide source of translocation stock for 40 years. A general season in the rest of Black Snow PMU ran until 1965 and controlled hunt tags have been offered since 1966. General season and liberal controlled hunts likely caused an overharvest in the Black Snow population, but the population recovered to levels that sustained regular translocation removal. Approximately 20 controlled hunt tags were offered in the late 1960s compared with 3–7 tags in 1–3 hunt areas in recent decades. High female harvest rates in GMU 10 hunt areas resulted in a reduction from 3 to 1 tag between 2019-2025. Currently, 2 tags are offered across 2 hunt areas in Black Snow PMU. Across the Black Snow PMU, hunter harvest success has been 74% and female harvest has averaged 32% over the last 10 years.

Current Issues

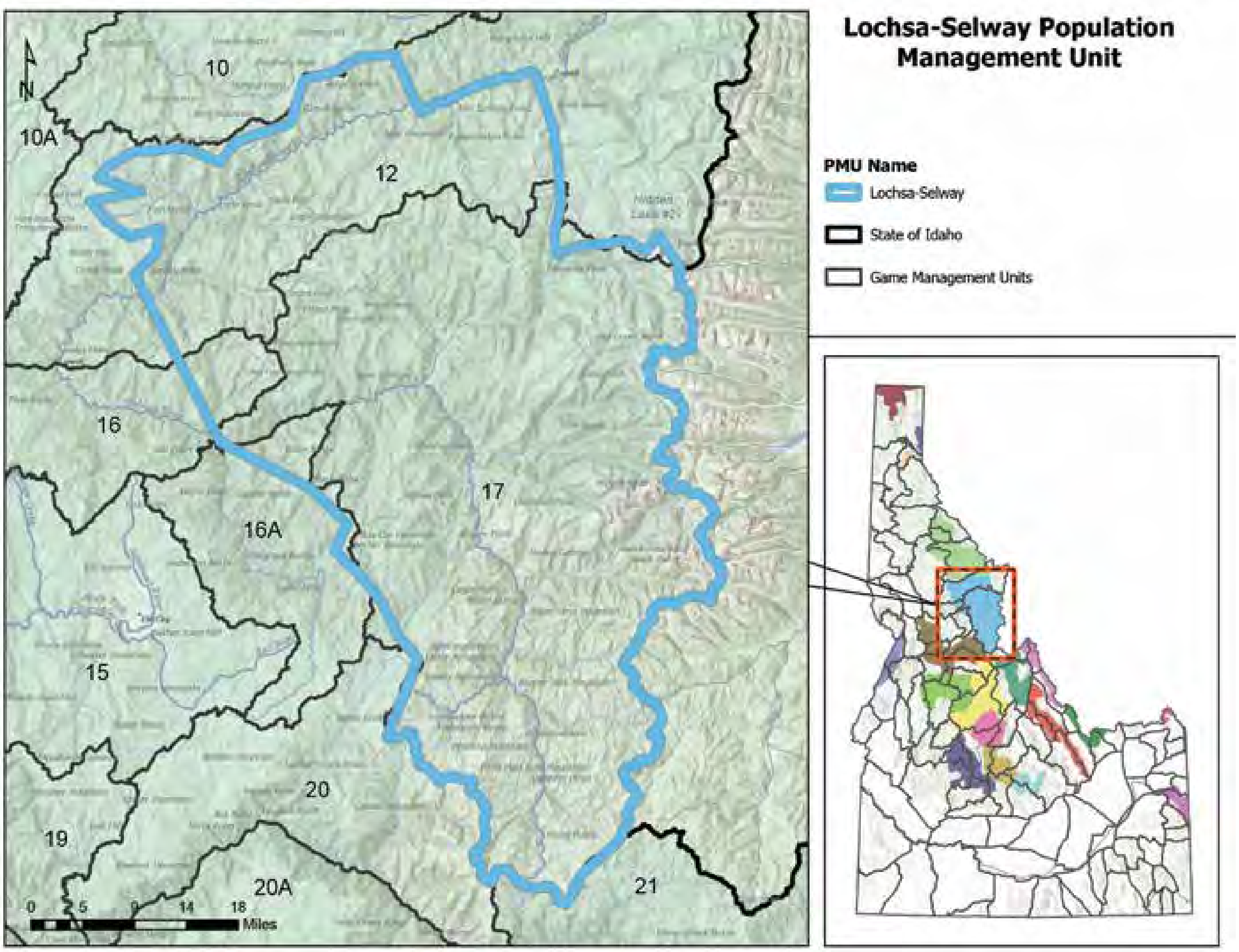
There are concerns with increasing snowmobile and snow bike access to mountain goat habitat in both the western part of GMU 9 and eastern portion of GMU 10. High road densities have potential to impact mountain goats in GMU 7. While population surveys have remained relatively consistent in GMUs 7 and 9, GMU 10 saw a population decline in the most recent survey. Additionally, high nanny harvest in GMU 10 has raised concerns for herd productivity.

Management Direction – IDFG will work to maintain a stable to increasing mountain goat population in the Black Snow PMU.

Strategy – Continue to collaborate with the Idaho Panhandle and Nez Perce-Clearwater National Forests and the BLM to minimize potential impact of recreation on mountain goats.

Strategy – Continue to work with the Idaho Panhandle and Nez Perce-Clearwater National Forests to improve foraging habitat.

Strategy – Take additional steps to reduce the number of females in the harvest.



Lochsa-Selway PMU

Mountain goats in the Lochsa-Selway PMU are found primarily along the Idaho-Montana border and in rocky cliffs in the Lochsa and Selway river drainages in GMUs 12 and 17. Nearly all the land within this PMU is managed by the USFS and much of the mountain goat habitat is located within designated wilderness. Areas of GMUs 16 and 16A would have been included in this PMU, but forest encroachment has eliminated much of the habitat that is suitable to mountain goats, and they have not been observed there in decades.

The 2 GMUs (12 and 17) differ in their history and accessibility. Highway 12 along the Lochsa River (Middle Fork of the Clearwater River) was completed in 1962 and subsequent side roads were built over time, which increased access to mountain goats in GMU 12. GMU 17 was designated as wilderness in 1964 as part of the Selway-Bitterroot Wilderness. This wilderness designation grandfathered a limited road system though a portion of the GMU, maintaining relatively low access to habitat where mountain goats occur.

Population

These populations were surveyed regularly until 1996 when they were dropped from the regular survey rotation. The Lochsa population varied from a high of 85 mountain goats in 1987 to 48 in 1996, the last year of surveys. Mountain goats are still observed through much of the area at low densities, but population levels are unknown. The last complete survey of the Selway population occurred in 1994, when 151 mountain goats were observed. A smaller survey, targeting only prime mountain goat habitat, in the same area in 2014 revealed only 19 mountain goats. There has not been a hunt in the Lochsa-Selway

Populations Surveys- Lochsa-Selway PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
GMU 12	Aerial	1996	May	43	5	**48**	12
GMU 17	Aerial	1994	May	127	24	**151**	19
GMU 17	Aerial	1991	May	122	44	**166**	36

***Number of kids per 100 adults.**

PMU since the 1980s and mountain goats have seemingly continued to decline in the Selway based on anecdotal observations. However, Montana maintained hunts long after Idaho stopped hunting this population, which may have contributed to the population decline. Six alpine ground surveys were conducted within the Lochsa-Selway PMU between 2019 and 2023 with no mountain goats detected.

These populations are not well understood but are likely a series of loosely connected groups functioning as a meta-population. No mountain goats have been translocated into or out of this population.

Harvest

All of this PMU and surrounding area was managed under a general season hunt until 1967, when it was converted to controlled hunts. Between 1967 and the mid-1970s controlled hunt tags increased in the PMU while hunt area size decreased. This progression stemmed from improved understanding of mountain goat population status and distribution and efforts to offer more opportunity in a more controlled manner. Controlled hunt tag numbers peaked in the mid-1970s and declined to 17 tags in 1981. There have been no hunts in the Lochsa-Selway PMU since 1982, when 1 tag was offered.

Current Issues

The abundance of the Lochsa-Selway population is unknown. There is also a lack of knowledge of how populations in the Lochsa-Selway PMU may or may not interact as a meta-population. In parts of GMUs 12 and 17, timber encroachment on small islands of habitat due to fire suppression has likely impacted mountain goat distribution over the last 65 years.

Management Direction – IDFG will work to maintain a stable to increasing mountain goat population in the Lochsa-Selway PMU.

Strategy – Continue to collect information on the size and distribution of this population whenever possible, including aerial and ground sightings during other projects.

Strategy – Continue to work with the Nez Perce-Clearwater National Forest to identify ways to improve foraging habitat, population connectivity, and mitigate impacts of timber encroachment on mountain goat habitat.

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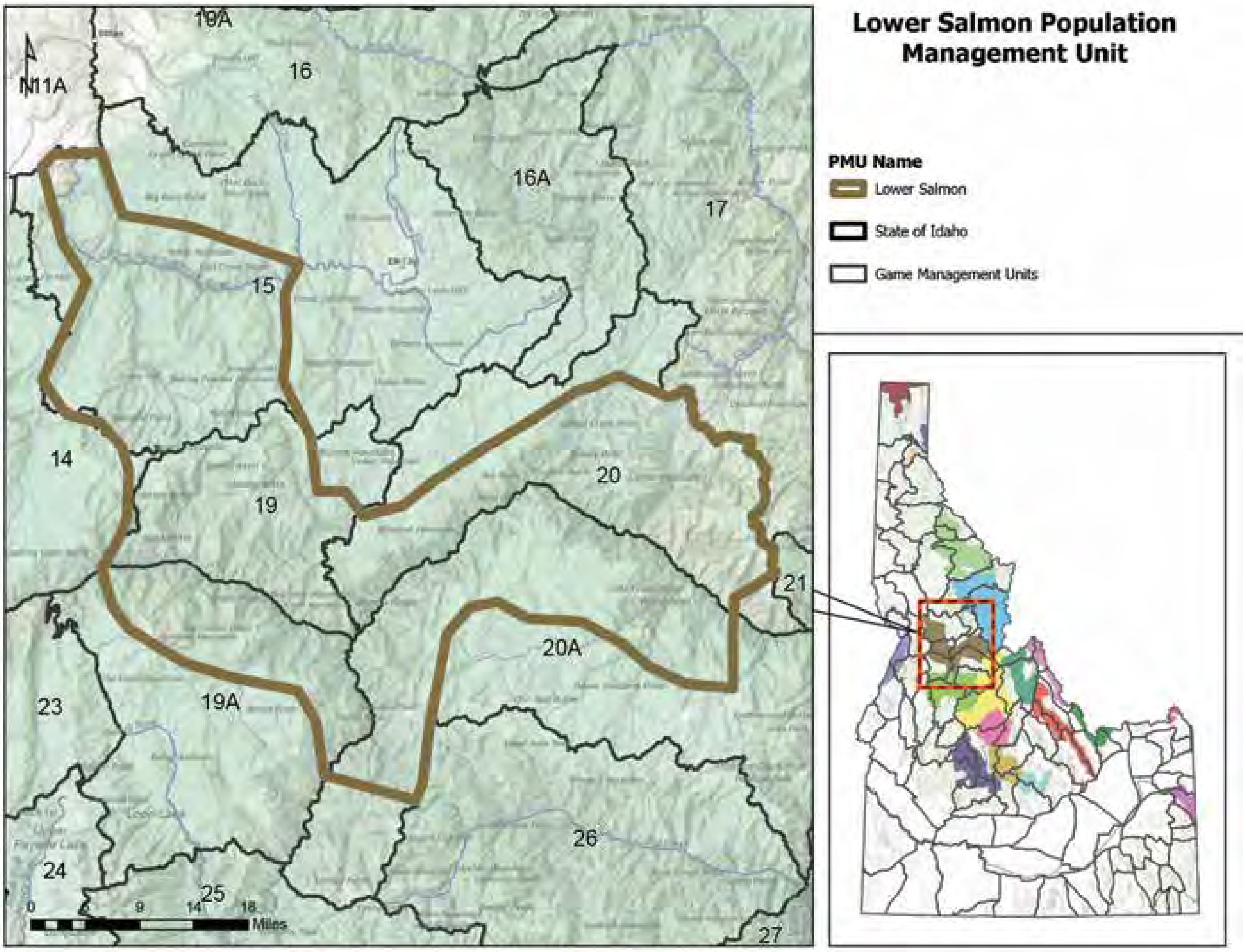


Lower Salmon PMU

The Lower Salmon PMU includes mountain goats along the South Fork Clearwater River in GMU 15 from Mill Creek to Tenmile Creek, drops south to include both sides of the Salmon River from the mouth of Wind River in GMUs 19 and 19A, and east to the mouth of Disappointment Creek in GMUs 20 and 20A. The east side of the South Fork Salmon River up to Elk Creek is also included within the PMU boundary. This PMU falls within parts of the Nez Perce-Clearwater, Bitterroot, and Payette National Forests and much of the PMU is located within the Gospel-Hump and Frank Church-River of No Return (FCRONR) wilderness areas. Mountain goat habitat in the Lower Salmon PMU consists largely of broken, river-canyon cliffs, but also includes several subalpine basins. Mountain goats in this PMU are very sparsely distributed in small groups and connectivity is very low.

Population

Earliest population estimates for the Lower Salmon PMU come from USFS reports and an IDFG research project initiated in 1949. Brandborg (1955) estimated there were approximately 160 mountain goats in this PMU in the mid-1950s. The first IDFG aerial surveys began in 1961. Early data was collected during partial, intermittent mountain goat surveys or incidentally during elk surveys. The first full mountain goat survey in lower South Fork Salmon River (South Fork) and south side of the Salmon River (South Main); 92 animals were counted on the north side of the Salmon River (North Main) and in GMU 15. In 1990, another full mountain goat survey was conducted on the South Fork and South Main where 36 mountain goats were observed. In 1993, a full survey of the North Main yielded 49 mountain goats. No mountain goat-specific surveys have occurred along the North Main since that time.

Populations Surveys- Lower Salmon PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
GMU 20A**	Aerial	2003	Apr	2	1	**3**	50
GMU 19, 20	Aerial	1993	Apr	43	6	**49**	14
GMU 19A, 20A**	Aerial	1990	Apr	31	5	**36**	14

***Number of kids per 100 adults.**
****Only includes a portion of 20A.**

The last full survey of the South Fork and South Main occurred in 2003, when observers counted only 3 mountain goats. One alpine ground survey was conducted within the Lower Salmon PMU between 2019 and 2023 with no mountain goats detected.

Seventy mountain goats, spread over 12 events, were translocated into the Lower Salmon PMU from 1966 to 2003 (Appendix B).

Harvest

Mountain goats in the Lower Salmon PMU were hunted under a general-season framework during 1945–1947. In 1952, IDFG opened 2 controlled hunts, offering 5 tags. A general season was opened in 1957 that included the area north of the Salmon River with the exception of the upper Lochsa River and a controlled hunt area in Big Mallard Creek. IDFG reduced the general-season area to GMU 20 (still excluding Big Mallard Creek) by 1959 and eventually closed the hunt in 1967. In 1963, 2 controlled hunts were opened on the south side of the Salmon River with 8 tags total. In 1972, 2 additional controlled hunts were opened on the north side of the Salmon River offering 4 tags. Mountain goat numbers in the PMU began to decline and IDFG reduced tag numbers and ultimately closed all hunts in this PMU by 1983. No harvest has occurred along South Fork Clearwater River.

Current Issues

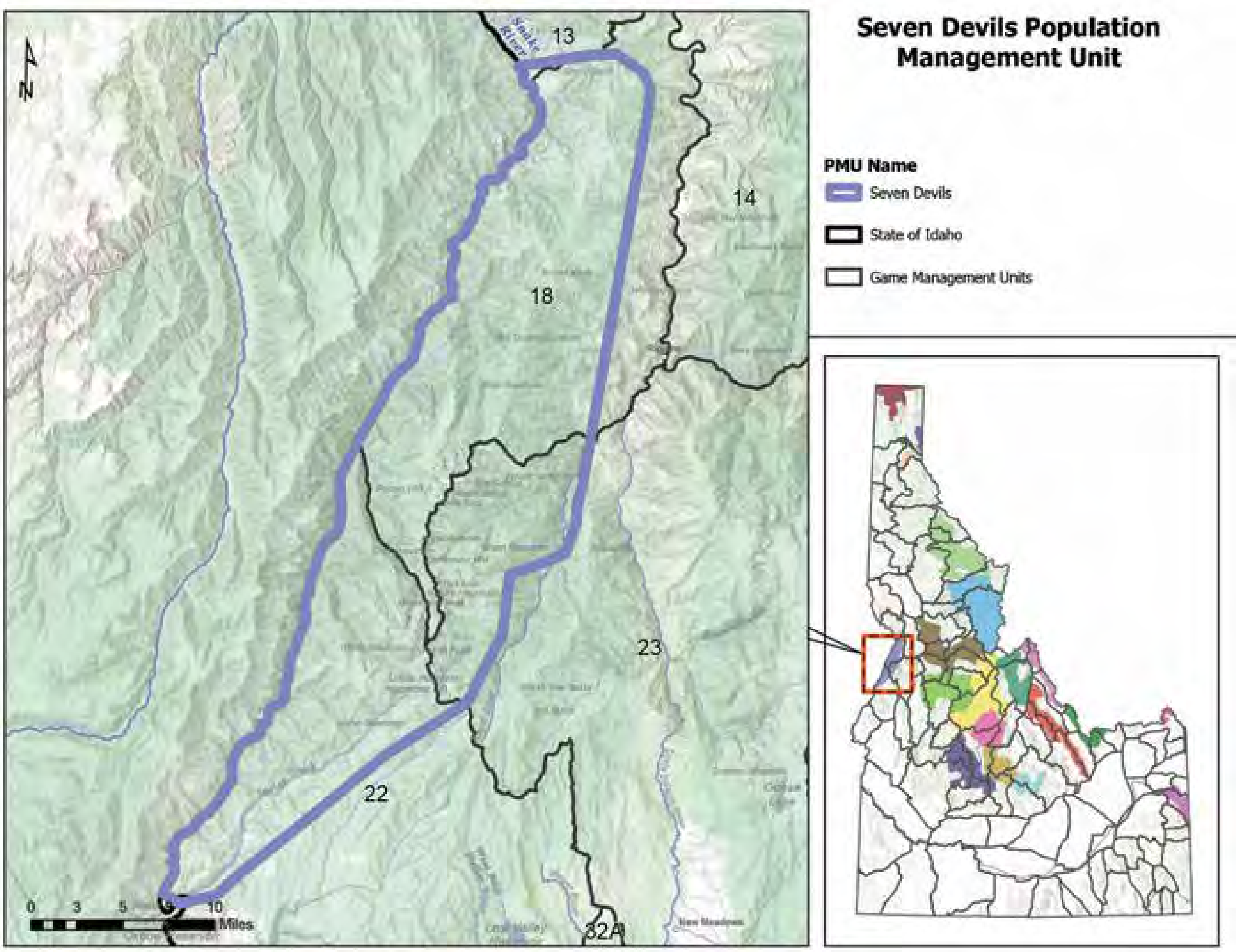
Population size and distribution of mountain goats in the Lower Salmon PMU is poorly understood. No harvest has been allowed in the PMU since 1982, but the population still appears to be declining. Groups are widely dispersed and interaction between groups is unlikely. Therefore, population augmentation through translocations may be the most effective means of rebuilding this population. Most habitat in the Lower Salmon PMU is remote and unroaded. Thus, potential impacts of motorized and non-motorized recreation are minimal.

