MOUNTAIN GOAT UNIT MANAGEMENT PLAN
Wasatch and Central Mountains
Lone Peak / Box Elder Peak / Timpanogos / Provo Peak / Nebo
August 2019

BOUNDARY DESCRIPTIONS

Lone Peak – Salt Lake County: Boundary begins at the junction of I-15 and I-80 in Salt Lake City; east on I-80 to the Salt Lake-Summit county line; south along this county line to the Salt Lake-Wasatch county line; southwest along this county line to the Salt Lake-Utah county line; southwest along this county line to I-15; north on I-15 to I-80 in Salt Lake City.

Box Elder Peak – Utah County: Boundary begins at I-15 and the Salt Lake-Utah county line; east along this county line to the Utah-Wasatch county line; south along this county line to "Pole Line Pass" on the Snake Creek-North Fork American Fork Canyon road; west on this road to SR-92; west on SR-92 to I-15; north on I-15 to the Salt Lake-Utah county line.

Timpanogos – Utah County: Boundary begins at the junction of SR-92 and SR-146; southeast on SR-92 to US-189; southwest on US-189 to SR-52; west on SR-52 to US-89; north on US-89 to SR-146; north on SR-146 to SR-92.

Provo Peak – Utah County: Boundary begins at the junction of I-15 and US-6 at Spanish Fork; north on I-15 to SR-52; east on SR-52 to US-189; northeast on US-189 to the South Fork Drainage of Provo Canyon; east along this drainage bottom to the Berryport trail; south along this trail to the Left Fork of Hobble Creek road; south on this road to the Right Fork of Hobble Creek road; east on this road to Cedar Canyon; south along this canyon bottom to Wanrhodes Canyon; south along this canyon bottom to Diamond Fork Creek; southwest along this creek to US-6; northeast on US-6 to I-15.

Nebo - Juab and Sanpete Counties: Boundary begins at the junction of US-6 and I-15 at Spanish Fork; southeast on US-6 to US-89; south on US-89 to SR-28 at Gunnison; north on SR-28 to I-15 at Nephi; north on I-15 to US-6 at Spanish Fork.

LAND OWNERSHIP

Land ownership and approximate area of modeled mountain goat habitat ≥8,000 ft elevation for the Wasatch Mountains and Central Mountains subunits.

OWNERSHIP	AREA (Acres)	PERCENT OWNERSHIP
U.S. Forest Service	229,946	87%
Private	20,686	8%
UDWR	12,221	4.6%
BLM	494	<1%
SITLA	184	<1%
National Parks	34	<1%
Total	263,566	100%

Land ownership of mountain goat summer and winter range is almost exclusively US Forest Service lands in the Uinta and Wasatch/Cache National Forest (Table 1) with the exception of the Loafer Mountain Wildlife Management Area (UDWR-owned property). There are five wilderness areas on the unit; Mt. Olympus, Twin Peaks, Lone Peak, Timpanogos, and Nebo. Active management of mountain goats utilizing these areas is essential to understanding population trends and habitat use. UDWR will continue to cooperate with the USFS in management actions within wilderness areas.

UNIT MANAGEMENT GOALS

Manage for a population of healthy animals capable of providing a broad range of recreational opportunities, including hunting and viewing. Balance mountain goat herd impacts with other uses such as authorized livestock grazing and local economies. Maintain the population that is sustainable within the available habitat as determined by acreage delineated from actual mountain goat utilization.

HISTORY AND CURRENT STATUS

The first mountain goat transplant on the Wasatch West unit was in 1967. Six mountain goats were brought into the state form Wanatchee Washington and released on Lone Peak. The next mountain goat transplant took place in 1981 with ten mountain goats from Olympic National Park and released on Timpanogos. Since then, the mountain goat population on Timpanogos has grown to 100 animals, and the population has been stable (see Appendix A).

In 1982, ten mountain goats were brought into the state from Olympic National Park and released on Mt. Olympus. Provo peak received an additional twelve goats from Olympic National Park in 1989 and was supplemented with six additional goats from Timpanogos in 1990. The mountain goat population on Provo Peak has grown to approximately 100 animals, and the population is also currently stable.

Since the first release on the Lone Peak and Box Elder Peak subunits in 1969, mountain goats have flourished to over 300 animals. Subsequently, within the past ten years, the population has declined to an estimated population of less than eighty mountain goats (see Appendix A). In this study, mountain goats will be collared and disease tested over several years across all the sub-units to determine migration movements, vital rates, and disease prevalence. The UDWR is currently working with the USFS to net-gun capture goats from a helicopter since this is the most effective and least-invasive capture method for this area.