Management Direction – IDFG will work to increase populations within the Lower Salmon PMU.

Strategy – Continue to collect survey information on mountain goat populations in the Lower Salmon PMU while concurrently surveying for other species.

Strategy – Continue to collaborate with the Nez Perce-Clearwater, Bitterroot, and Payette National Forests to minimize potential impact of recreation on mountain goats and consider potential projects to improve mountain goat habitat.

Strategy – Evaluate potential for successful translocations of mountain goats into historically occupied portions of this PMU to restore healthy populations



Seven Devils

The Seven Devils PMU (GMUs 18, 22 and 23) is primarily managed by the USFS (Wallowa-Whitman, Nez Perce-Clearwater, and Payette National Forests) and includes smaller portions of land owned by BLM. A large portion of the area used by mountain goats is contained within the Hells Canyon Wilderness, which is the deepest river gorge in North America (2,436 m [7,993 ft]) and is split by the Snake River between Oregon and Idaho.

Lower elevations within the PMU are dominated by dry, barren, steep slopes and rim-rock that reach to the Snake River canyon. Higher elevations are dominated by towering peaks, rock-faced slopes, and alpine lakes of the Seven Devils Mountain Range. The area contains an extensive amount of mountain goat habitat. In addition to having a full suite of potential predators (black bear, mountain lion, and gray wolf), the PMU supports healthy populations of elk, mule deer (*O. hemionus*), and white-tailed deer (*O. virginianus*), as well as a population of bighorn sheep.

Population

Mountain goats in this PMU were historically counted incidentally during elk surveys. Beginning in the early 1980s, helicopters were used to conduct mountain goat surveys. In the late 1990s and into the mid-2000s, IDFG conducted research on estimating mountain goat numbers using helicopters and paintball mark-resight techniques (Pauley et al. 2006). Although early surveys did not include portions of GMU 22 containing mountain goats, paintball surveys and later helicopter surveys included GMU 22 and showed a generally growing population that peaked in 1999 at 237 (± 67) mountain goats. One

Populations Surveys- Seven Devils PMU								
Area	Method	Year	Month	Adult	Kid	Unk	Total	Kid:Ad*
GMU 18, 22	Aerial	2022	Apr	176	33	1	**210**	19
GMU 18, 22	Aerial	2013	Apr-May	90	26	0	**116**	29
GMU 18, 22	Aerial**	2007	Apr-May			194	**194**	Unk
GMU 18, 22	Aerial**	2002	Apr			196	**196**	Unk

***Number of kids per 100 adults.**
****Mark-resight population estimate (not minimum count).**

alpine ground survey was conducted within the Seven Devils PMU between 2019 and 2023 with 12 mountain goats detected.

The Seven Devils PMU received translocations to augment the population in the 1960s. Between 1999 and 2003 this population was used as a source population for augmenting the Lower Salmon PMU (Appendix B). Currently this population appears to be stable.

Harvest

Hunts in parts of this PMU (GMU 18 portion and a small part of GMU 23) were started in 1970 as a controlled hunt with 5 tags. This continued with minor boundary changes (including portions of GMU 22 in the late 1990s) until 2003 when the hunt areas were split into 2 hunts, GMU 18 and GMU 22 with 4 tags each. In 2020, both hunt areas had a reduction in controlled hunt tags from 4 to 3. Hunter success has averaged 90% over the last 10 years with females making up 23% of the harvest.

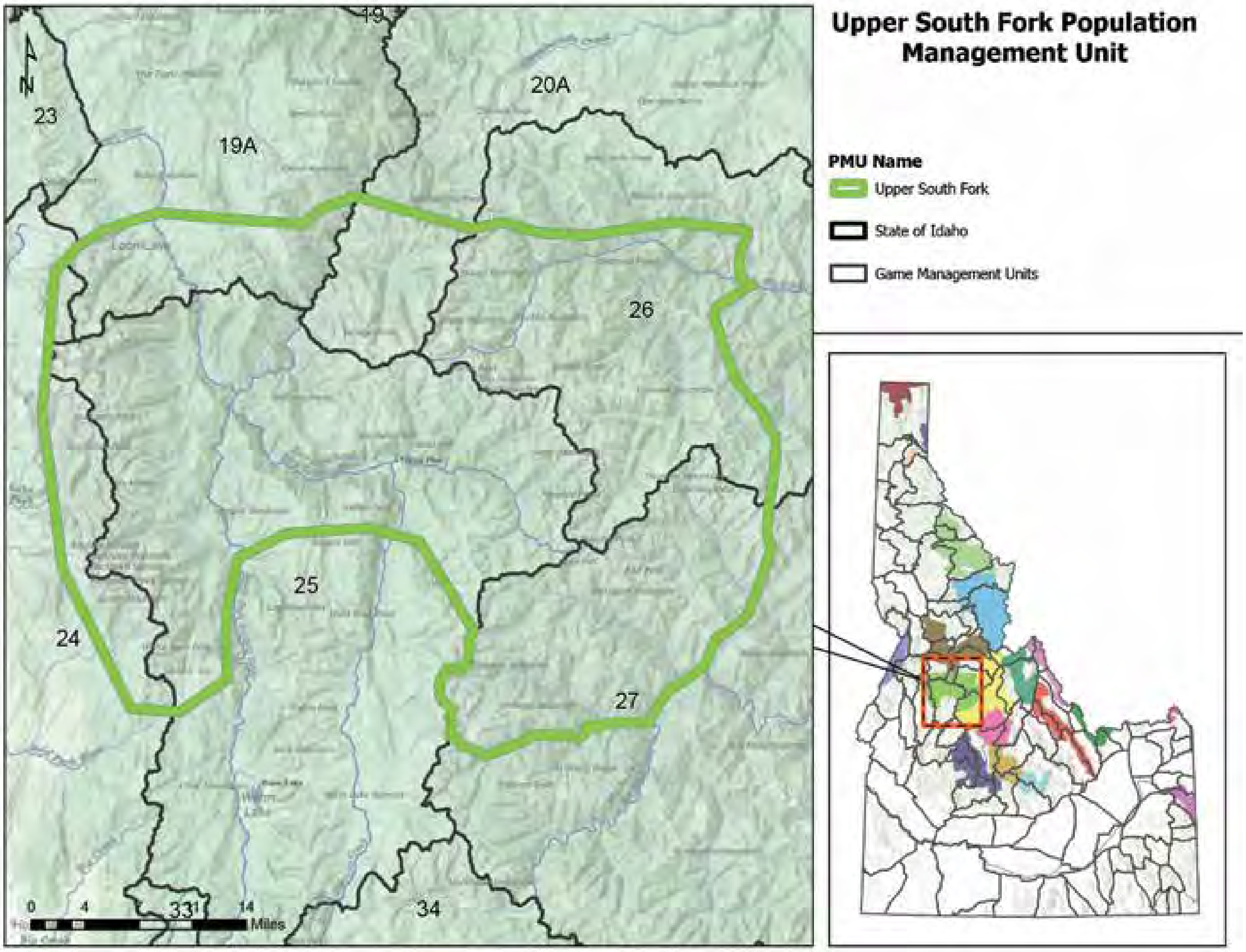
Current Issues

The majority of the Seven Devils PMU is within the Hells Canyon Wilderness, which precludes motorized access. However, hiking and backpacking is very popular during the summer months. This area is also popular with pack goat users. Because mountain goats in this PMU share winter range with bighorn sheep, there is a risk of pathogen exposure and transmission among domestic livestock, mountain goats, and bighorn sheep.

Mountain goat habitat is very limited in GMU 22. Accordingly, all harvest for this portion of the PMU (3 tags) comes from a small area. In addition, female harvest is a concern and may be suppressing potential growth of this population.

Management Direction – IDFG will work to maintain a stable to increasing mountain goat population in the Seven Devils PMU.

> **Strategy** – Continue to collaborate with the Wallowa-Whitman, Nez Perce-Clearwater, and Payette National Forests to minimize potential impact of recreation on mountain goats.



Upper South Fork PMU

The Upper South Fork PMU includes mountain goats in the Salmon River Mountains extending from Lick Creek range on the border of GMUs 19A, 24, and 25, along ridgelines dividing Big Creek drainage from the East Fork of South Fork Salmon River drainage (on the borders of GMUs 25, 26, and 20A) to the highest ridges on the west side of GMU 27. Mountain goats occur in small scattered groups in Lick Creek and Fitsum Creek areas on the west side of GMU 25 and southwest part of 19A, around the Pinnacles on the border of GMUs 25 and 26, along the upper ends of Big Creek, Monumental Creek, and West Fork Monumental Creek in GMU 26, and on Big Baldy Ridge, Murphy Peak, Red Peak, and Red Ridge in GMU 27. Land ownership in this PMU is almost exclusively USFS. Upper South Fork PMU includes parts of Payette, Boise, and Salmon-Challis National Forests and also occurs in the Frank Church River of No Return (FCRONR) Wilderness. Mountain goat habitat in this area is extensive and consists primarily of high granite ridgelines and cirque lake basins.

Population

Population data for the Upper South Fork PMU primarily includes mountain goat counts in the western and central portions of the PMU. Earliest population estimates were produced by the USFS Krassel Ranger District, which estimated 65–95 mountain goats in the Buckhorn Creek-Fitsum Creek-Lick Creek-Enos Lake area and 60 mountain goats in the upper Big Creek-Monumental Creek area (Brandborg 1955). IDFG flight records begin in 1959, and partial surveys continued every 1–3 years until the early 1980s. The first complete aerial survey was conducted in March 1982, which documented 41 mountain goats in Buckhorn-Fitsum-Lick-Enos area and

Populations Surveys- Upper South Fork PMU							
Area	Method	Year	Month	Adult	Kid	Total	Kid:Ad*
GMU 27**	Ground	2020	Aug	49	16	**65**	33
GMU 27**	Aerial	2020	Mar	29	3	**32**	10
GMU 25, 26**	Aerial	2018	Jul	39	8	**47**	21
GMU 25, 26**	Ground	2016	Jul	22	9	**38**	41
GMU 25, 26**	Aerial	2003	Apr	20	6	**26**	30
GMU 25, 26**	Aerial	1990	Apr	47	11	**58**	23

***Number of kids per 100 adults.**
****Only a portion of the GMU(s) were surveyed.**

39 in Big Creek-Monumental area. In April 1990, another full survey counted 8 and 50 mountain goats in the same respective areas. Another partial survey occurred in April of 2003. Observers counted 6 mountain goats in Lick-Enos area (Buckhorn-Fitsum area was not surveyed) and 20 in Big Creek-Monumental Creek area. Since that time, no aerial surveys were conducted, but sporadic sightings of mountain goats from ground observations have been recorded from IDFG and USFS personnel and the public. In 2016, with help from Rocky Mountain Goat Alliance (RMGA), IDFG performed a ground survey of the Pinnacles area in GMUs 25 and 26 and observed 38 mountain goats. In 2018, an aerial survey of the central portion of this PMU resulted in a count of 47 individuals with a kid:adult ratio of 21:100.

Little information exists for mountain goat counts on the west side of GMU 27. The only population information is from helicopter surveys in February 2006 and March 2020 where 27 and 32 mountain goats were observed, respectively, around Red Peak and Red Ridge. Ground crews observed 12 mountain goats on Red Ridge and Murphy Peak in July 2016. Seven alpine ground surveys were conducted within the Upper South Fork PMU between 2019 and 2023 with no mountain goats detected. In 2020, IDFG and RMGA conducted a ground survey of Red Ridge, Murphy Peak, and Big Baldy Ridge counting a total of 65 goats (kid:adult ratio of 33:100).

No translocations have occurred into or out of the Upper South Fork PMU.

Harvest

IDFG managed the portion of the Upper South Fork PMU in Valley County east of the South Fork Salmon River from 1943 to 1947 under a general-season framework. No harvest occurred in the PMU until 1959 when a portion of upper Big Creek, including Monumental Creek, was opened for a controlled hunt with 3 tags. By the early 1970s a total of 20 tags were allocated in Upper South Fork PMU. In 1978, IDFG closed the hunt area in the central portion of the PMU, and by 1980 and 1982, hunt areas on the west and east side, respectively, were also closed to hunting. In 2007, a hunt was opened on the east side of the PMU (including part of Middle Fork PMU in GMU 27) offering 2 tags and is currently the only mountain goat hunting opportunity offered in this PMU. Tag numbers were increased to 3 in 2021 and subsequently reduced back to 2 in 2023. Hunter success has averaged 77% over the past 10 years with females making up 47% of the harvest.

Current Issues

The majority of this PMU has been closed to hunting since 1982, but the mountain goat population appears to be declining. With 25 tags offered in a population where a maximum of approximately 100 mountain goats was ever observed, overharvest is the most likely cause for the initial decline. Information about current status of mountain goats in this PMU is lacking because a complete survey has not been conducted since 2003. However, current observations are widely dispersed across the PMU. Habitat in this PMU does not appear limiting. Due to sparse and widespread distribution, consideration of augmentation to help rebuild the population may be necessary. The amount of year-round recreation has been increasing rapidly, especially on the west side of the PMU in the Lick Creek area. As this area increases in popularity, there will continue to be additional risk of disturbance to declining mountain goat populations. High female harvest rates may be limiting population growth potential in a portion of the Upper South Fork PMU.

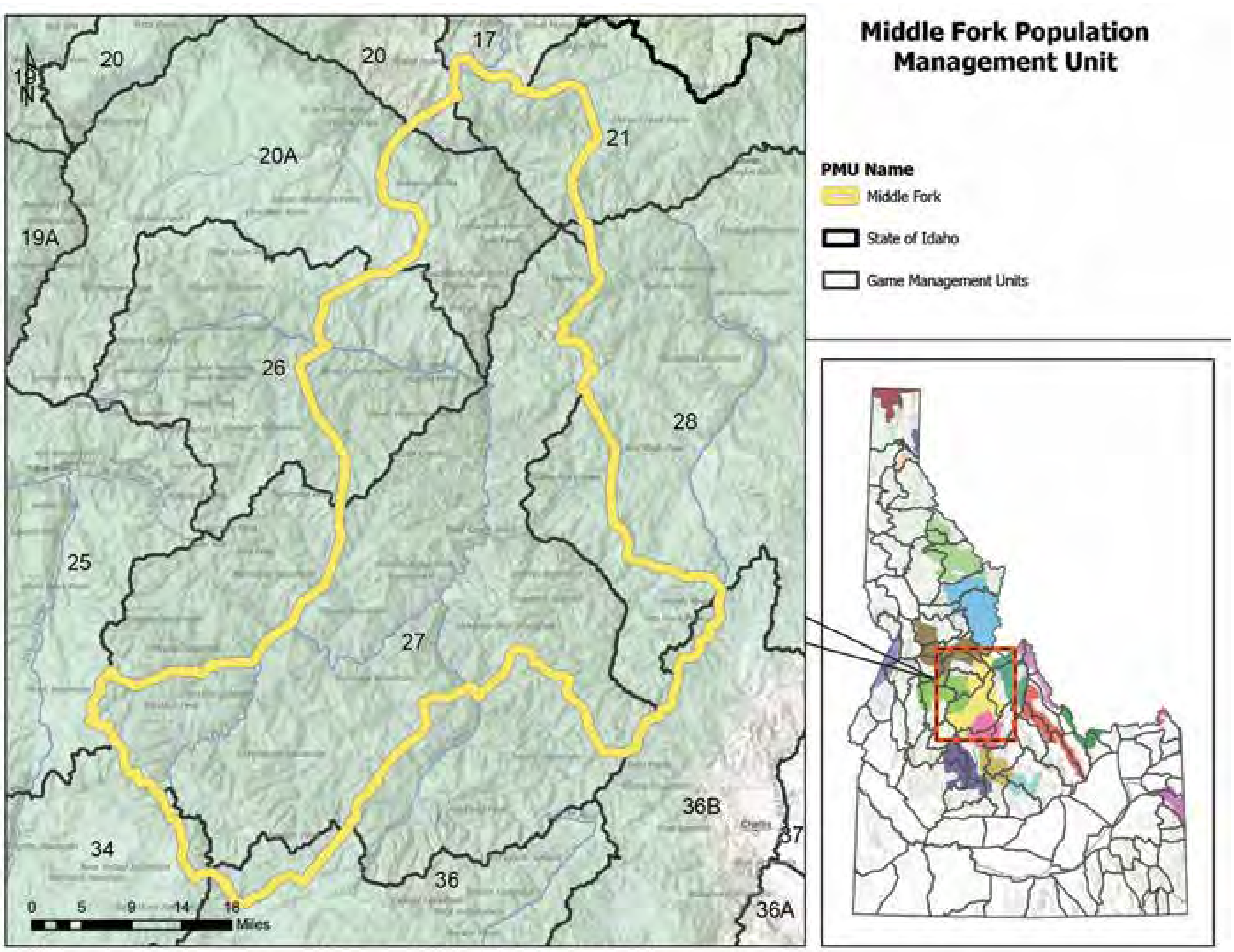
Management Direction– IDFG will work to increase the population and maintain secure habitat in Upper South Fork PMU.

Strategy – Collaborate with Payette, Boise, and Salmon-Challis National Forests to minimize potential impact of recreation on mountain goats

Strategy – Evaluate potential for successful translocations of mountain goats into historically occupied portions of this PMU to restore healthy populations.

Strategy – Take additional steps to reduce the number of females in the harvest.

Mountain Goats CCBY IDAHO FISH AND GAME



Middle Fork PMU

The Middle Fork PMU is comprised of mountain goats found in the Middle Fork Salmon River drainage in GMU 27, except for upper Loon Creek-Mayfield Creek area (included in Yankee Fork PMU) and portions of Marble and Pistol creeks (included in Upper South Fork PMU). The PMU also includes occupied habitat in Horse Creek drainage of GMU 21 and the farthest east portions of GMUs 20A and 26. Land ownership is primarily Salmon-Challis, Payette, and Boise National Forests. Almost the entire PMU falls within FCRONR Wilderness.

Population

Early population estimates in the Middle Fork PMU suggest there were approximately 435 mountain goats inhabiting the area (Brandborg 1955). Most of this data came from USFS estimates and an IDFG research project that began in 1949. Observations were obtained during both winter and summer. A partial survey in 1963 yielded an estimate of 68 individuals and another survey in 1982 that covered a comparable area indicated 71 animals. In a 1993 spring survey, observers counted 117 mountain goats over approximately the same area as the 1963 and 1982 surveys. The first survey of the entire PMU documented 169 individuals during spring 1999. The same area was covered again in 2006 and ≥157 mountain goats were observed. In 2020, a survey of the entire PMU was conducted with 137 mountain goats observed.

Two other areas within the PMU were surveyed at different times than indicated above. Occupied habitat in GMUs 20A and 26 was surveyed in 1982, 1990, 2003, and 2017 with 13, 13, 26, and 15 mountain goats observed, respectively. Horse Creek drainage in GMU 21 was surveyed in

Populations Surveys- Middle Fork PMU							
Area	Method	Year	Month	Adult	Kid	Total	Kid:Ad*
Entire PMU	Aerial	2020	Mar	108	29	**137**	27
GMU 20A, 26	Aerial	2017	Feb	11	4	**15**	27
GMU 21	Aerial	2010	Feb	6	3	**9**	50
GMU 27	Aerial	2006	Feb	132	25	**157**	19
GMU 27	Aerial	1999	Apr	152	17	**169**	11
GMU 27	Aerial	1993	Apr	101	16	**117**	16

***Number of kids per 100 adults.**

1996, 2001, 2005, and 2010 with 18, 6, 11, and 9 mountain goats observed, respectively. Thirteen alpine ground surveys were conducted within the Middle Fork PMU between 2019 and 2023 with one mountain goat detected.

Nine mountain goats were translocated into Jack Creek in GMU 27 in 1989. Eight were translocated into Ship Island Creek in 1991. Two releases of 10 animals each occurred in western GMU 21: at Square Top Mountain in 1994 and Corn Lake in 1997.

Harvest

Mountain goats in the Middle Fork PMU were harvested under a general-season framework during 1943–1945 in portions of Custer, Idaho, Lemhi, and Valley Counties. Except for within Custer County, general hunts in these areas continued until 1948, when all hunts were closed. IDFG established 5 controlled hunts in 1952, offering 19 tags in this PMU. Over the next 2 decades, new controlled hunts were added, existing hunt areas were adjusted, and tag numbers increased to a high of 59 tags across 13 different controlled hunts offered in 1974. Mountain goat populations began declining, and in 1975 IDFG reduced tag numbers and closed hunt areas. All hunts in this PMU were closed by 1984. IDFG opened a controlled hunt in 1993 with 2 tags. In 1999, another hunt was re-opened with 2 tags. Since that time, there have been 2–4 controlled hunts in the PMU with 4–6 tags. Currently, there are 2 controlled hunts offered in this PMU (1 is shared with the Upper South Fork PMU) that include 3 tags. Harvest success has been 65% and female harvest rate has been 38% over the last 10 years..

Current Issues

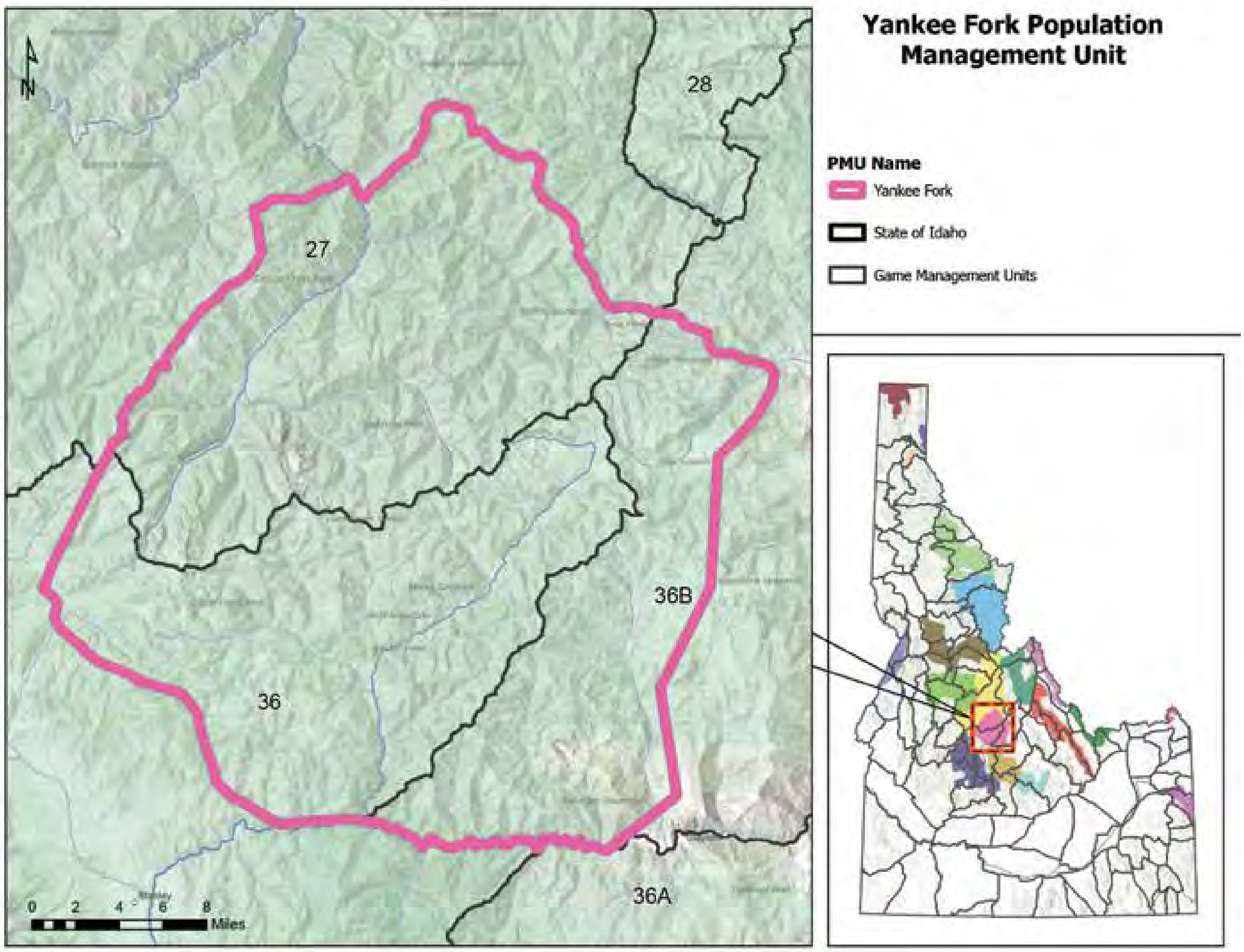
Most of this PMU is within designated wilderness area, so motorized recreation has little impact on mountain goats. Non-motorized recreation is very dispersed in summer and almost non-existent in winter. Mineral exploration has increased over the last several years in areas adjacent to the Salmon River where it runs through the PMU. Female harvest is a concern and may be suppressing potential growth of this population.

Management Direction – IDFG will work to increase the population and maintain secure habitat in the Middle Fork PMU.

Strategy – Take additional steps to reduce the number of females in the harvest.

Strategy – Explore the use of ground count surveys to provide data points between aerial surveys.

Mountain Goat CCBY IDAHO FISH AND GAME



Yankee Fork PMU

The Yankee Fork PMU includes the upper Loon Creek and Warms Springs Creek drainages in GMU 27, the Yankee Fork drainage in GMU 36, and the Squaw Creek and Thompson Creek drainages in GMU 36B. Land is managed primarily by Salmon-Challis National Forest, with private inholdings scattered throughout. Approximately one-half of the PMU lies within FCRNOR Wilderness Area. The area is characterized by high, rugged ridges and very steep drainages. Most mountain goats occupy ridge habitat of upper Loon Creek, Tango Creek, and Lightning Creek in GMUs 27 and 36; and ridges and peaks between Yankee Fork and Thompson Creek in GMU 36B.

Population

Brandborg (1955) reported an estimate of 30 mountain goats in the area between Cabin Creek Peak and Sherman Peak in 1953. More complete and targeted surveys of the entire PMU began in the early 1980s. The population appeared to be stable in the late 1980s to mid-1990s at approximately 150–200 mountain goats. The most recent survey for this PMU in 2012 yielded a minimum count of 212 individuals. During a bighorn sheep survey in February 2024, 53 mountain goats were observed in the southern part of the PMU around Bonanza Peak. Surveys have been conducted during winter and late spring and are usually done as part of elk or deer surveys. Ten alpine ground surveys were conducted within the Yankee Fork PMU between 2019 and 2023, no mountain goats were observed.

Populations Surveys- Yankee Fork PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
All PMU	Aerial	2012	Feb	162	49	**212**	30
All PMU	Aerial	2002	Apr	70	11	**81**	16
All PMU	Aerial	1994	Mar	140	29	**169**	21

***Number of kids per 100 adults.**

No mountain goats have been translocated into or out of this population.

Harvest

Mountain goat harvest occurred under a general-season framework for all of Lemhi and Custer Counties from 1943 to 1945. A portion of the PMU including parts of GMUs 27 and 36 was opened to a controlled hunt with 5 tags in 1961 and was expanded in 1968 with the same number of tags. In addition, another hunt area was opened with 5 tags in 1968. Tag numbers were reduced to 3 and boundaries changed for both hunt areas in 1989. In 1997, these 2 hunt areas were combined with the number of tags reduced to 2. The boundary of Hunt Area 27-2 was adjusted in 2019 encompassing a larger area. Currently there are 2 tags available for this hunt area.

A hunt area was opened in the GMU 36B portion of the PMU in 1986 with 3 tags. Tag numbers were reduced to 2 in 2009 and have remained at that level to the present. Harvest success has been 100% across the PMU and female harvest has averaged 15% over the last 10 years.

Current Issues

Two very popular and heavily travelled roads go through the middle of this PMU. Loon Creek road provides one of very few motorized access points to FCRONR Wilderness Area and receives regular use during summer and fall and is plowed in winter several miles up Jordan Creek. Custer Motorway is a very popular driving route that connects the Sunbeam area with Challis. This road also receives regular use in summer and fall, but is not plowed in winter. Consequently, winter recreation use is limited, but may be increasing because of power and design improvements of snowmobiles and snow bikes. During the summer, outdoor recreation is popular in Yankee Fork PMU, including endurance races with up to 100 runners. This could be a source of disturbance for mountain goats, particularly nannies with kids, at that time of year.

The 2012 Halstead fire impacted a small portion of the Yankee Fork PMU in upper Loon Creek. There may have been displacement of mountain goats from a small area. Effects of fire on foraging habitat in the Yankee Fork PMU are unknown.

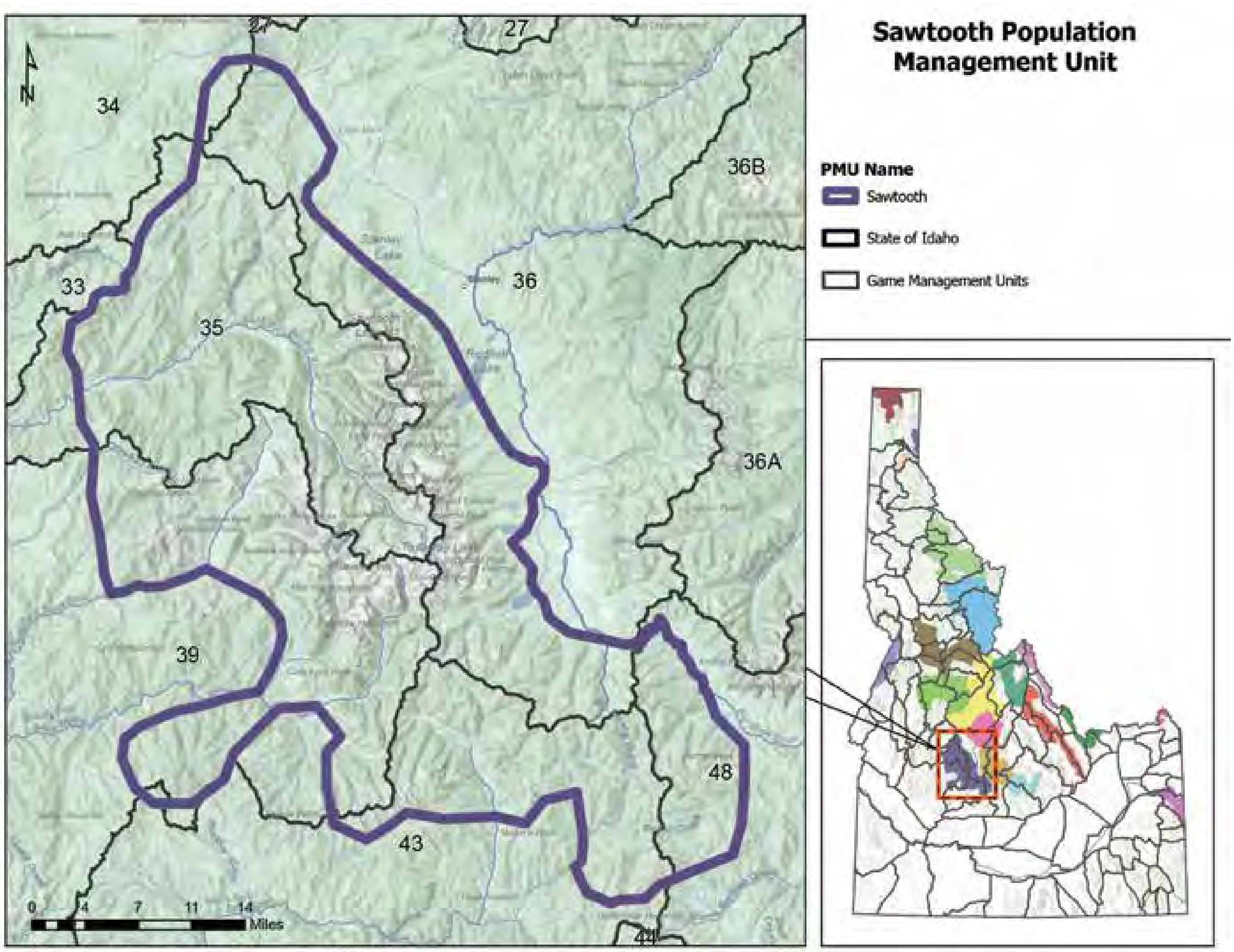
Bonanza Peak offers a good viewing opportunity in all seasons and is visited specifically to view mountain goats.

Although this PMU experiences a number of human activities, the mountain goat population appears to be stable with a relatively low female harvest rate.

Management Direction – IDFG will work to increase the population and maintain secure habitat in the Yankee Fork PMU.

Strategy – Collaborate with Salmon-Challis National Forest to minimize potential impact of recreation on mountain goats.

Strategy – Conduct population survey by 2028.



Sawtooth PMU

The Sawtooth PMU encompasses the rocky, jagged peaks of the Sawtooth Mountains in portions of GMUs 35, 36, and 39, as well as the Smoky Mountains in adjacent GMUs 43 and 48. Land ownership is primarily USFS (Boise National Forest in GMUs 35 and 39 and Sawtooth National Forest in GMUs 36, 43, and 48). Mountain goats occupy detached rocky cliffs along Eightmile, Tenmile, Warm Springs, and Canyon creeks in GMU 35, and Steel Mountain and North Fork Boise River in GMU 39. They are otherwise found along the main Sawtooth crest that divides GMU 36 from GMUs 35 and 39; and in the Smoky Mountains along the southern edge of GMU 36 and the northern portion of GMUs 43 and 48.

Population

Population surveys during the past 20 years have been conducted from a helicopter (Bell 47 Soloy with pilot and 2 observers) during mid-winter or late spring. All GMUs within the Sawtooth PMU were flown at same time. Small, scattered groups of mountain goats (<25/group) are found along detached drainages in GMU 35. North Fork Boise River drainage in GMU 39 supports 40–60 mountain goats. The majority of the Sawtooth population occurs along headwaters of the South and Middle Fork Boise rivers in GMU 39 and 43, the upper South Fork Payette River in GMU 35, the headwaters of Big Wood drainage in GMU 48, and along rocky cliffs and drainages on the western edge of GMU 36. The Sawtooth PMU supports the largest mountain goat population in Idaho. The latest survey in winter 2019 recorded the highest number of mountain goats ever counted in the Sawtooth PMU. The lower count

Populations Surveys- Sawtooth PMU								
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Unk**	**Total**	**Kid:Ad***
All PMU	Aerial	2019	Feb	450	70	4	**524**	16
All PMU**	Aerial	2017	Mar	306	49	0	**355**	16
All PMU	Aerial	2009	Feb	349	78	0	**427**	22
All PMU	Aerial	2004	Feb	373	94	0	**467**	25
All PMU	Aerial	1994	Mar	280	45	0	**325**	16

***Number of kids per 100 adults.**
****Incomplete survey.**

in 2017 was due to an incomplete survey of the PMU. However, the population has been generally stable since the mid-1990s. Thirty-two alpine ground surveys were conducted within the Sawtooth PMU between 2019 and 2023 with 28 mountain goats observed.

No mountain goats have been translocated into or out of this population.

Harvest

Historically, controlled hunts for mountain goats occurred in GMUs 35 and 39 until 1981. GMU 35 had 3 hunt areas with 15 any-weapon tags and 15 archery tags. Average annual harvest for the last 5 years of the hunt (1977–1981) was 8 mountain goats. Three hunt areas with 17 any-weapon tags were offered in GMU 39. Average annual harvest for the last 5 years of the hunt was 7 mountain goats (1977–1981). Mountain goat seasons in both GMUs were discontinued between 1981 and 2004. A new hunt with 2 tags was established in 2005 for that portion of GMU 39 in the Middle Fork Boise River drainage upstream from, and including, Queen's River and Yuba River drainages.

Hunt boundaries and tag levels have been altered as managers learned more about mountain goat distribution and to simplify regulations. Between 2000 and 2006, 2 tags were offered in Hunt Area 43, which incorporates portions of Units 43, 48, and 36. Tags were judiciously increased to 4 in 2019, and to 5 in 2021 in response to increased numbers of mountain goats observed during aerial surveys. Since 2023, 6 tags have been available for Hunt Area 43.

Hunting in Hunt Area 36-1 was discontinued in the early 1980s in response to declining mountain goat populations, but was reinstated in 2005 with 4 tags. In 2010, that portion of GMU 35 within the Sawtooth National Recreation Area was added to the hunt area.

Currently there are 9 tags in 3 hunt areas in the Sawtooth PMU. There is 1 tag in GMU 39, 2 tags in GMU 35 and a portion of GMU 36, and 6 tags in GMUs 43, 48, and a portion of GMU 36. During the past 10 years, harvest success averaged 88% across the PMU and female harvest averaged 23%.

Current Issues

Heli-skiing, cross country skiing, and snowmobiling are becoming more popular along the Blaine-Camas county border between GMUs 43, 48, and 36. Possible impacts to wintering mountain goats from these activities should be closely monitored. Hiking and backpacking during summer and fall are popular activities. Trail count data from the Sawtooth National Recreation Area (SNRA) showed very high use on trails accessing the Sawtooth Wilderness. For example, the Iron Creek trailhead saw over 19,000 entries in 2020.

Road salt accumulation on Highway 21 between Grandjean and Capehorn has been identified as an attractant to nearby summering mountain goats. Motorists annually report near misses and collisions with mountain goats on the road. Starting in the spring of 2024, variable messaging boards were deployed to warn drivers of mountain goat road hazards. Following this deployment, collision rates will be monitored to identify if further actions are required.

Recently, there have been some concerns about presence of disease, such as pneumonia in native mountain goat herds. Collecting samples from harvested animals will help managers closely monitor this situation.

Following the 2024 Wapiti Complex Fire, portions of mountain goat summer and winter range were identified as burned in GMUs 35 and 36. Understanding the immediate and long-term impacts of the fire on local herds will be an important consideration when managers are determining tag allocations.

Four tags were offered in Hunt Area 36-1 between 2005 and 2018. During the past 10 years, 42% of mountain goats harvested were breeding age females. This is 2 to 3 times the female harvest rate of the other 2 hunt areas in the PMU.

Management Direction – IDFG will maintain a stable population with secure habitat within the Sawtooth PMU.

Strategy – Collaborate with Boise and Sawtooth National Forests to minimize potential impact of recreation on mountain goats.