In 2007, the UDWR transplanted twenty mountain goats from the Tushar Mountains in southern Utah to Loafer Mtn. The goats exhibited little growth initially. In 2013, an additional twenty-one goats (ten from the Tushar Mountains and eleven from Willard Peak) were released on Mount Nebo to supplement the population and expand distribution. The herd has since grown steadily from sixty-six counted goats in 2015 to almost double that number in 2018 (Appendix B).

ISSUES AND CONCERNS

Native Status: A number of records exist that document the historical presence of mountain goats in Utah prior to reintroduction efforts that began in 1967. An analysis of available information is included as an appendix in the Utah Mountain Goat Statewide Management Plan. However, there are not as many documented records as with some other wildlife native to Utah, which has led to some controversy about their native status. Regardless of the controversy, they are certainly native to the Northern Rocky Mountains and neighboring states to Utah. UDWR's position is that mountain goat habitat exists in Utah and that mountain goats are a valuable part of our wildlife resource diversity and are a legitimate part of our modern Utah faunal landscape. As with any other ungulate species in our now pervasively human-altered ecosystem, they require pro-active management.

Habitat Modeling: Potential mountain goat habitat has been modeled on the Wasatch and Central Mountains units using a simplified GIS analysis approach as described by Gross et al. (2002). Mountain goats are highly associated with escape terrain, which has been defined as slopes from >25° (Varley 1994) to $\geq$ 33° (Gross et al. 2002). We used slopes >30° as potential mountain goat escape terrain. Gross et al. found that applying a 258m (846ft) buffer to escape terrain correctly classified 87% of active mountain goat habitat. We applied a 258 m buffer to all slopes $\geq$ 30º on the Wasatch and Central Mountains and calculated potential habitat acreage at the $\geq$ 8,000 ft, > 9,000 ft, and >10,000 ft

elevations. A map of the modeled goat habitat at all elevations across the Wasatch and Central mountains is provided in Figures 1 & 2.

Interspecific Competition and Disease Concerns: Interactions of mountain goats with other ungulates are anticipated seasonally, but due to their specific habitat requirements, mountain goats are not likely to impact these other species. Competition for forage between goats and deer or elk has never been considered important since the bulk of mountain goat range is unavailable to deer and elk due to elevation and terrain. Additionally, there is no grazing of domestic livestock in mountain goat habitats on the Wasatch or Central Mountains units.

There may be potential for some competition and disease transmission between bighorn sheep and mountain goats. There are remnant bighorn sheep throughout the area and it is suspected these sheep have been exposed to several pathogens due to occasional contact with domestic sheep (Shannon et al. 2014). Due to the potential for mountain goats to become infected with some of these pathogens, particularly *Mycoplasma* spp., periodic disease testing may be necessary. *Mycoplasma* spp. has not shown to negatively impact other wildlife or livestock species.

Although little interaction has been documented between bighorn sheep and goats on this unit, an evaluation of habitat use and preferences should occur in conjunction with disease assessments for both species.

Sensitive Plants: The USFS has identified three sensitive (rare) plants species within the management unit; Cliff jamesii (*Jamesii americana var.Macracalyx*), Garrett's bladderpod (*Lesquerella garrettii*), and King woody aster (*Aster kingii var. kingii*). These three sensitive plant species occurred in the Wasatch mountains before pioneer settlement when bighorn sheep grazed the area. The potential for significant impacts on these sensitive plants by big game animals and/or by grazing livestock is apparently low, possibly because of poor palatability.

Soils: There has been some speculation that mountain goat populations could over populate and cause destruction to high alpine soils from over grazing and summer dusting. However, mountain goat populations on Timpanogos and Lone Peak never reached sizes that impacted the habitat. There have been goat movements from Lone Peak to Box Elder Peak and from Mount Timpanogos to Provo Peak. Little evidence has surfaced to indicate goats have any significant direct effect on soils, vegetative resources, or watershed values.

Non-Consumptive Use: There is great public interest in mountain goat viewing opportunities as has been demonstrated on other goat management units within Utah. On Timpanogos, an average of fifty people per day, hike the mountain to view mountain goat throughout the summer months. Approximately 100 people have annually attended the UDWR sponsored "goat-viewing day" which typically occurs in January at the mouth of Little Cottonwood Canyon. The increase of tourism for mountain goat viewing on

Wasatch is very likely given the proximity of Salt Lake City and the Ski resorts in the area.

Predation: Cougars are suspected to be the main predator of mountain goats on the Wasatch and Central Mtns units. If predation is identified as a limiting factor, predator control work will be administered within the guidelines of the UDWR predator management policy and guidelines.