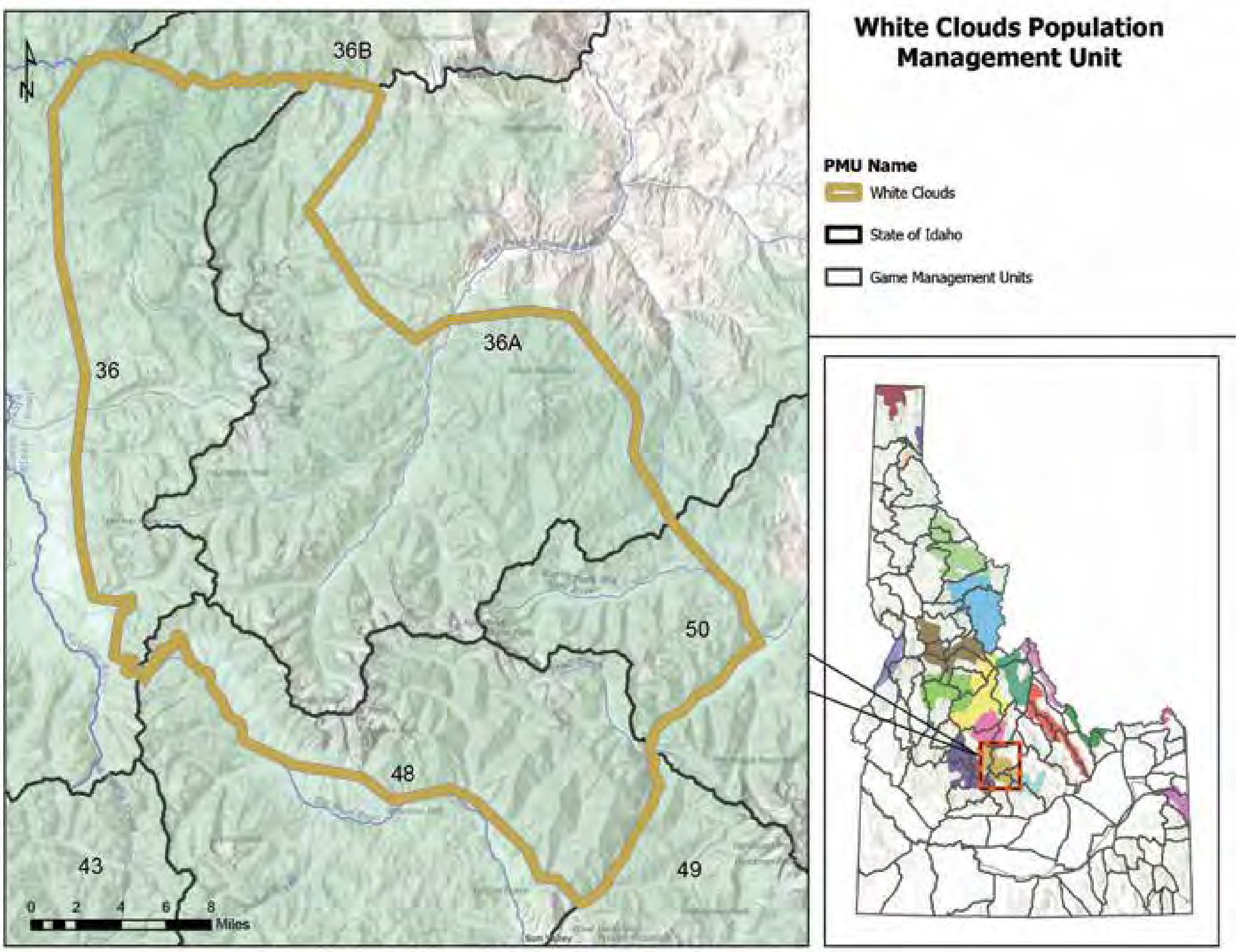
Strategy – Work with SNRA to install trailhead signs educating users about safe and ethical behavior around mountain goats.

Strategy – Continue to work with hunters to help monitor for possible disease outbreaks by collecting samples from hunter-harvested mountain goats.

Strategy – Partner with ITD to deploy roadside signs warning drivers about mountain goats on roadways and investigate techniques to reduce roadside salt accumulation.

Strategy – Collect summer and winter range observations to identify the impacts of the 2024 Wapiti Complex Fire. In subsequent aerial population surveys, emphasis will be placed on historical locations within the winter range burn scar.

Mt. Goats on HWY 21 © IDAHO FISH AND GAME



White Clouds PMU

Within GMU 36A, the White Clouds PMU includes the White Cloud Mountains, Germania Creek, upper East Fork Salmon River, West Pass Creek, Bowery Creek, and Sheep Creek. The PMU also encompasses the portion of GMU 36 from Warm Springs Creek to Galena Summit, the north end of the Boulder Mountains in GMU 48, and North Fork Big Lost River in GMU 50. Land ownership is mostly USFS, with some scattered private inholdings. High elevation, rugged terrain is almost continuous throughout the central part of the PMU. Mountain goat habitat in Sheep-Bowery creeks area and North Fork Big Lost is somewhat isolated from this central area. Portions of White Clouds, Hemingway-Boulders, and Jerry Peak wilderness areas are within the PMU.

Population

Brandborg (1955) reported an estimate of 125 mountain goats within this PMU in the early 1950s. The first complete survey of the PMU likely occurred in 1973, when 87 mountain goats were observed. A 1988 survey indicated a minimum count of 278 individuals. A survey in 2012 showed 279 mountain goats in the White Clouds PMU, the highest on record. The most recent survey in winter 2018 yielded a minimum count of 220 animals. Surveys have been conducted during winter and late spring, sometimes conducted in conjunction with an elk or deer survey. Forty-one alpine ground surveys were conducted within the White Clouds PMU between 2019 and 2023 with 122 mountain goats observed.

No mountain goats have been translocated into or out of this population.

Populations Surveys- White Clouds PMU							
Area	Method	Year	Month	Adult	Kid	Total	Kid:Ad*
All PMU	Aerial	2018	Feb	191	29	**220**	16
All PMU	Aerial	2012	Feb	223	56	**279**	25
All PMU	Aerial	2004	Jan	208	61	**269**	29
All PMU	Aerial	1994	Feb	207	33	**240**	16

***Number of kids per 100 adults.**

Harvest

Mountain goat harvest occurred under a general-season framework for all of Lemhi and Custer Counties from 1943 to 1945. There was apparently no hunting until 1960 when 9 tags were issued for 2 hunt areas. Boundaries and tag levels fluctuated somewhat until 1975 when the PMU was split into 4 hunt areas with 27 tags. Hunt area boundaries have remained consistent to present except for 36A-1, which was expanded in 2004 to include part of GMU 50, and again in 2006 to include part of GMU 48. In 1994 tag numbers for the 4 hunt areas were reduced to 17 and reduced once more in 1997 to 11 tags. Ten tags were offered between 2009 and 2018. Tag numbers were reduced to 6 in 2019 and remain at that level. Harvest success across the PMU has been very high over the last 10 years, averaging 92%. Female harvest over the last 10 years averaged 33% across the PMU. Hunt Area 36A-3 has the highest female harvest rate at 38%.

Current Issues

The large amount of wilderness within this PMU reduces conflicts with motorized recreation. However, portions of the PMU, such as Germania Creek drainage, North Fork Big Lost River, and Silver and Boulder Peaks are open to some level of motorized use during winter and summer. The western part of the White Clouds PMU is a popular destination for backpacking and back-country skiing. Further, summer hiking and backpacking use is high and increasing in popularity, which may impact nursery habitat. Significant levels of domestic sheep use occur in this PMU, which could result in increased risk of disease transmission to mountain goats. Female harvest is somewhat high, ranging from 29% in Hunt Area 36A-1 to 41% in 36A-3. Although the overall population appears stable, this level of harvest, especially on female mountain goats, may be reducing productivity.

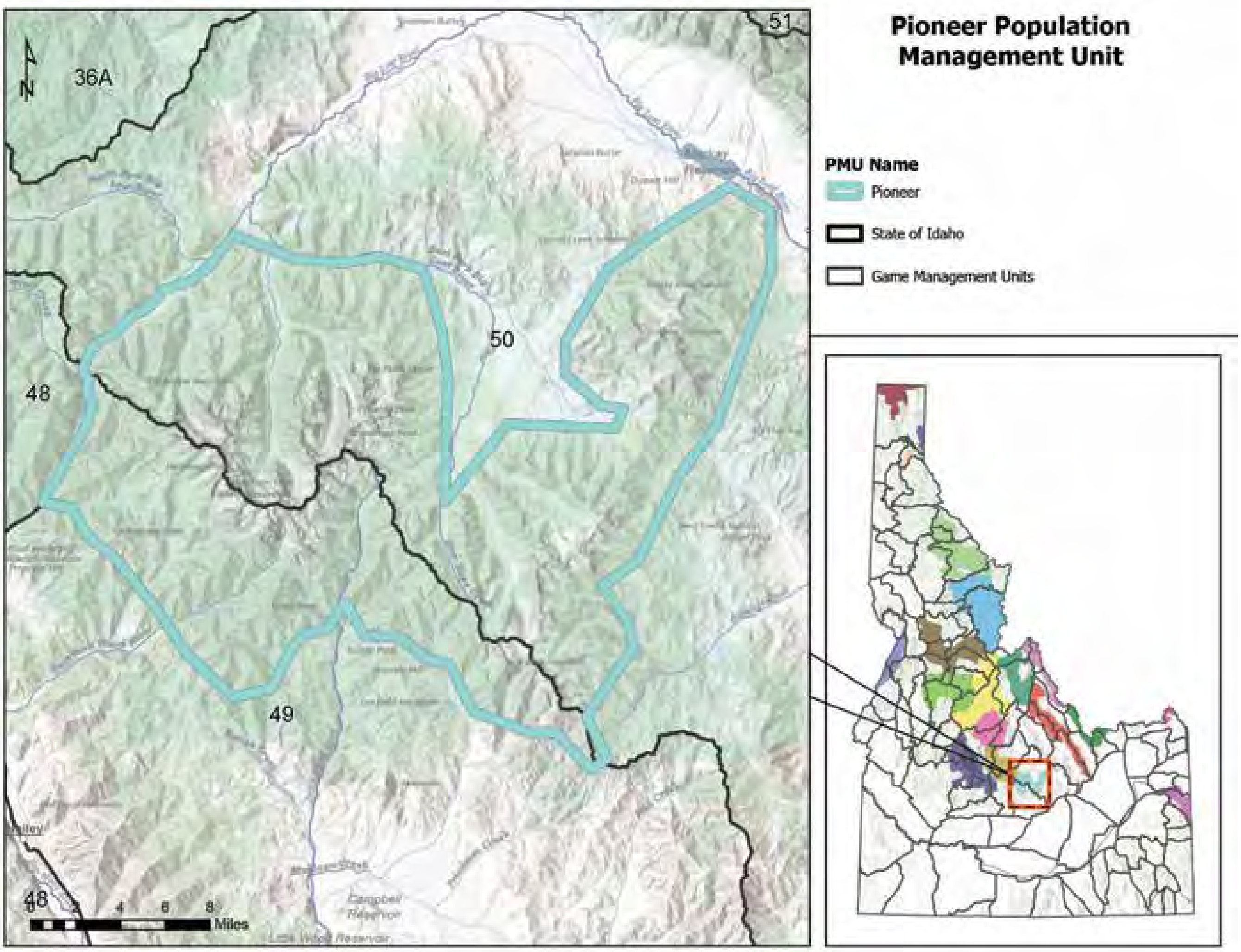
Management Direction – IDFG will work to increase the population and maintain secure habitat in the White Clouds PMU.

Strategy – Collaborate with Salmon-Challis and Sawtooth National Forests to minimize potential impact of recreation on mountain goats. .

Strategy – Take additional steps to reduce the number of females in the harvest.

Strategy – Work with SNRA to install trailhead signs educating users about safe and ethical behavior around mountain goats.

Mountain Goat CCBY IDAHO FISH AND GAME



Pioneer PMU

The Pioneer PMU encompasses rocky, jagged peaks of the Pioneer Mountains in portions of GMUs 49 and 50. Land ownership is primarily USFS (Sawtooth National Forest in GMU 49 and Salmon-Challis National Forest in GMU 50). Mountain goats are generally located along rocky ridges and alpine bowls along the top of the Pioneer Mountains that divides GMU 49 from GMU 50, as well as in the White Knob Mountains in GMU 50.

Population

Small, scattered groups of mountain goats (<25/group) are found in rocky drainages in headwaters of East Fork Big Wood River and Little Wood River in GMU 49. In GMU 50, mountain goats are located in headwaters of Wildhorse Creek, drainages in headwaters of East Fork Little Lost River, and the White Knob Mountains. The overall population within the PMU is stable to increasing, with 200–250 mountain goats scattered across the PMU. The most recent aerial survey occurred in August 2022 and documented 209 mountain goats. Historically, 50–100 mountain goats were observed during aerial surveys (e.g., 75 mountain goats were observed in 2010). Seven alpine ground surveys were conducted within the Pioneer PMU between 2019 and 2023 with one mountain goat detected.

The Pioneer PMU is a native mountain goat population without any translocations or augmentation. Mountain goats in this PMU likely interchange to an unknown degree with those in the White Clouds PMU because mountain goats are separated by only 8–16 km (5–10 mi) of mountainous terrain.

Populations Surveys- Pioneer PMU							
Area	Method	Year	Month	Adult	Kid	Total	Kid:Ad*
All PMU	Aerial	2022	Aug	163	46	**209**	28
All PMU	Aerial	2018	Aug	140	32	**172**	23
All PMU	Aerial	2010	Aug	59	16	**75**	27
All PMU	Aerial	2004	Aug	62	10	**72**	16
All PMU	Aerial	1999	Aug	40	10	**50**	25

***Number of kids per 100 adults.**

Harvest

This mountain goat hunt was closed in 1982 because of a low kid:adult ratio but was reopened in 1986 with 5 tags available. Tags were reduced from 5 to 2 following an aerial survey in 1992 and remained consistent until 2019 when tags were increased to 4. Following the 2022 survey, tags were increased from 4 to 6. Hunter success has averaged 83% over the last 10 years, with females making up 10% of the harvest.

Current Issues

This mountain goat population is located near the popular recreational area Sun Valley. The Pioneer Mountains receive year-round use from hikers, backpackers, mountain bikers, backcountry anglers, snowmobilers, snow bikers, snowshoers, backcountry skiers, and heli-ski operations.

Technological advancements in snowmobile and snow bike capabilities have increased interest and ability to reach some of the more remote areas occupied by mountain goats. During the summer, outdoor recreation is popular in Pioneer PMU, including endurance races with up to 100 runners. This could be a source of disturbance for mountain goats, particularly nannies with kids, at that time of year.

Management Direction – IDFG will work to maintain a stable to increasing population with secure habitat in the Pioneer PMU.

Strategy – Collaborate with Salmon-Challis and Sawtooth National Forests to minimize potential impact of recreation on mountain goats.

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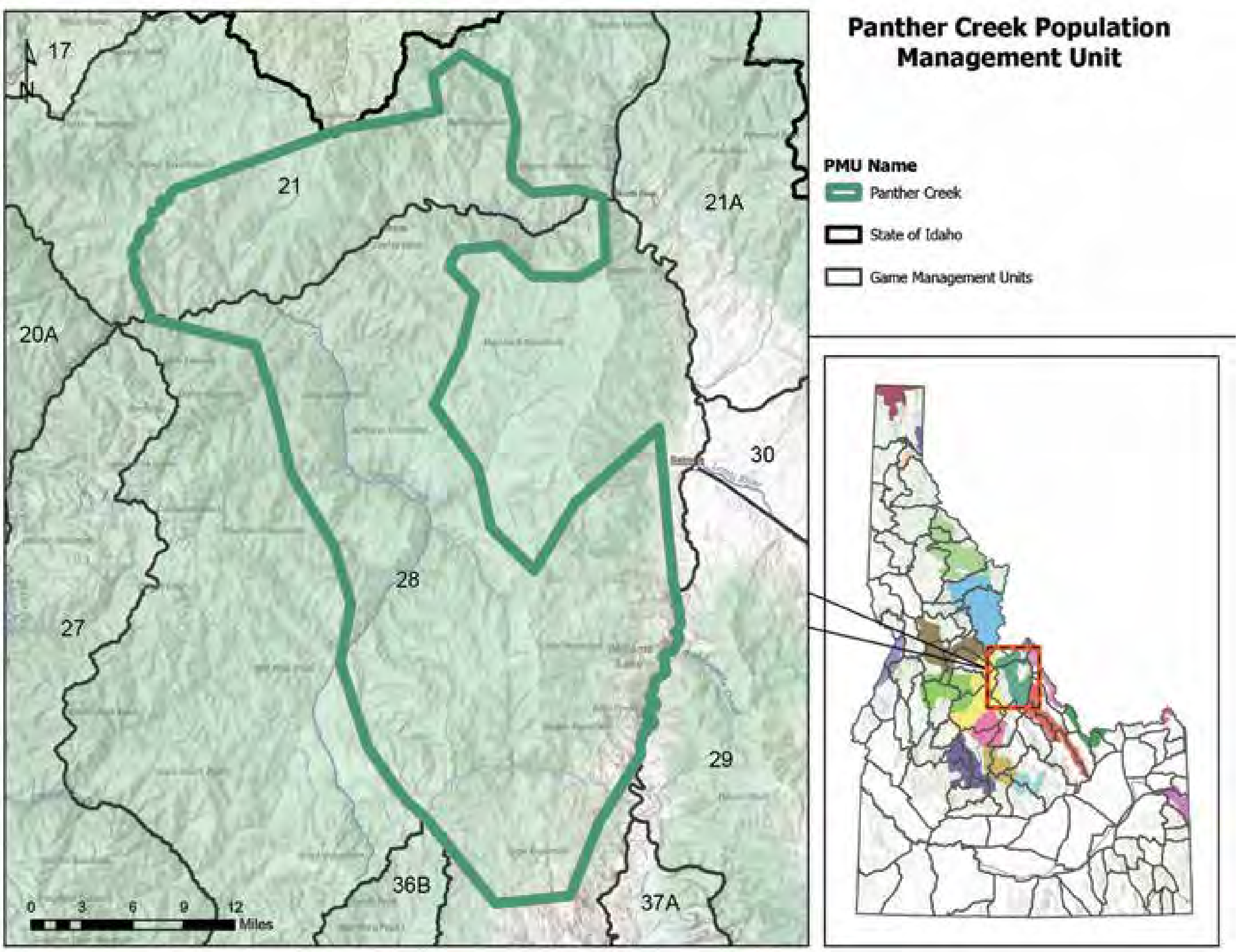


Panther Creek PMU

The Panther Creek PMU includes mountain goats in the eastern part of GMU 21 from Colson Creek to Sage Creek and the middle and southeast portions of GMU 28. Mountain goats occur along river breaks in GMU 21 and along Panther Creek, Woodtick Creek, Moyer Creek, Iron Creek, and Williams Creek in GMU 28. Most of the PMU is under USFS ownership with a small portion under BLM ownership. Much of the area has roaded access except for the breaks on the north side of Salmon River.

Population

Mountain goat numbers were estimated at 25 along the Salmon River breaks in GMU 21 and 5 in lower Panther Creek in the early 1950s (Brandborg 1955). A 1967 survey in Panther Creek yielded 32 mountain goats and a more comprehensive survey in 1996 indicated 31 mountain goats in the PMU. Survey data indicates numbers remained between 25 and 50 through 2010, however, only 15 were observed during a 2016 survey. Fourteen mountain goats were observed incidentally during a bighorn sheep survey in 2022, and 8 were observed during a 2023 elk survey. Surveys are conducted during winter as part of deer and elk abundance and composition aerial counts. Four alpine ground surveys were conducted at the southern tip of the Panther Creek PMU between 2019 and 2023, no mountain goats were observed.

Translocations of 26 mountain goats into GMU 28 occurred in 1989, 1990, 1991, and 1992 (Appendix B).

Harvest

Mountain goat harvest occurred under a general-season framework for all of Lemhi and Custer

Populations Surveys- Panther Creek PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
GMU 28	Aerial	2016	Jan	11	4	**15**	36
All PMU	Aerial	2010	Feb	59	7	**66**	13
All PMU	Aerial	2008	Jan	22	4	**26**	18
All PMU	Aerial	1996	Apr	27	4	**31**	15

***Number of kids per 100 adults.**

Counties from 1943 to 1945. This was restricted to just the west side of Highway 93 in Lemhi County during 1946–1947. No mountain goat hunting was allowed until a controlled hunt was offered from 1967 to 1974 with 3 tags for the east side of lower Panther Creek. There have been no hunts in this PMU since 1974.

Current Issues

The primary issue for mountain goats in the Panther Creek PMU is an apparent decline in numbers. Historical surveys indicate the population remained relatively stable until approximately 2010. Between 2010 and present, total numbers have declined by >50%. Suitable habitat is relatively patchy throughout this PMU. A variety of factors, including conifer encroachment, decline in forage base, and predation may have contributed to this decline. Another potential impact is the 2012 Mustang fire, which affected a portion of this PMU north of Salmon River that contains the highest density of historical mountain goat locations. No mountain goats were observed while surveying this area for elk in 2016, suggesting mountain goats may have been displaced as a result of the fire. Effects of fire on foraging habitat in the Panther Creek PMU are unknown.

Most of the PMU has motorized road and trail access except for the Salmon River breaks in GMU 21. Over-snow travel is unregulated except for very small areas throughout the PMU and may be a source of disturbance during energetically crucial winter periods.

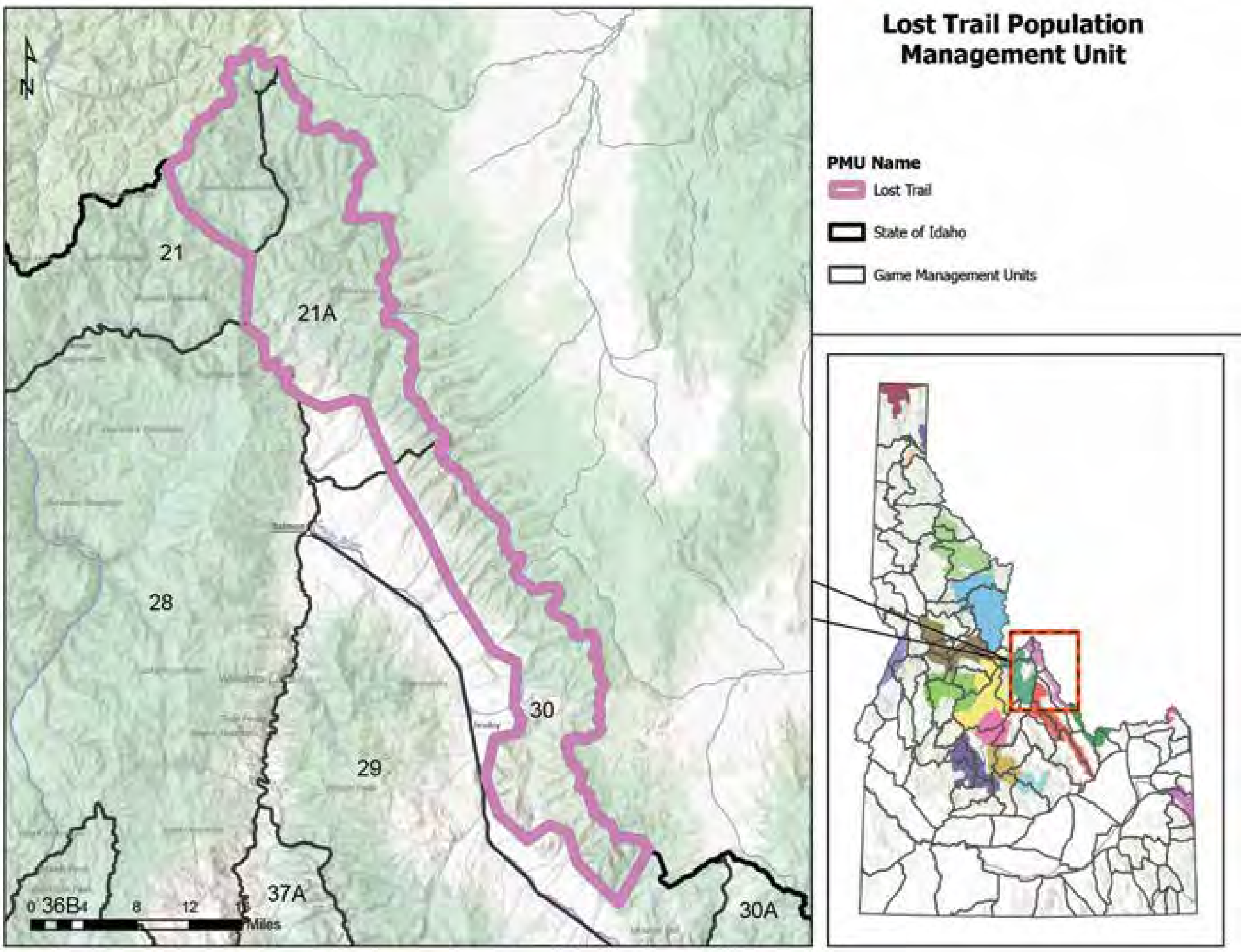
Mineral exploration has increased over the last several years in areas adjacent to the Salmon River where it runs through the PMU.

Management Direction – IDFG will work to increase the population and maintain secure habitat in the Panther Creek PMU.

Strategy – Conduct a dedicated mountain goat survey. Past surveys have been incidental to other species and not all possible habitat was covered.

Strategy – Collaborate with Salmon-Challis National Forest to minimize potential impact of recreation on mountain goats.

Strategy – Evaluate potential for successful translocations to restore healthy populations of mountain goats in the Panther Creek PMU.



Lost Trail PMU

The Lost Trail PMU includes mountain goats in the Beaverhead Mountains between Lost Trail Pass and Little Eightmile Creek in GMUs 21A and 30. The northern part of the PMU is primarily USFS land while BLM ownership predominates in the southern part. The PMU is characterized by somewhat dense conifer cover in the north trending to more open habitat on the southern end. Historical and current mountain goat distribution is patchy. Occupied areas include upper North Fork-Moose Creek drainages to Lost Trail Pass, upper 4th of July Creek, Carmen-Freeman creeks to Kenney Creek, and Little Eightmile drainage.

Population

Mountain goat numbers in this PMU were estimated at approximately 20 in the Allan Mountain area and 60 from Sheep Creek to Goldstone Mountain in the early 1950s (Brandborg 1955). No known survey records exist until 1967 when 63 mountain goats were observed in GMU 21A from Lost Trail to Agency Creek. A survey in 1975 yielded a similar number. Beginning in 1981, survey boundaries were adjusted from Sheep Creek to Goat Mountain (Little Eightmile drainage), with 64 animals observed. Approximately 80 mountain goats were observed from the 1980s until the late 1990s. More recent observations ranged from 29 in 2016 to 52 in 2019. The 2019 survey counted an additional 12 individuals (10 adults, 2 kids) in an adjacent portion of Montana. A less complete record exists for the west side of the North Fork Salmon River between Hughes Creek and Lost Trail Pass. A 1996 survey produced 10 animals and surveys in 2005 and 2010 indicated 4 and 15 individuals, respectively. All population surveys were aerial surveys conducted in winter. Nine alpine ground surveys were conducted within the

Populations Surveys- Lost Trail PMU							
Area	Method	Year	Month	Adult	Kid	Total	Kid:Ad*
All PMU	Aerial	2019	Mar	47	5	52	11
All PMU	Aerial	2016	Jan	24	5	29	21
All PMU	Aerial	2013	Jan	26	8	34	31
All PMU	Aerial	2006	Jan	46	7	53	15
All PMU	Aerial	2002	Apr	52	3	55	6

***Number of kids per 100 adults.**

Lost Trail PMU between 2019 and 2023 with 2 mountain goats observed.

No mountain goats have been translocated into or out of this population.

Harvest

Mountain goat harvest occurred under a general-season framework for all of Lemhi and Custer Counties from 1943 to 1945 but was restricted to the west side of Highway 93 in Lemhi County for 1946–1947. There was no hunting in this PMU from 1948 until 1961 when controlled hunts were implemented. Five tags were issued that year within a hunt boundary that included the North Fork Salmon River drainage, GMU 21A, and GMU 30 south to Kenney Creek. A general archery season was also part of the hunt structure. Harvest structure remained stable until 1964 when the hunt area was expanded to all of GMUs 21A and 30. Tag numbers, area descriptions, and structure of general archery season fluctuated until 1989. Tag numbers varied between 5 and 10, the area included GMU 30A some years, and general archery season was eventually converted to a controlled hunt. Beginning in 1989, the number of tags was decreased to 3, archery season was eliminated, and the hunt area was changed to a smaller area from Freeman Peak to Lemhi Pass. The number of tags was reduced to 2 in 2003 and then eliminated completely beginning in 2007. Female harvest averaged 45% from 1995 through 2005.

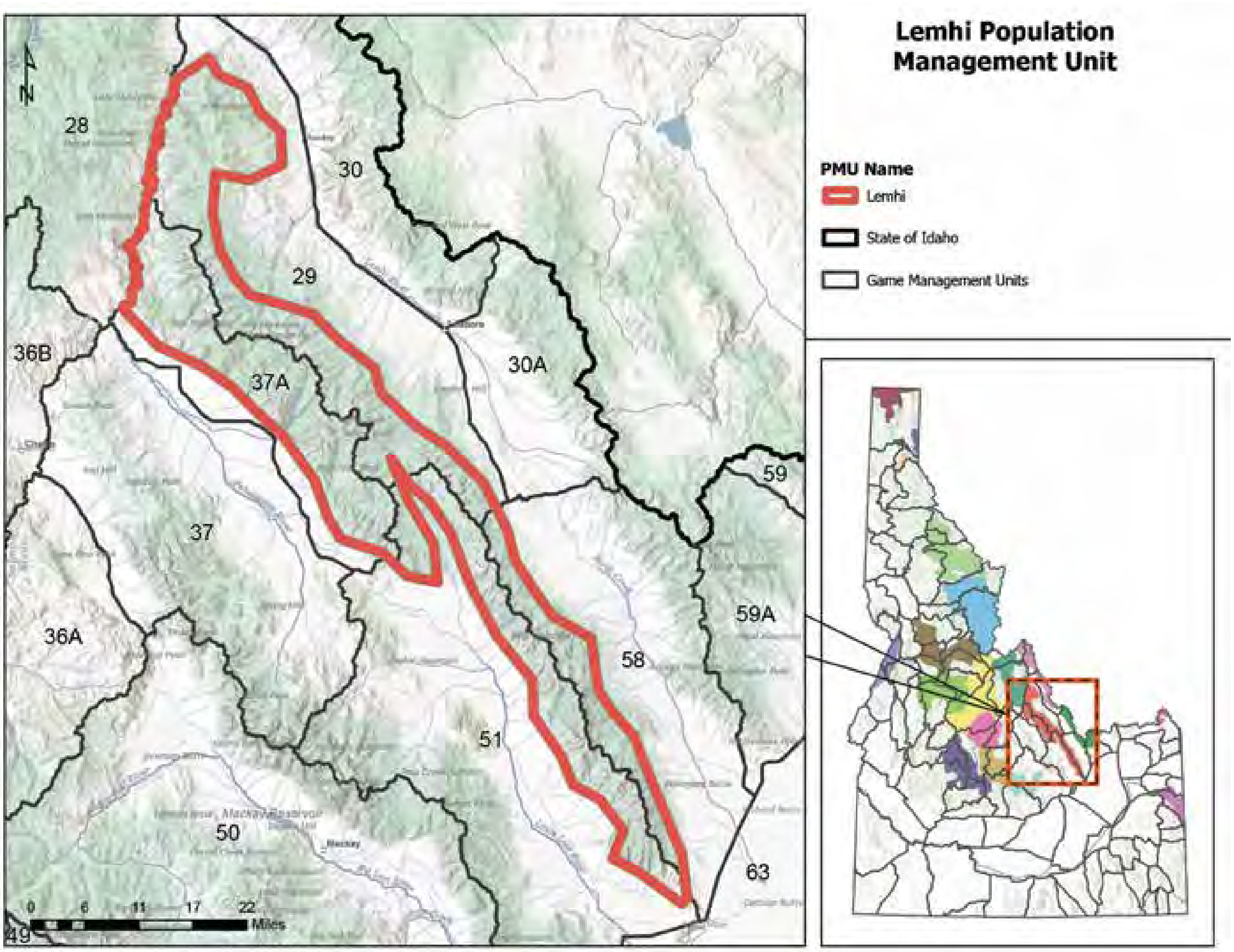
Current Issues

The Lost Trail PMU was closed to hunting in 2007 and the population appears to have stabilized near the 2006 survey number. Montana also closed their hunting season at approximately the same time. Determining causes of population decline and identifying possible solutions to re-establish a stable population is the most important priority for this PMU. There are no restrictions on motorized over-snow travel within this PMU except in a few small areas. Historically, there have been low levels of motorized use within the PMU. However, advancements in snowmobile and snow bike capabilities have increased interest and ability to reach some of the more remote areas occupied by mountain goats. Non-motorized use in winter, although still low, has increased in recent years. During the summer, outdoor recreation is popular in Lost Trail PMU, including endurance races with 200 or more runners. This could be a source of disturbance for mountain goats, particularly nannies with kids, at that time of year.

Management Direction – IDFG will work to increase the population and maintain secure habitat in the Lost Trail PMU.

Strategy – Collaborate with Salmon-Challis National Forest and BLM Salmon Field Office to minimize potential impact of recreation on mountain goats.

Strategy – Coordinate with Montana Department of Fish, Wildlife and Parks on surveys, monitoring, and potential harvest.



Lemhi PMU

The Lemhi PMU encompasses the Lemhi Range from just south of Salmon to the southern tip near Howe in GMUs 29, 37A, 51, and 58. Mountain goats occupy suitable habitat along the entire range. Land ownership within the PMU is primarily Salmon-Challis and Caribou-Targhee National Forests, with some small BLM parcels.

Population

Estimates from the early 1950s indicated approximately 100 mountain goats occupied the PMU north of Big Creek. Historical records document winter helicopter surveys of the north end of the PMU every year from 1959 to 1976. The number of animals observed ranged from a high of 218 in 1962 to a low of 59 in 1976. This population was intensely studied in the early 1970s to determine population parameters and response to hunting (Kuck 1978). Surveys resumed in 1983 and included summer helicopter surveys of the south end of the PMU. Surveys during the 1990s and 2000s were conducted on different years and counts ranged from 61 to 157 on the south end and 16 to 47 on the north end. A helicopter survey of entire PMU in summer 2018 yielded 165 mountain goats with the most recent survey in 2021 counting 199 mountain goats. Forty alpine ground surveys were conducted within the Lemhi PMU between 2019 and 2023 with 86 mountain goats observed.

Two translocations occurred into the PMU: 20 animals from Olympic National Park in 1982; and 24 individuals from Tushar Mountains, Utah in 2007.

Harvest

Harvest in the Lemhi PMU occurred in several different hunt areas over the years, but generally was divided between GMUs 29-37A and GMUs

Populations Surveys- Lemhi PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
All PMU	Aerial	2021	Aug	154	45	**199**	29
All PMU	Aerial	2018	Jul	131	34	**165**	26
GMU 51, 58	Aerial	2012	Jul	48	17	**65**	35
GMU 29, 37A	Aerial	2007	Jan	19	4	**23**	21
GMU 51, 58	Aerial	2005	Jul–Aug	67	14	**81**	21
GMU 29, 37A	Aerial	2003	Mar	51	20	**71**	39

***Number of kids per 100 adults.**

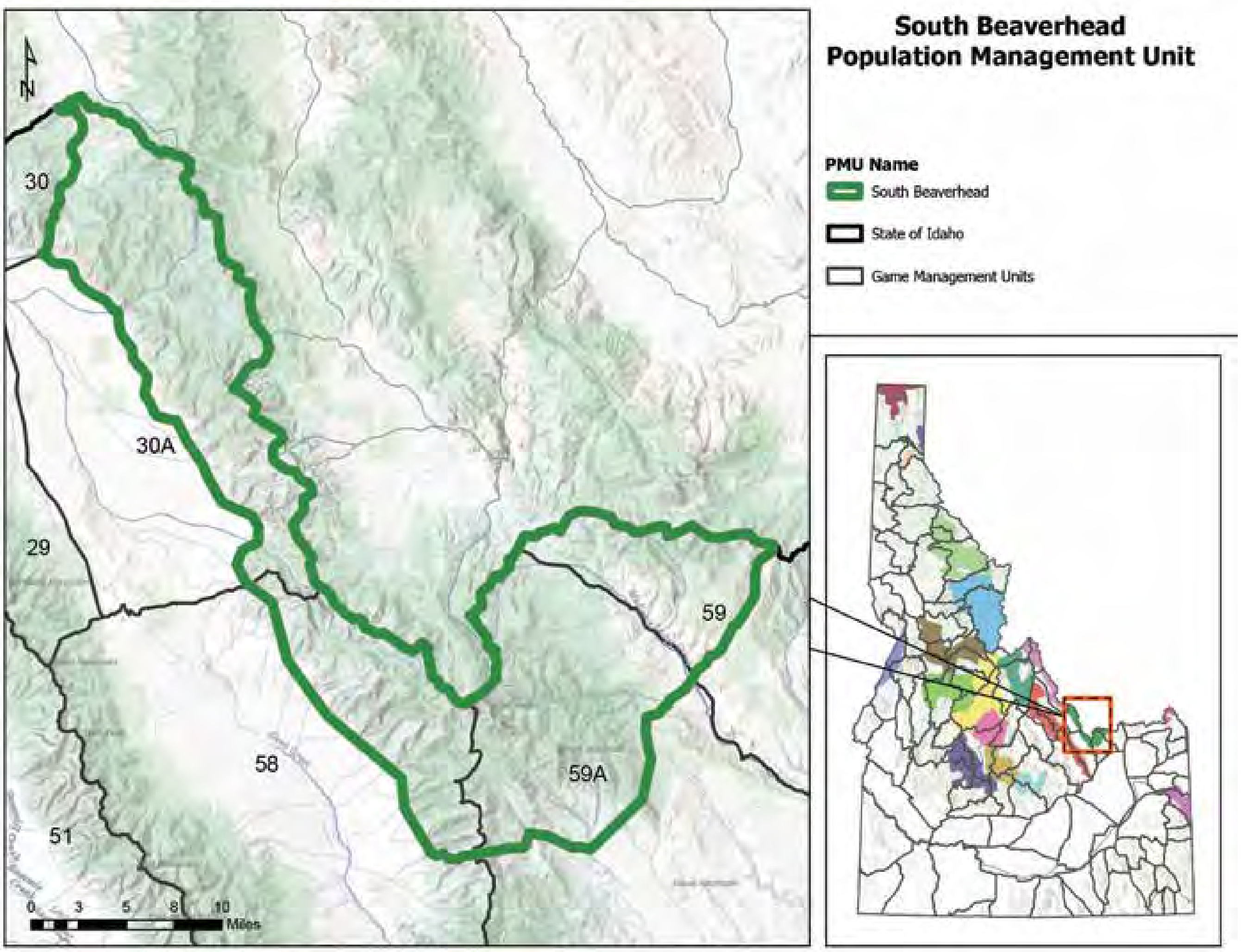
51-58. Mountain goat harvest occurred under a general-season framework for all of Lemhi and Custer Counties from 1943 to 1945. A controlled hunt was initiated in GMU 37A in 1960 with 20 tags. In 1966, there were 4 hunts with 35 tags. The area was divided into 7 hunt areas with 25 total tags in 1974 and then closed the following year. A hunt was opened in GMU 37A in 2005 with 1 tag and maintained at that level to present. In GMUs 51-58, a controlled hunt was initiated in 1967 with 8 tags. In 1970, the hunt area was expanded and tags were increased to 12. The number of tags was reduced to 3 in 1979, increased back to 6 in 2005, and again reduced to 3 for 2011–12 seasons. The GMU 51 hunt was closed from 2012-2018 and reopened in 2019 with 2 tags and maintained at that level to present. In the Lemhi PMU, success over the last 10 years has been 77% and females have made up 6% of the harvest.