POPULATION MANAGEMENT

Population Management Objectives:

Mountain goats in the Wasatch and Central Mtns units will be managed on a long-term basis to not exceed the densities found in wild populations of Southeastern Alaska (6.0 goats/sq. mile).

Table 2. Summary of mountain goat population densities for each unit in Utah based on modeled habitat ≥8000 ft elevation.

Unit	Population Objective	Square Miles of Mountain Goat Habitat	Mountain Goats per Square Mile
Cache/Ogden/East Canyon	700	150	4.67
Uinta Mountains	1500	990	1.52
Wasatch & Central Mtns	875	412	2.12
Beaver	175	261	0.67
La Sal Mountains	200	91	2.20
Mount Dutton	125	157	0.79

a. Achieve a minimum abundance of 125 mountain goats on each of the sub-units.

b. Manage the sub-units for abundances of:
    a. Box Elder/Lone Peak/Mt Timpanogos – 550
    b. Provo Peak – 125
    c. Nebo – 200

Population Management Strategies:

Transplant/Hunting Plan: If the Nebo unit continues to grow at a substantial rate, the mountain goat herd in this unit may be used as a source stock for transplants as needed. If populations surpass the objective, we will implement a transplant or increase nanny hunting opportunities to regulate population numbers.

Monitoring: Monitor population size and composition using statewide survey protocols. Perform aerial helicopter surveys every 2-3 years as well as potential ground

classification as resources allow. Utilize population or sight-ability models to determine the relationship between surveys and population size.

Predator Management: Predator management will be coordinated with USDA Wildlife Services prior to bighorn release. If predation becomes a limiting factor on bighorns, predator control work will be administered within the guidelines of the DWR Predator Management Policy.

HABITAT MANAGEMENT

Habitat Management Objectives:

1) Maintain or improve sufficient mountain goat habitat to achieve population objectives.

Habitat Management Strategies:

Monitoring: If significant concern arises that mountain goats are having negative impacts to habitats that they use, then the DWR will coordinate habitat monitoring with land management agencies to detect changes in habitat quantity or quality and identify and protect critical mountain goat habitats

Habitat Improvement: Work with land managers to minimize and mitigate loss of goat habitat due to human disturbance and development. Inform and educate the public concerning the needs of mountain goats including the effects of human disturbance and the need for habitat improvements. Encourage land management agencies and private landowners to protect alpine tundra habitats from overuse in recreational activities. Identify specific habitat restoration projects to immediately benefit mountain goats.

RECREATION MANAGEMENT

Recreation Management Objectives:

1) Provide high quality opportunities for hunting and viewing of mountain goats.
2) Increase public awareness and expand viewing opportunities of mountain goats.

Recreation Management Strategies:

Hunting: Recommend hunting seasons to provide maximum recreational opportunity while not imposing on DWR management needs. Recommend mountain goat permits (including female only permits) to make progress towards population objectives contained in unit management plans. Recommend mountain goat permits to harvest 5%-25% of the counted adult population. Use subunits to maximize hunting opportunities and improve hunter distribution. When feasible, use multiple seasons to maximize hunting opportunities and minimize hunter conflicts. Require mountain goat orientation course for all hunting permit holders. Encourage hunters to avoid harvesting nannies with hunter's choice permits. Explore providing a greater variety of hunting

opportunities by utilizing more primitive weapons, variation in season length, and more variable season dates

Non-Consumptive Uses: Look for ways to expand mountain goat viewing opportunities for the public. Ensure that information about mountain goats published on the Division's website, social media channels, and print products is current and accurate. Work with partner entities (state and federal agencies, conservation groups, agricultural stakeholders, etc.) to help educate the public about the value of mountain goats on the landscape, as well as the threats the species faces.