Current Issues

None of the Lemhi PMU is within wilderness area, but some portions are roadless, with non-motorized restrictions on trails. However, several moderately to heavily used ATV trails traverse the mountain range in areas of mountain goat occupancy. In addition, there is some backpacking use throughout the PMU.

Management Direction – IDFG will work to increase the population and maintain secure habitat in the Lemhi PMU.

Strategy – Collaborate with Salmon-Challis and Caribou-Targhee National Forests to minimize potential impact of recreation on mountain goats.



South Beaverhead PMU

The South Beaverhead PMU encompasses mountain goat habitat found in the Beaverhead Mountains along the Idaho-Montana border in GMUs 30A, 58, 59, and 59A within Caribou-Targhee National Forest. Most mountain goats in the PMU are found in 4 areas of suitable habitat: the Red Conglomerates (GMU 59), Italian Peak (GMU 58 and 59A), Eighteenmile Peak (GMUs 30A and 58), and Baldy Mountain (GMU 30A).

Population

Mountain goats are native to these ranges. Reports of mountain goats date back to the early 1950s. Numbers remained low until approximately the mid-1970s. Aerial surveys in the 1980s indicated mountain goat populations in the Red Conglomerates and Italian Peak areas increased enough to sustain harvest. Hunt Area 59A was established in 1983 and Hunt Area 59 was established in 1987. Hunt Area 59A was closed in 2002 and Hunt Area 59 was closed in 1994 after population declines. The latest aerial survey was conducted in 2006. Two adults and no kids were observed in Hunt Area 59, and 20 adults and 7 kids were observed in Hunt Area 59A. Eight alpine ground surveys were conducted within the South Beaverhead PMU between 2019 and 2023 with 8 mountain goats observed.

No mountain goats have been translocated into or out of this population.

Harvest

Harvest was initiated in Hunt Area 59 in 1987. Two tags were issued each year during the 8 years this hunt was open, and 16 mountain goats were harvested (100% success). Harvest included 7 female mountain goats, which was 44% of total

Populations Surveys- South Beaverhead PMU							
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Total**	**Kid:Ad***
All PMU	Aerial	2006	Aug	20	7	**27**	35
All PMU	Aerial	2002	Aug	18	4	**22**	22
All PMU	Aerial	2001	Aug	16	4	**20**	25
All PMU	Aerial	1994	Aug	106	47	**153**	44

***Number of kids per 100 adults.**

harvest. This represented a 6% harvest rate of 32 adult mountain goats observed during the 1986 aerial survey.

Harvest was initiated in Hunt Area 59A in 1983. Three tags were offered each year between 1983 and 1992, yielding a 6.5% harvest rate of 46 adult mountain goats observed during the 1982 aerial survey. Five tags were offered each year between 1995 and 2001, representing a 5.5% harvest rate of 92 adult mountain goats observed during the 1994 aerial survey. Montana Department of Fish, Wildlife and Parks also harvested 2–6 mountain goats from this population annually from 1980 into the late 2000s. There is currently no harvest in the South Beaverhead PMU.

Current Issues

Size of the South Beaverhead population is unknown, but mountain goats were confirmed present in GMU 59A in October 2023. Land management allows motorized travel over snow; however, winter distribution of these mountain goats is unknown. Motorized vehicle travel in summer is restricted in most suitable mountain goat habitat.

Management Direction – IDFG will work to increase the population within the South Beaverhead PMU.

Strategy – Conduct a population survey of the South Beaverhead PMU.

Strategy – Investigate mountain goat distribution and habitat use.

Strategy – Collaborate with Caribou-Targhee National Forest to minimize potential impact of recreation on mountain goats.

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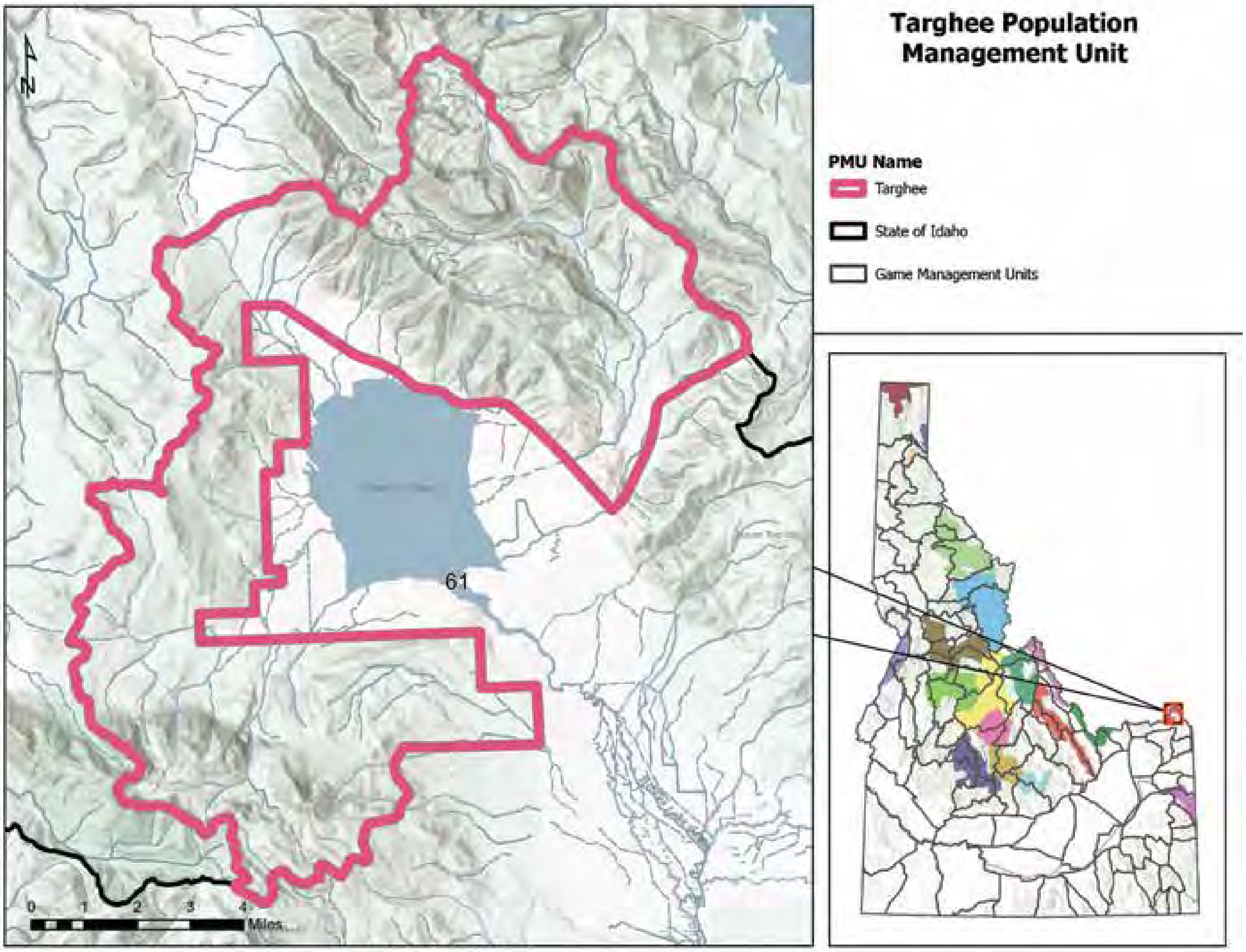


Targhee PMU

The Targhee PMU encompasses an area of suitable mountain goat habitat within Caribou-Targhee National Forest around Sawtelle Peak, Mount Jefferson, and Targhee Creek drainage of GMU 61 in Idaho. This population spans the state line encompassing the Henry's Mountains, Quake Lake, and Hebgen Lake areas of Hunt District (HD) 361 in Montana. This population is comanaged by Montana Department of Fish, Wildlife, and Parks (MTFWP) and IDFG with approximately two-thirds of the mountain goats in Montana and one-third in Idaho. Therefore, all PMU-wide surveys include mountain goats counted on both sides of the state line in MTFWP HD 361 and the Targhee Creek drainage of Idaho's GMU 61.

Population

Small numbers of mountain goats have been observed in this area since 2001, most likely originating from an introduced population in the Madison Range of Montana. In summer 2013, RMGA performed a ground survey counting 46 mountain goats. In August 2018, IDFG conducted an aerial survey of Targhee PMU and adjacent mountain goat habitat in Montana where 43 adults and 14 kids were observed. The RMGA also conducted a ground survey in August 2018, counting 37 adults, 14 kids, and 7 unknown mountain goats. This survey comparison provides us with confidence in using ground survey data for tag allocations for this population. The RMGA conducted ground counts in July 2020, 2022, and 2024 counting totals of 77, 101, and 112 mountain goats respectively, suggesting this population is increasing. The Sawtelle Peak and Mount Jefferson portion of this PMU was surveyed for the first time in July 2024 with 22 mountain goats

Populations Surveys- Targhee PMU								
Area	**Method**	**Year**	**Month**	**Adult**	**Kid**	**Unk**	**Total**	**Kid:Ad***
All PMU	Ground	2024	Jul	62	26	24	**112**	42
All PMU	Ground	2022	Jul	76	20	5	**101**	26
All PMU	Ground	2020	Jul	44	10	23	**77**	23
All PMU	Ground	2018	Aug	37	14	7	**58**	38
All PMU	Aerial	2018	Aug	43	14	0	**57**	33
All PMU	Ground	2013	Jul	36	10	0	**46**	28

***Number of kids per 100 adults.**

counted in a ground survey. One alpine ground survey was conducted within the Targhee PMU between 2019 and 2023 with no mountain goats detected.

No mountain goats have been translocated into or out of this population.

Harvest

MTFWP opened the first mountain goat hunt in this population in 2014 with 2 tags offered after 46 mountain goats were counted during the 2013 RMGA ground survey. In 2020, 77 mountain goats were counted during the RMGA ground survey which led to a tag increase from 2 to 3 tags in the Montana portion of this population in 2021. IDFG introduced the first tag on the Idaho portion of this population in 2023 after 101 mountain goats were counted in 2022. The Idaho hunt area only encompasses the Targhee Creek drainage portion of GMU 61, not the Sawtelle Peak and Mount Jefferson areas of the PMU. Success over the last 10 years has been 100% and females have made up 8% of the harvest in Montana HD 361. Since the Idaho hunt opened in 2023, one female mountain goat has been harvested in the Targhee PMU.

Current Issues

Current land management allows for motorized travel over snow in the PMU; however, winter distribution of these mountain goats is unknown. Although no motorized vehicle travel is allowed in summer in the Targhee Creek drainage, a public forest service road allows full size vehicle access to the top of Sawtelle Peak, which provides mountain goat kid rearing habitat. Humans feeding and harassing the Sawtelle Peak mountain goats has been reported, and the placement of mountain goat warning and education signs along the parking area is in discussion.

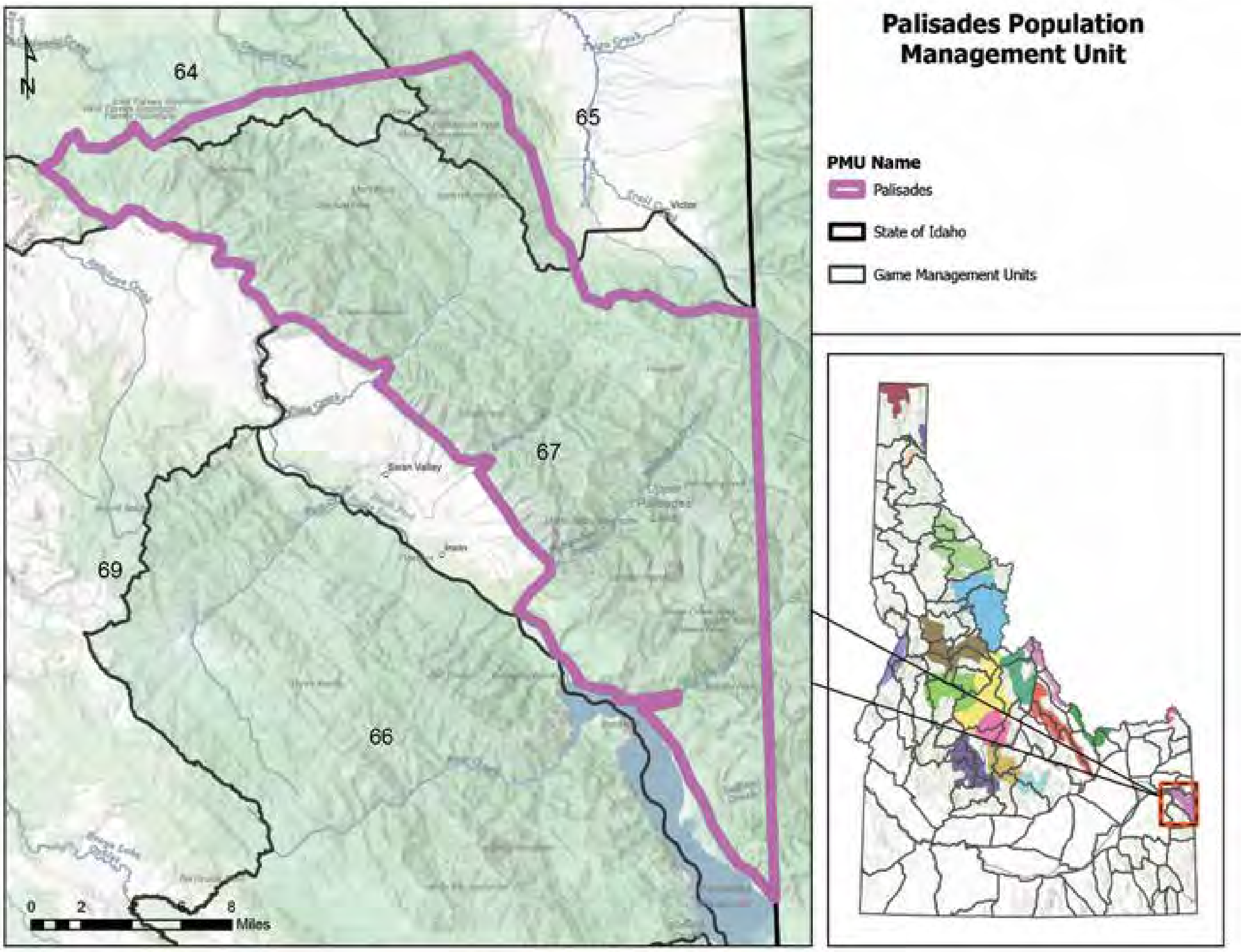
Management Direction – IDFG will work to maintain a stable to increasing mountain goat population within the Targhee PMU.

Strategy – Investigate mountain goat distribution, movements, and habitat use, specifically in the Sawtelle Peak and Mount Jefferson areas.

Strategy – Collaborate with Caribou-Targhee National Forest to minimize potential impact of recreation on mountain goats.

Strategy – Work with Caribou-Targhee National Forest to install mountain goat signs along the vehicle parking area at Sawtelle Peak educating users about safe and ethical behavior around mountain goats.

Strategy – Continue to coordinate with Montana Department of Fish, Wildlife and Parks on surveys, monitoring, and potential harvest.



Palisades PMU

The Palisades PMU encompasses mountain goats found in GMU 67, primarily in the Snake River Range southeast of Highway 31, within Caribou-Targhee National Forest. Mountain goats are occasionally observed in the Big Hole Mountains northwest of Highway 31.

Population

Mountain goats were introduced into the Palisades PMU between 1969 and 1971. The population increased rapidly and then quickly declined, similar to observations of other introduced populations. The population grew to a high of 281 mountain goats in 1996 and then declined to a low of 42 in 2002. The population appeared stable from 2006-2018 but has declined steeply since then. Over the last 4 surveys, 38–66 mountain goats were observed. Observers counted 43 mountain goats during the most recent survey in 2024. Most mountain goats found in the Palisades PMU are distributed along high elevation ridges between Rainey Creek and the Wyoming border. They are also commonly observed in Palisades Creek and Big Elk Creek. Surveys of the Palisades PMU have been conducted biennially since 1994 and are coordinated with staff from Wyoming Game and Fish Department, who survey the eastern portion of the population in Wyoming. Surveys are conducted in August because summer range of the Palisades PMU is more open and allows for better sightability than winter range. IDFG initiated a graduate research project to test effectiveness of ground-survey techniques for estimating abundance of mountain goat populations in the Palisades PMU (McDevitt et al. 2021). Researchers developed methodology that used spatially balanced random sampling combined with double-observer point count surveys to provide unbiased abundance estimates. In 2019, the double-observer estimate

Populations Surveys- Palisades PMU								
Area	Method	Year	Month	Adult	Kid	Unk	Total	Kid:Ad*
All PMU	Aerial	2024	Aug	32	9	2	**43**	28
All PMU	Aerial	2022	Aug	28	10	0	**38**	36
All PMU	Aerial	2020	Aug	52	14	0	**66**	27
All PMU	Aerial	2019	Aug	50	13	0	**63**	26
All PMU	Ground**	2019	July/Aug			104	**104**	Unk
All PMU	Aerial	2018	Aug	110	18	0	**128**	16
All PMU	Aerial	2016	Aug	104	39	0	**143**	38
All PMU	Aerial	2014	Aug	110	25	0	**135**	23
All PMU	Aerial	2012	Aug	87	23	0	**110**	26
All PMU	Aerial	2010	Jul	115	40	0	**155**	35
All PMU	Aerial	2008	Aug	96	27	0	**123**	28
All PMU	Aerial	2006	Aug	113	22	0	**135**	19

***Number of kids per 100 adults.**
****Double-observer abundance estimate with 95% CRI = 68-153**

was 104 with 95% CRI = 68-153. Two alpine ground surveys using distance sampling were conducted within the Palisades PMU between 2019 and 2023 with no mountain goats detected.

Harvest

Hunts were initiated in the Palisades PMU in 1983. As the population increased, tags were added. In 1990, 24 tags were offered in the Palisades PMU in 5 different controlled hunt areas. Subsequent declines in population resulted in fewer tags offered and no tags were available 2003–2004. Tags were offered again in 2005 in a portion of the PMU (Mount Baird area) after a survey indicated the population was >100 animals. That portion north and west of Palisades Creek (Baldy Mountain) remained closed since 2003 because of low numbers. Five tags were offered in the Mount Baird portion of the PMU from 2005-2018, followed by a drop to 3 tags from 2019-2020, then a drop to 2 tags from 2021-2022, ultimately followed by the hunt being closed in 2023. Hunter success averaged 77% over the last 10 years with females making up 22% of the harvest.

Current Issues

Much of the occupied mountain goat habitat in the Palisades PMU is managed by Caribou-Targhee National Forest. Access is limited to non-motorized travel during summer months. Snowmobile use is restricted in the Palisades Creek section of mountain goat winter habitat but is permitted in the Big Elk Creek section. Heli-skiing operations are conducted within Palisades PMU but are restricted in most occupied mountain goat winter range. Hiking and backpacking are popular in summer months. During the summer, outdoor recreation is popular in Palisades PMU, including endurance races. This could be a source of disturbance for mountain goats, particularly nannies with kids, at that time of year. The Palisades PMU population has experienced an unexplained drastic decline in numbers since 2019.

Management Direction – IDFG will work to increase the population and secure habitat within the Palisades PMU.

Strategy – Conduct research to determine the cause of the population decline in recent years.

Strategy – Provide Caribou-Targhee National Forest information about mountain goat winter distribution and habitat use on winter range.

Strategy – Collaborate with Caribou-Targhee National Forest to minimize potential impact of recreation on mountain goats.

Strategy – Coordinate with Wyoming Game and Fish Department on surveys, monitoring, and potential harvest.

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Appendix A: Harvest Model and Tables

Mountain Goat Population Models

We developed a 2- and a 12-stage mountain goat population model using R 3.5.0 (R Core Team 2018). Package Rramas (Caswell 2006) was used to project population growth in both model structures although we wrote additional code to modify harvest structure outside of the package's constraints. We used vital rates published in Hamel et al. (2006, hereafter Hamel in Appendix A) as a starting point and varied survival and fecundity to approximate "well-performing," "average," and "poorly-performing" populations. Models are based on vital rates from Hamel unless otherwise noted and were considered "average." Our objective in developing these models was to extend modeling efforts begun by Hamel over a wider range of population sizes, recruitment rates, and harvest scenarios. We assumed Idaho's mountain goat populations experience similar population dynamics and have similar vitals rates compared with Alberta populations. We did not incorporate density dependence because it was not used by Hamel and does not appear to be a significant factor in mountain goat population dynamics. We also assumed kid and yearling harvest was negligible and did not incorporate such harvest into applied harvest structures. Within each modeled year, mortality occurred after reproduction.

Annual harvest was based on initial population size (e.g., an initial population of 100 was harvested as if it was 100 individuals, regardless of whether the population increased or decreased over the 20-year projection). We chose to structure harvest this way to more realistically reflect limited year-to-year knowledge of exact population size and our ability to change seasons on an annual basis in response to short-term population change. Harvest was rounded down to the nearest whole individual to prevent going over annual target harvest. We only presented annual harvest structures where harvest rate could be met on an annual basis. For example, we did not present a model of a population of 50 individuals harvested at 1% because that would equate to 0.5 individuals harvested each year.

In the 12-stage model, number of male and female individuals harvested during each time step was determined by drawing from a multinomial distribution using the target proportion of females and males in the harvest. Age classes of harvested males and females were determined separately by drawing from a multinomial distribution using the age class distribution from the previous time step.

2-Stage Population Models

The 2-stage population model included 2 age classes (juvenile and adult) and did not incorporate sex. Demographic stochasticity was incorporated using a matrix of standard deviations associated with transition probabilities. We projected population growth over 20 years with 1,000 replicates. Harvest varied across models from 1 to 12 individuals. Fecundity ranged from 0.253 to 0.535 and approximated kid:adult ratios of 10 to 21 kids per 100 adults. Hamel's fecundity value (0.395) was used as the "average" value and translated to approximately 15 kids per 100 adults. Varying fecundity values in this way, we assumed surveys were consistently conducted just before parturition, effectively measuring recruitment for the year. Using 5 initial population sizes, 1–12 individuals harvested, and 3 different fecundity values, we ran 180 model variations. Seventy-eight models are presented in our results. We excluded those models in which harvest structure was unrealistic relative to IDFG's management practices (e.g., substantially >5% harvest rate or <1% harvest rate).

12-Stage Population Models

The 12-stage population model included 6 age classes (kid, yearling, 2 years, 3–4 years, 5–8 years, and 9+ years) of both male and female mountain goats. Demographic stochasticity was incorporated into the model using a matrix of standard deviations associated with transition probabilities. We projected population growth over 20 years with 1,000 replicates. Model parameters included initial population size (50, 100, 150, 200, or 250), harvest rate (1–5% per time step), and percent of females in the harvest (10–50%). Using these ranges of parameter values, we ran 125 model variations. We present 122 models in the results. We excluded models in which harvest structure was unrealistic relative to IDFG's management practices (e.g., substantially >5% harvest rate or <1% harvest rate).

Future Research Needs

In those models that included harvest, all available age classes were harvested proportional to their availability in the population. In the future, incorporation of age-class-specific vulnerability could be helpful because certain age-sex classes may be more vulnerable to harvest (e.g., mature males or dispersing juveniles). Additionally, updating transition probabilities to reflect Idaho populations could enhance applicability of models to our mountain goat populations. Development of a systematic program to investigate relationships between survey results and these modeling efforts would help us determine how closely models track observed population trends in the state.

Table A-1. 2-Stage Model with recruitment of 15 kids:100 adults and no harvest.

Initial Abundance	Probability of 10% Decline	Probability of 25% Decline	λ
50	0.27	0.05	1.04
100	0.08	0	1.04
150	0.02	0	1.04
200	0.01	0	1.04
250	0.01	0	1.04

2-Stage Population Model

Harvest Rate (%)	# Individuals Harvested	Kid:100 Adults	10% Decline	25% Decline	λ
2	1	10 15 21	1 0.55 0.07	0.99 0.29 0.01	0.94 1.01 1.07
4	2	10 15 21	1 0.86 0.19	1 0.71 0.08	0.85 0.98 1.05
6	3	10 15 21	1 0.99 0.53	1 0.97 0.36	0.70 0.90 1.01

Table A-2. Probability of decline from an initial population size of 50 and annual population growth rate (λ) for modeled mountain goat populations under different annual harvest structures over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Table A-3. Probability of decline from an initial population size of 100 and annual population growth rate ($\hat{\lambda}$) for modeled mountain goat populations under different annual harvest structures over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	Kid:100 Adults	10% Decline	25% Decline	$\hat{\lambda}$
1	1	10 15 21	1 0.17 0	0.97 0.02 0	0.96 1.03 1.08
2	2	10 15 21	1 0.36 0.01	1 0.12 0	0.94 1.01 1.07
3	3	10 15 21	1 0.65 0.02	1 0.40 0	0.90 1.00 1.06
4	4	10 15 21	1 0.90 0.06	1 0.75 0.02	0.82 0.98 1.05
5	5	10 15 21	1 0.98 0.16	1 0.94 0.06	0.72 0.94 1.03
6	6	10 15 21	1 1 0.41	1 1 0.27	0.64 0.89 1.01

Table A-4. Probability of decline from an initial population size of 150 and annual population growth rate ($\hat{\lambda}$) for modeled mountain goat populations under different annual harvest structures over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	Kid:100 Adults	10% Decline	25% Decline	$\hat{\lambda}$
1	1	10 15 21	1 0.05 0	0.96 0 0	0.97 1.03 1.08
2	3	10 15 21	1 0.25 0	1 0.05 0	0.94 1.01 1.07
3	4	10 15 21	1 0.50 0	1 0.21 0	0.91 1.00 1.06
4	6	10 15 21	1 0.91 0.01	1 0.76 0	0.81 0.98 1.05
5	7	10 15 21	1 0.98 0.05	1 0.93 0.01	0.73 0.95 1.04
5.5	8	10 15 21	1 1 0.12	1 0.99 0.05	0.66 0.92 1.03

Table A-5. Probability of decline from an initial population size of 200 and annual population growth rate (λ) for modeled mountain goat populations under different annual harvest structures over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	Kid:100 Adults	10% Decline	25% Decline	λ
1	2	10	1	1	0.96
		15	0.05	0	1.03
		21	0	0	1.08
2	4	10	1	1	0.94
		15	0.19	0.03	1.01
		21	0	0	1.07
3	6	10	1	1	0.89
		15	0.60	0.30	1.00
		21	0	0	1.06
4	8	10	1	1	0.80
		15	0.93	0.76	0.97
		21	0	0	1.05
5	10	10	1	1	0.68
		15	1	0.98	0.94
		21	0.04	0.01	1.03
5.5	11	10	1	1	0.64
		15	1	1	0.91
		21	0.11	0.04	1.03

Table A-6. Probability of decline from an initial population size of 250 and annual population growth rate (λ) for modeled mountain goat populations under different annual harvest structures over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	Kid:100 Adults	10% Decline	25% Decline	λ
1	2	10	1	0.99	0.97
		15	0.01	0	1.03
		21	0	0	1.08
2	5	10	1	1	0.94
		15	0.12	0.01	1.01
		21	0	0	1.07
3	7	10	1	1	0.90
		15	0.47	0.17	1.00
		21	0	0	1.06
4	10	10	1	1	0.79
		15	0.94	0.80	0.98
		21	0	0	1.05
5	12	10	1	1	0.70
		15	1	0.98	0.95
		21	0.02	0	1.04

12-Stage Population Model

Table A-7. Probability of decline from an initial population size of 50 and annual population growth rate (λ) for modeled mountain goat populations with different annual harvest characteristics over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	% Female	10% Decline	25% Decline	λ
2	1	10	0.24	0.13	1.02
		20	0.26	0.14	1.01
		30	0.27	0.15	1.01
		40	0.30	0.17	1.01
		50	0.33	0.20	1.00
4	2	10	0.34	0.19	1.01
		20	0.37	0.22	1.01
		30	0.45	0.29	1.00
		40	0.49	0.34	0.99
		50	0.54	0.39	0.98

Table A-8. Probability of decline from an initial population size of 100 and annual population growth rate (λ) for modeled mountain goat populations with different annual harvest characteristics over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	% Female	10% Decline	25% Decline	λ
1	1	10	0.10	0.03	1.02
		20	0.11	0.03	1.02
		30	0.12	0.03	1.02
		40	0.13	0.04	1.02
		50	0.14	0.04	1.01
2	2	10	0.14	0.04	1.02
		20	0.17	0.05	1.02
		30	0.20	0.07	1.01
		40	0.23	0.09	1.01
		50	0.28	0.12	1.00
3	3	10	0.18	0.06	1.01
		20	0.27	0.11	1.01
		30	0.31	0.14	1.00
		40	0.35	0.18	1.00
		50	0.43	0.24	0.99
4	4	10	0.27	0.10	1.01
		20	0.34	0.15	1.00
		30	0.42	0.22	1.00
		40	0.51	0.30	0.99
		50	0.59	0.38	0.97
5	5	10	0.33	0.14	1.01
		20	0.44	0.23	1.00
		30	0.53	0.30	0.99
		40	0.62	0.41	0.97
		50	0.71	0.51	0.95

Table A-9. Probability of decline from an initial population size of 150 and annual population growth rate (λ) for modeled mountain goat populations with different annual harvest characteristics over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	% Female	10% Decline	25% Decline	λ
1	1	10	0.04	0.01	1.02
		20	0.04	0.01	1.02
		30	0.06	0.01	1.02
		40	0.05	0.01	1.02
		50	0.07	0.01	1.02
2	3	10	0.10	0.01	1.02
		20	0.13	0.04	1.01
		30	0.16	0.04	1.01
		40	0.18	0.05	1.01
		50	0.24	0.08	1.00
3	4	10	0.14	0.03	1.02
		20	0.18	0.05	1.01
		30	0.23	0.08	1.01
		40	0.28	0.12	1.00
		50	0.33	0.14	1.00
4	6	10	0.23	0.06	1.01
		20	0.32	0.12	1.00
		30	0.41	0.19	1.00
		40	0.52	0.28	0.98
		50	0.60	0.37	0.97
5	7	10	0.29	0.09	1.01
		20	0.40	0.17	1.00
		30	0.52	0.27	0.99
		40	0.63	0.39	0.97
		50	0.70	0.49	0.96

Table A-10. Probability of decline from an initial population size of 200 and annual population growth rate (λ) for modeled mountain goat populations with different annual harvest characteristics over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	% Female	10% Decline	25% Decline	λ
1	2	10	0.04	0	1.02
		20	0.05	0	1.02
		30	0.05	0.01	1.02
		40	0.05	0.01	1.02
		50	0.07	0.01	1.02
2	4	10	0.07	0.01	1.02
		20	0.10	0.01	1.01
		30	0.12	0.03	1.01
		40	0.16	0.04	1.01
		50	0.20	0.05	1.00
3	6	10	0.14	0.02	1.01
		20	0.19	0.05	1.01
		30	0.25	0.07	1.01
		40	0.34	0.13	1.00
		50	0.42	0.18	0.99
4	8	10	0.20	0.04	1.01
		20	0.29	0.09	1.00
		30	0.40	0.16	1.00
		40	0.52	0.27	0.98
		50	0.62	0.36	0.97
5	10	10	0.30	0.08	1.01
		20	0.45	0.17	1.00
		30	0.56	0.30	0.98
		40	0.68	0.43	0.97
		50	0.75	0.53	0.95

Table A-11. Probability of decline from an initial population size of 250 and annual population growth rate (λ) for modeled mountain goat populations with different annual harvest characteristics over 20 years. Red indicates a decreasing population, green indicates an increasing population.

Harvest Rate (%)	# Individuals Harvested	% Female	10% Decline	25% Decline	λ
1	2	10	0.01	0	1.02
		20	0.02	0	1.02
		30	0.02	0	1.02
		40	0.02	0	1.02
		50	0.04	0	1.02
2	5	10	0.05	0	1.02
		20	0.07	0.01	1.01
		30	0.09	0.01	1.01
		40	0.14	0.03	1.01
		50	0.18	0.04	1.00
3	7	10	0.10	0.01	1.02
		20	0.15	0.03	1.01
		30	0.19	0.05	1.01
		40	0.27	0.08	1.00
		50	0.36	0.13	0.99
4	10	10	0.18	0.03	1.01
		20	0.27	0.07	1.00
		30	0.40	0.15	0.99
		40	0.53	0.24	0.99
		50	0.62	0.37	0.97
5	12	10	0.29	0.06	1.01
		20	0.40	0.13	1.00
		30	0.55	0.27	0.99
		40	0.66	0.39	0.97
		50	0.73	0.50	0.95

Table A-12. Probability of decline from an initial population size of 100 and annual population growth rate (λ) for modeled mountain goat populations with high fecundity (~21 kids: 100 adults) with different annual harvest characteristics over 20 years. Green indicates an increasing population.

Harvest Rate (%)	% Female	10% Decline	25% Decline	λ
1	10	0	0	1.06
1	20	0	0	1.06
1	30	0.01	0	1.06
1	40	0	0	1.05
1	50	0.01	0	1.05
2	10	0.01	0	1.06
2	20	0.01	0	1.05
2	30	0.01	0	1.05
2	40	0.01	0	1.05
2	50	0.02	0.01	1.04
3	10	0.02	0	1.05
3	20	0.02	0.01	1.05
3	30	0.03	0.01	1.05
3	40	0.04	0.01	1.04
3	50	0.05	0.02	1.04
4	10	0.02	0	1.05
4	20	0.04	0.01	1.04
4	30	0.05	0.01	1.04
4	40	0.09	0.04	1.03
4	50	0.13	0.06	1.02
5	10	0.03	0.01	1.05
5	20	0.05	0.01	1.04
5	30	0.09	0.03	1.03
5	40	0.15	0.07	1.02
5	50	0.25	0.14	1.01

Table A-13. Probability of decline from an initial population size of 200 and annual population growth rate (λ) for modeled mountain goat populations with high fecundity (~21 kids:100 adults) with different annual harvest characteristics over 20 years. Green indicates an increasing population.

Harvest Rate (%)	% Female	10% Decline	25% Decline	λ
1	10	0	0	1.06
1	20	0	0	1.06
1	30	0	0	1.06
1	40	0	0	1.05
1	50	0	0	1.05
2	10	0	0	1.05
2	20	0	0	1.05
2	30	0	0	1.05
2	40	0	0	1.05
2	50	0	0	1.04
3	10	0	0	1.05
3	20	0	0	1.05
3	30	0	0	1.04
3	40	0.01	0	1.04
3	50	0.01	0	1.03
4	10	0	0	1.05
4	20	0.01	0	1.05
4	30	0.01	0	1.04
4	40	0.03	0.01	1.03
4	50	0.06	0.02	1.02
5	10	0	0	1.05
5	20	0.01	0	1.04
5	30	0.04	0.01	1.03
5	40	0.09	0.03	1.02
5	50	0.18	0.08	1.01

Table A-14. Probability of decline and annual population growth rate (λ) for modeled mountain goat populations with different all-male harvest over 20 years. Green indicates an increasing population.

Initial Abundance	Harvest Rate (%)	10% Decline	25% Decline	λ
50	2	0.21	0.10	1.02
50	4	0.27	0.13	1.02
100	1	0.07	0.01	1.02
100	2	0.12	0.03	1.02
100	3	0.15	0.04	1.02
100	4	0.20	0.06	1.02
100	5	0.25	0.09	1.01
150	1	0.04	0	1.02
150	2	0.08	0.01	1.02
150	3	0.09	0.01	1.02
150	4	0.16	0.04	1.02
150	5	0.19	0.05	1.02
200	1	0.03	0	1.02
200	2	0.05	0.01	1.02
200	3	0.09	0.01	1.02
200	4	0.13	0.01	1.02
200	5	0.18	0.03	1.02
250	1	0.01	0	1.02
250	2	0.03	0	1.02
250	3	0.06	0	1.02
250	4	0.12	0.01	1.02
250	5	0.15	0.01	1.01

Appendix B: Translocation Records

Year	Month	Capture State	Capture PMU	Capture GMU	Capture Location	Release State	Release PMU	Release GMU	Release Location	Adult M	Adult F	Kid M	Kid F	Total
1960	Jun	ID	Black Snow	9	Snow Peak	ID	Pend Oreille	4A	Echo Bay					**5**
1960	Jun	ID	Black Snow	10	Black Mt.	ID	Pend Oreille	4A	Echo Bay					**3**
1961	Jul	ID	Black Snow	9	Snow Peak	CO			Mount Evans	2	3			**5**
1962	Jun	ID	Black Snow	9	Snow Peak	ID	Seven Devils	18	Seven Devils	2	3	3		**8**
1962	Jul	ID	Black Snow	9	Snow Peak	ID	Pend Oreille	4A	Echo Bay					**3**
1964	Jul	ID	Black Snow	9	Snow Peak	ID	Seven Devils	18	Seven Devils					**7 or 9**
1965	Jul	ID	Black Snow	9	Snow Peak	ID	Pend Oreille	4A	Echo Bay					**4 or 7**
1966	Jun	ID	Black Snow	9	Snow Peak	ID	Lower Salmon	15	Johns Creek	4	4			**8**
1967	Jun	ID	Black Snow	9	Snow Peak	ID	Lower Salmon	15	Johns Creek	1	1-2			**2 or 3**
1968	Jul	ID	Black Snow	9	Snow Peak	ID	Pend Oreille	4A	Green Monarchs	1-2	2			**3 or 4**
1969	Jul	ID	Black Snow	9	Snow Peak	ID	Palisades	67	Palisades Creek	2	1			**3**
1969	Jul	ID	Black Snow	10	Black Mt.	ID	Palisades	67	Palisades Creek	1	1			**2**
1970	Jul	ID	Black Snow	9	Snow Peak	ID	Palisades	67	Blacks Canyon	3				**3**
1971	Jul	ID	Black Snow	9	Snow Peak	ID	Palisades	67	Palisades Creek	1	2	1		**4**
1981	Jul	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Lion Creek	1	1			**2**
1982	Jul	WA			Olympic NP	ID	Selkirk	1	Lion Creek	5	3		1	**9**
1982	Jul	WA			Olympic NP	ID	Lemhi	37A	Patterson Creek	8	12			**20**
1983	Jun-Jul	ID	Black Snow	9	Snow Peak	OR			Elkhorn Mts.	2	3		1	**6**

Table B-1. Mountain goats translocated into, out of, and within Idaho, 1960–2007.