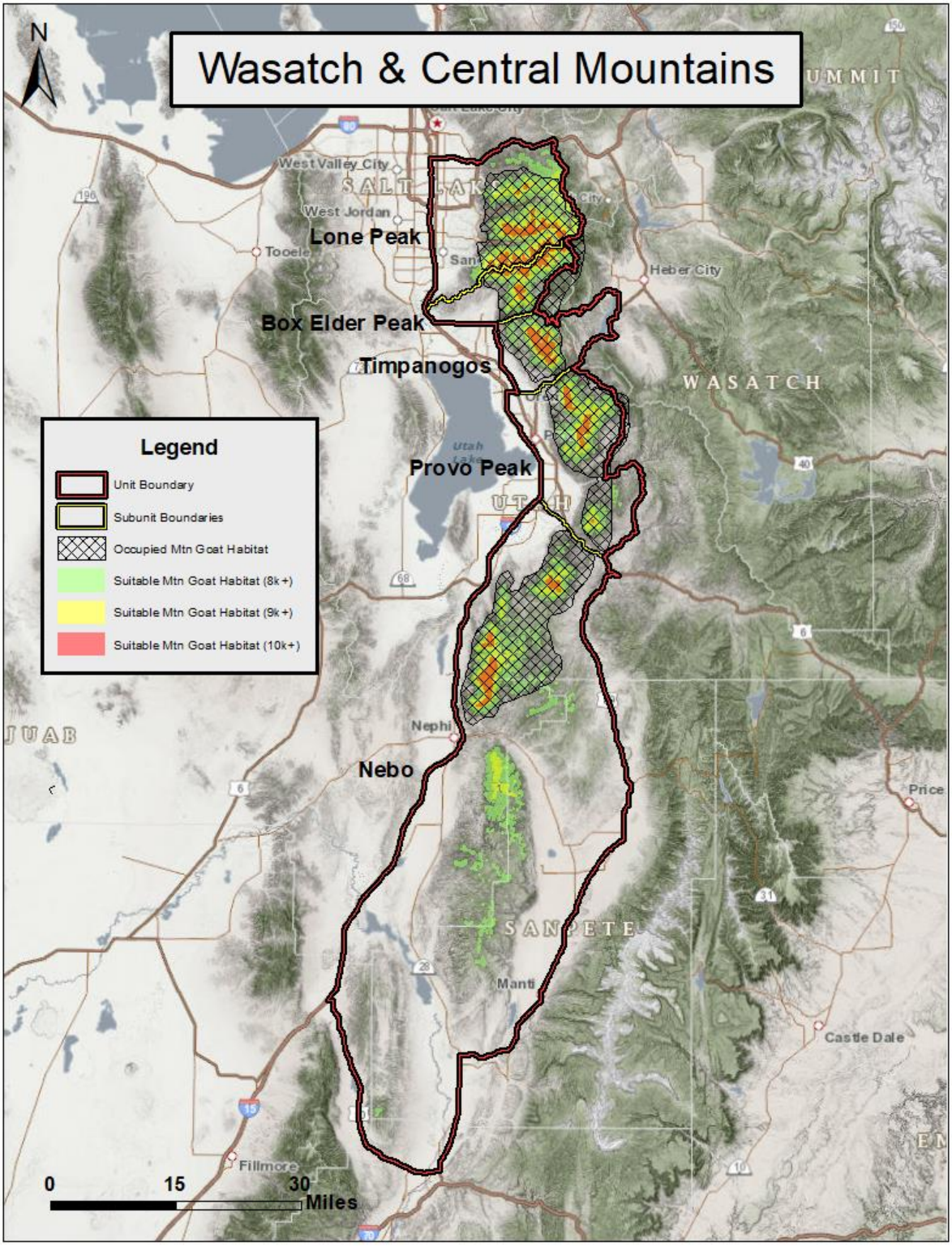
Literature Cited

Gross, J. E., M. C. Kneeland, D. F. Reed, and R. M. Reich. 2002. GIS-Based habitat models for mountain goats. Journal of Mammalogy 83:218-228.

Shannon, J. M., J. C. Whiting, R. T. Larsen, D. D. Olson, J. T. Flinders, T. S. Smith, and R. T. Bowyer. 2014. Population response of reintroduced bighorn sheep after observed commingling with domestic sheep. European journal of wildlife research 60:737-748

Varley, N. C. 1994. Summer-fall habitat use and fall diets of mountain goats and bighorn sheep in the Absaroka Range, Montana. Biennial Symposium of the Northern Wild Sheep and Goat Council 9:131-138.