Year	Month	Capture State	Capture PMU	Capture GMU	Capture Location	Release State	Release PMU	Release GMU	Release Location	Adult M	Adult F	Kid M	Kid F	Total
1983	Jul	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Bugle Creek	2				**2**
1985	Jun	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Lion Creek	1	5			**6**
1986	Jun	ID	Black Snow	10	Black Mt.	ID	Black Snow	12	Boulder Creek					**7**
1987	Jun	ID	Black Snow	9	Snow Peak	ID	Lower Salmon	19	Oregon Butte		8			**8**
1987	Jun	ID	Black Snow	10	Black Mt.	ID	Lower Salmon	19	Oregon Butte	2	2			**4**
1989	Jun	ID	Black Snow	9	Snow Peak	ID	Middle Fork	27	Middle Fork of Salmon River		2			**2**
1989	Jun	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Parker Creek		5			**5**
1989	Jun	ID	Black Snow	10	Black Mt.	ID	Selkirk	1	Parker Creek	2	1			**3**
1989	Jul	WA			Olympic NP	ID	Seven Devils	18	Seven Devils	8				**8**
1989	Aug	ID	Black Snow	10	Black Mt.	ID	Middle Fork	27	Jack Creek	2	4			**6**
1989	Aug	ID	Palisades	67	Baldy Mt.	ID	Panther Creek	28	Williams Creek	1	1			**2**
1989	Jul	ID	Black Snow	9	Snow Peak	ID	Middle Fork	27	Jack Creek		1			**1**
1990	Jul	ID	Palisades	67	Baldy Mt.	ID	Panther Creek	28	Pine Creek	1				**1**
1990	Jul	ID	Palisades	67	Baldy Mt.	ID	Panther Creek	28	Panther Creek	1	4		1	**6**
1991	Jun	ID	Black Snow	10	Black Mt.	ID	Middle Fork	27	Ship Island Creek	4	4			**8**
1991	Jul	ID	Palisades	67	Baldy Mt.	ID	Panther Creek	28	Panther Creek	1	4		1	**6**
1992	Jun	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Parker Creek		1			**1**

Year	Month	Capture State	Capture PMU	Capture GMU	Capture Location	Release State	Release PMU	Release GMU	Release Location	Adult M	Adult F	Kid M	Kid F	Total
1992	Jul	ID	Palisades	67	Baldy Mt.	ID	Panther Creek	28	Panther Creek	2	9			**11**
1994	Jun-Jul	ID	Black Snow	9	Snow Peak	ID	Selkirk	1	Ball Creek		3			**3**
1994	Jun	ID	Black Snow	10	Black Mt.	ID	Lower Salmon	20	Big Squaw Creek	4	4			**8**
1994	Aug	ID	Palisades	67	Mt. Baird	ID	Middle Fork	21	Square Top Mt.	4	6			**10**
1996	Jun	ID	Black Snow	10	Black Mt.	ID	Lower Salmon	20	Big Squaw Creek		1			**1**
1997	Aug	ID	Palisades	67	Mt. Baird	ID	Middle Fork	21	Corn Lake	4	6			**10**
1998	Jun	ID	Black Snow	10	Black Mt.	ID	Lower Salmon	15	Johns Creek	1				**1**
1998	Jun	ID	Black Snow	10	Black Mt.	ID	Lower Salmon	20	Big Squaw Creek	1	2			**3**
1999	Jun	ID	Seven Devils	18	Seven Devils	ID	Lower Salmon	20	Big Mallard Creek	4	3			**7**
2001	Mar-Apr	ID	Seven Devils	18	Bernard-Granite Creeks	ID	Lower Salmon	20	Big Mallard Creek	5	6			**11**
2003	Mar	ID	Seven Devils	18	Seven Devils	ID	Lower Salmon	20	Sheep Hill	4	6	2	4	**16**
2007	Sept	UT			Tushar Mts.	ID	Lemhi	29	Haynes Creek	5	18	1		**24**

Appendix C: Modeling Potential Distribution of Mountain Goats in Idaho

Although several species distribution models were developed for mountain goats in the Rocky Mountains (e.g., Gross et al. 2002, DeVoe et al. 2015, Lowrey et al. 2017, White and Gregovich 2017, White et al. 2018), none of these encompass all of Idaho nor do they make use of Idaho observation data. The only other statewide distribution models for mountain goat currently available are deductive habitat models developed by the Gap Analysis Project (Scott et al. 2002, USGS 2017).

To aid in development of this plan, we created a preliminary model of mountain goat distribution using maximum entropy methods (MaxEnt 3.4.1; Phillips et al. 2006, Phillips and Dudík 2008). Given a set of environmental variables and species presence locations, MaxEnt identifies correlations between each variable and presence data, compares those correlations with the range of environmental conditions available in the modeled region, and develops a continuous model of relative likelihood, or probability, of suitable habitat across the study area based on environmental similarity to known occupied sites. Our modeling process incorporated all available occurrence data and several environmental variables hypothesized to influence distributions of mountain goats in the previously mentioned modeling efforts. Conducting all spatial analyses in ArcGIS 10.5.1 (ESRI 2017), we ensured spatial data were in a common geographic coordinate system, spatial resolution (30 m x 30 m), and extent, then exported data as ASCII files for input into R and MaxEnt.

Mountain Goat Observations

All known locations of mountain goats in Idaho as of 12 October 2018 were compiled for this modeling effort. The data set included observations from numerous helicopter and fixed-wing airplane survey efforts (1960–2018), remote-camera-survey detections, GPS locations from collared animals, incidental observations recorded in the USFS Natural Resource Information System database and in IDFG regional data files, and observations previously stored in Idaho Fish and Wildlife Information System (IFWIS) Species Diversity Database (including museum specimens, older survey efforts, and incidental observations). All of these compiled data were uploaded to IFWIS Species Diversity Database for long-term data storage and accessibility.

We carefully evaluated all data for use in the distribution model to ensure observational, spatial, and temporal accuracy. Of 25,222 observations compiled, we categorized 25,005 as verified (e.g., specimen, DNA, or photograph) or trusted (e.g., documented by a biologist, researcher, or taxonomic expert) and 23,776 of these as having sufficient spatial accuracy (≤1,000 m) for our modeling purposes. Compiled observation data such as these are prone to errors of sampling bias, both geographically and environmentally, and our observations exhibited spatial clustering at fine scales in portions of the state. Species distribution models can be sensitive to such bias and spatial filtering of presence data is often suggested as a solution (Phillips et al. 2009, Veloz 2009, Kramer-Schadt et al. 2013, Radosavljevic and Anderson 2013, Boria et al. 2014). The key to spatial filtering is to randomly subsample presence data with a minimum distance separating sample points, thereby limiting spatial autocorrelation and reducing environmental bias caused by uneven sampling. That minimum distance is somewhat arbitrary, however, and depends on environmental conditions of the study area as well as resolution of data used for modeling. We reduced locally dense sampling of mountain goats by randomly subsampling with a minimum distance of 270 m. These filtering procedures (verified or trusted, ≤1,000 m accuracy, within Idaho, and >270 m separation) resulted in 4,250 observations available for use in our modeling effort.

Environmental Variables

Previous modeling efforts focused on topographic, vegetative, and heat-related suites of environmental covariates at a variety of spatial scales (Gross et al. 2002, DeVoe et al. 2015, Lowrey et al. 2017, White and Gregovich 2017, White et al. 2018). Given that topographic measures were by far the most significant variables in these efforts, and limited time constraints for our effort, we used a subset of fine-scale (30-m resolution) topographic and climatic covariates (Table C-1) that were already developed for use in other statewide modeling projects (L. K. Svancara, IDFG, unpublished data).

Topographic variables developed from National Elevation Data (30 m) (USGS 2016) included elevation, slope, aspect, compound topographic index (CTI), roughness, and vector ruggedness measure (VRM). The CTI, a steady-state wetness index, measures catenary topographic position represented by both slope and catchment size (Moore et al. 1993, Gessler et al. 1995). Although CTI aims to model soil water content, the index also characterizes landscapes such that areas with low CTI represent small catchments and steep slopes while areas with high CTI are large catchments with gentle slopes. Roughness, similar to terrain ruggedness index (Riley et al. 1999), calculates amount of elevation difference between a grid cell and its neighbors, essentially variance of elevation within the neighborhood (8x8 in this analysis). The VRM measures terrain heterogeneity within a neighborhood (9x9 in this analysis), capturing variability in both slope and aspect into a single measure. Both CTI and roughness were calculated using Evans et al. (2014) whereas VRM was calculated following Sappington et al. (2007) and Sappington (2012).

Climatic variables included a recent temperature dataset developed at finer spatial resolution (250 m) for the Northern Rockies (Holden et al. 2015) in combination with precipitation data from PRISM (800 m) (PRISM Climate Group 2012). Original PRISM precipitation data at 800-m resolution were resampled to 250 m to match temperature data. Using monthly 30-year normals (1981–2010) from both temperature and precipitation datasets, we calculated 19 bioclimatic variables patterned after Hijmans et al. (2005) which have been used extensively in wildlife habitat modeling (e.g., Elith et al. 2010, Anderson and Gonzalez 2011, Stanton et al. 2011).

Current Habitat Suitability

We supplied MaxEnt with occurrence data described above, as well as background points consisting of 10,000 randomly generated pseudo-absences across Idaho that were >270 m apart, >270 m from presence locations, and outside of waterbodies. Following recommended approaches, we then calculated species-specific model parameters with regard to collinearity, regularization multiplier, and feature types.

In an iterative approach, we optimized each model for regularization multiplier (values tested included 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 6, 7, 8, 9, 10, 12.5, 15, 17.5, and 20) and feature types (linear, quadratic, product, threshold, hinge, and interactions) using the enmSdm package (Smith 2017) in R 3.5.0 (R Core Team 2018) and selected the best performing combination based on AICc (Warren and Seifert 2011, Wright et al. 2015). Beginning with a full model inclusive of all covariates (n = 26), we implemented a 10-fold subsample routine (withholding 30% [n = 1,275] of observations for testing) and jackknifing to measure importance of each variable to the resulting model. Variables were then ranked based on their permutation importance and removed if <2% contribution. Correlated variables (P > 0.75) were also removed, keeping the variable with the higher permutation importance. This process of model optimization, development, and variable ranking and removal was repeated until all variables had a minimum contribution of ≥2%. The final model represented the average of 10 subsample replicates using the optimized parameters and most important variables.

We imported mean model output into ArcGIS 10.5.1 (ESRI 2017) and identified areas of suitable and unsuitable habitat based on the 10-percentile training presence threshold calculated by MaxEnt (Table C-2). This threshold identifies the model value that excludes 10% of training locations having the lowest predicted value. For comparative purposes, we further binned suitable habitat using other MaxEnt calculated thresholds to identify low, medium, and high suitability. To separate low- and medium-suitability habitat we used the 'balance training omission, predicted area and threshold value' threshold, which uses weighting constants to provide a balance between over-fitting and over-estimating. To separate medium- and high-suitability habitat we used the 'equal training sensitivity and specificity' threshold, which equalizes omission and commission errors.

Results and Discussion

MaxEnt accurately predicted mountain goat distribution with area under the receiver operating characteristic curve, AUC = 0.857. The best fit model based on AICc employed linear, quadratic, product, and hinge features with a regularization multiplier of 0.5. Averaged over replicate runs, the most important variables were precipitation of driest month (bio14), roughness, VRM, temperature seasonality (bio4), and elevation (in order of permutation importance) (Table C-1). Jackknife tests indicated roughness contained the most useful information by itself, as well as the most information that was not present in other variables. Predicted mountain goat suitability increased with increasing precipitation in driest month, elevation, roughness, and VRM, and with decreasing temperature seasonality.

Because selection of specific model thresholds is somewhat arbitrary and biologically meaningful thresholds can be difficult to determine, careful consideration of resulting model accuracy is necessary and reporting a range of threshold values, or none at all, is often recommended (Liu et al. 2005, Merow et al. 2013). Using selected thresholds described above, our final mountain goat model predicted 5.2 million acres of suitable habitat across the state (9.8% of Idaho), composed of 2 million acres of low suitability, 0.6 million acres of medium suitability, and 2.5 million acres of high suitability. The majority of suitable habitat is predicted to occur in Salmon region, including 40% of the area classified as high suitability.

Future Model Refinements

Given time constraints under which this model was developed, we strongly recommend additional biologic and programmatic model refinements be considered. Biologically, developing seasonal models (summer vs. winter) as well as region-specific models would address the sometimes dramatically different landscapes used by mountain goats across the state. For example, mountain goat occurrences in Upper Snake region average >2,800 m (range 2,184–3,305 m) elevation, whereas those in Panhandle and Clearwater regions average <1,500 m (range 856–2,000 m). Programmatically, further refinement of background data, as well as inclusion of different covariates, may result in better fitting models. Because MaxEnt uses background locations where presence or absence of target species is unknown or unmeasured, choice of background data influences what is modeled and perceptions about results (Elith et al. 2010, Merow et al. 2013). By default, MaxEnt assumes the species is equally likely to be anywhere in the study extent (Phillips and Dudík 2008), thus, modifying the background sample is equivalent to modifying prior expectations for species distribution (Merow et al. 2013). Assessing a range of background extents, instead of just full statewide extent of our preliminary model, may result in increased model performance (e.g., VanDerWal et al. 2009, Anderson and Raza 2010, Iturbide et al. 2015). Similarly, including additional covariates such as forest canopy cover, NDVI, heat load, snow depth, and multi-scale variations of these covariates, may improve model performance as in other efforts (e.g., DeVoe et al. 2015, Lowrey et al. 2017). Lastly, assessing potential future changes in modeled distribution of mountain goats under various climate change scenarios would be beneficial.

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Table C-1. Environmental variables used in modeling mountain goat distribution in Idaho.

Type	Variable	Code	Units	Source
Topography	Aspect	Asp	Degree	3D Elevation Program (USGS 2016), Evans et al. (2014) [CTI and Rough8], Sappington et al. (2007) [VRM]
	Slope	Slp	Degree	
	Elevation	Elev	Meters	
	Compound Topographic Index	CTI	Index	
	Roughness (8 neighbor cells)	Rough 8	Meters	
	Vector Ruggedness Measure (9 neighbor cells)	VRM	Index	
Climate	Mean annual temp	Bio1	°C	Holden et al. (2015), PRISM (2012), dismo package in R.
	Mean diurnal range	Bio2	°C	
	Isothermality (bio2 / bio7) (×100)	Bio3	Percent	
	Temp seasonality (SD × 100)	Bio4	°C	
	Max. temp of warmest month	Bio5	°C	
	Min. temp of coldest month	Bio6	°C	
	Temp annual range (bio5 – bio6)	Bio7	°C	
	Mean temp of wettest quarter[1]	Bio8	°C	
	Mean temp of driest quarter[1]	Bio9	°C	
	Mean temp of warmest quarter[1]	Bio10	°C	
	Mean temp of coldest quarter[1]	Bio11	°C	
	Total annual precipitation	Bio12	mm	
	Precipitation of wettest month	Bio13	mm	
	Precipitation of driest month	Bio14	mm	
	Precipitation seasonality (CV)	Bio15	%	
	Precipitation of wettest quarter[1]	Bio16	mm	
	Precipitation of driest quarter[1]	Bio17	mm	
	Precipitation of warmest quarter[1]	Bio18	mm	
	Precipitation of coldest quarter[1]	Bio19	mm	
	Annual mean growing degree days	gdd	No.	Holden et al. (2015)

[1]Quarter is any 3-month time period

Table C-2. MaxEnt modeled thresholds used in aiding interpretation of habitat suitability. Values used in displaying the final model are highlighted in bold.

Threshold	Average Value
Prevalence	0.2321
Min. training presence	0.0016
10 percentile training presence	**0.3625**
Equal training sensitivity and specificity	**0.5174**
Max. training sensitivity plus specificity	0.3026
Balance training omission, predicted area and threshold value area	**0.4739**

Appendix D: Public Input Summary

The draft plan was available for comment on the IDFG website for 18 days from 22 May 2025 to 08 June 2025. A variety of press releases, social media posts and e-mails were released several times during the comment period to encourage participation. We also directly e-mailed USFS, Northern Wild Sheep and Goat Council, Rocky Mountain Goat Alliance, Tribes, neighboring state and provincial wildlife agencies, and several other organizations to solicit feedback.

The draft mountain goat management plan webpage was visited by 679 users. Of these users, 60 individuals responded to the online comment form. Most of the respondents were Idaho residents (88%). More than 88% of the respondents either supported (n=29) or supported with concerns (n=26) the draft management plan (Table D-1). Less than 9% (n=5) did not support the plan.

Seventy-three percent of online respondents (n=44) left additional comments regarding the plan. Additionally, IDFG received written comments from Idaho Wildlife Federation, Theodore Roosevelt Conservation Partnership, Idaho Conservation League, Rocky Mountain Goat Alliance, and Sawtooth National Forest.

The most frequently mentioned topics were general support of the plan (n=12), comments related to specific season setting suggestions (n=8), support for the mandatory sex identification training (n=7), support for limiting recreational activities in places where mountain goats may be disturbed (n=7), support for reducing hunter harvest in herds with population declines or high nanny harvest (n=5), and suggestions that IDFG to conduct more population surveys especially in non-hunted populations and populations without recent survey data (n=5) (Figure D-1). The 5 respondents who did not support the plan provided comments addressing predation, non-resident participation, and prioritizing wildlife viewing.

After considering all public comments, the draft plan was modified and prepared for consideration by the Commission.

Table D-1. Level of support for the plan based on online comments (n=60).

Level of Support	Respondents (n)	Proportion of Respondents (%)
Support	29	48.3
Support with concerns	26	43.3
Do not support	5	8.3

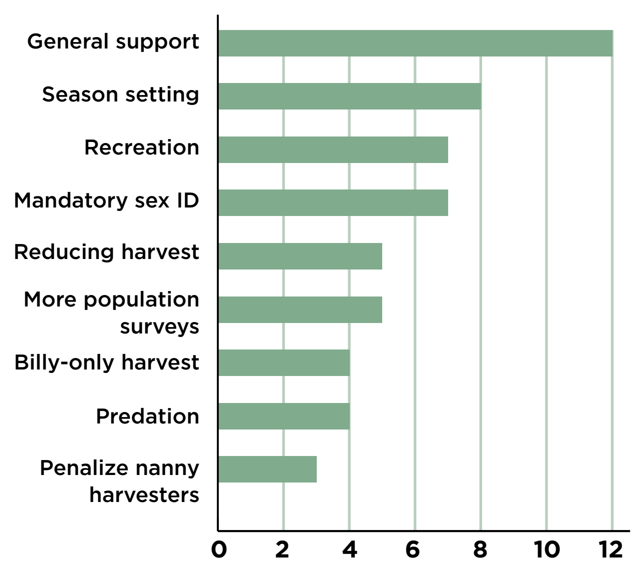

Figure D-1. Topics discussed in written comments (n=5) and by online users who opted to leave a comment (n=44).

Idaho
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