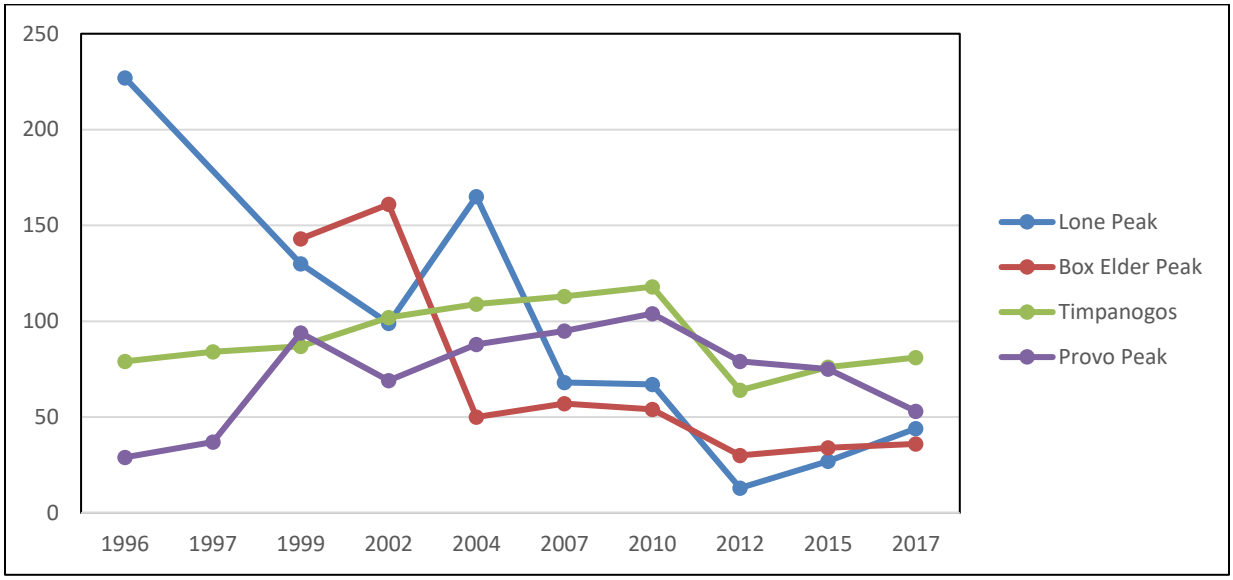
Figure 1. Wasatch and Central Mountains Unit boundary, sub-unit boundaries, habitat currently occupied by mountain goats, and modeled suitable mountain goat habitat.



Appendix A. Summary of mountain goat trend count data on Wasatch Mountains, 1996-2017.

Subunit	Year	Number Counted	Billies	Nannies/ Immature Males	Kids	Uncl	Kids:100 Adults
Lone Peak	1996	227	0	0	77	150	
Lone Peak	1999	130	25	69	36	0	0.38
Lone Peak	2002	99	0	0	0	99	
Lone Peak	2004	165	20	77	42	26	
Lone Peak	2007	68	26	23	18	1	
Lone Peak	2010	67	26	23	17	1	
Lone Peak	2012	13	9	0	0	4	
Lone Peak	2015	27	4	14	9	0	0.50
Lone Peak	2017	44	7	24	13	0	0.42
Box Elder Peak	1999	143	16	85	42	0	0.42
Box Elder Peak	2002	161	0	0	0	161	
Box Elder Peak	2004	50	8	16	4	22	
Box Elder Peak	2007	57	7	32	16	2	
Box Elder Peak	2010	54	8	36	10	0	0.23
Box Elder Peak	2012	30	10	12	6	2	
Box Elder Peak	2015	34	0	24	10	2	
Box Elder Peak	2017	36	9	19	8	0	0.28
Timpanogos	1996	79	0	0	21	58	
Timpanogos	1997	84	0	0	0	84	
Timpanogos	1999	87	18	40	29	0	0.50
Timpanogos	2002	102	0	0	0	102	
Timpanogos	2004	109	7	72	23	7	
Timpanogos	2007	113	14	4	28	67	
Timpanogos	2010	118	15	12	28	63	
Timpanogos	2012	64	4	19	7	34	
Timpanogos	2015	76	17	45	14	0	
Timpanogos	2017	81	16	44	15	6	0.25
Provo Peak	1996	29	0	0	0	29	
Provo Peak	1997	37	0	0	0	37	
Provo Peak	1999	94	12	54	28	0	0.42
Provo Peak	2002	69	0	0	0	69	
Provo Peak	2004	88	3	16	11	58	
Provo Peak	2007	95	18	5	23	49	
Provo Peak	2010	104	15	14	25	50	
Provo Peak	2012	79	5	29	22	23	
Provo Peak	2015	75	16	19	6	34	
Provo Peak	2017	53	4	40	9	0	0.20

Appendix A (con't). Summary of mountain goat trend count data on the Wasatch Mountains, 1996-2017.



Appendix B. Summary of mountain goat trend count data on Central Mtns, Nebo, 2012-2018.

Unit	Year	Number Counted	Billies	Nannies/ Immature Males	Kids	Unclassified	Kids per 100 Adults
Nebo	2012	48	4	14	10	20	26
Nebo	2015	66	11	37	18	0	38
Nebo	2017	111	5	62	25	19	29
Nebo	2018	128	7	84	37	0	41