BIGHORN SHEEP UNIT MANAGEMENT PLAN
WASATCH MOUNTAINS, AVINTAQUIN WMU #17C
August 2019

BOUNDARY DESCRIPTION

Carbon, Duchesne, Utah and Wasatch counties Boundary begins at US-40 and the Soldier Creek Dam road; south along this road to Soldier Creek Dam and the Strawberry River; east along this river to Beaver Creek; southwest along Beaver Creek to Big Beaver Spring and USFS Road 081 (Reservation Ridge Road); southeast on this road to the Right Fork of White River road; southwest on this road to US-6; southeast on US-6 to US-191; north on US-191 to US-40; west along US-40 to the Soldier Creek dam road. EXCLUDES ALL NATIVE AMERICAN TRUST LANDS WITHIN THIS BOUNDARY. Excludes all CWMUs. USGS 1:100,000 Maps: Duchesne, Nephi, Price. Boundary questions? Call Vernal office, 435-781-9453.

LAND OWNERSHIP

Table 1. Land ownership and approximate area of modeled bighorn sheep habitat for the Wasatch Mountains, Avintaquin bighorn sheep management unit.

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Private	88,254	33.4%
National Forest	81,512	30.8%
Tribal	49,832	18.9%
Utah Division of Wildlife Resources	29,074	11.0%
Bureau of Land Management	12,341	4.7%
Utah State Institutional Trust Lands	2,889	1.1%
Utah State Parks	442	0.2%
Totals	**264,344**	**100%**

UNIT MANAGEMENT GOALS

The Utah Statewide Bighorn Management plan was approved by the Utah Wildlife Board in 2018. In accordance with the plan an MOU between the state and the US Forest service was signed in 2019 that identifies management responsibilities and areas of cooperation between the state and US Forest Service. This plan identifies the status and management direction specific to this unit under those documents. The Avintaquin Subunit of the Wasatch Mountains is located south of the Strawberry River between Duchesne and Strawberry Reservoir. Bighorn habitat is

located within the long steep rocky canyons, hillsides and windblown ridges. Significant habitat exists, and will continue to be enhanced by future habitat projects in areas where currently thick brush, pinyon-juniper and conifer reduce the value to bighorn. Specific goals for this unit are to:

1) Manage for a healthy population of Rocky Mountain bighorn sheep capable of providing a broad range of recreational opportunities, including hunting and viewing.
2) Balance bighorn sheep impacts with other uses such as authorized grazing and local economies.
3) Maintain a population that is sustainable within the available habitat in the unit boundary.

HISTORY AND CURRENT STATUS

Rocky Mountain bighorn sheep are known to be historic residents of the area. Evidence of bighorn sheep has been found on and around the subunit (Avintaquin Canyon, the Strawberry River corridor, Currant Creek Mtn., etc…).

In January of 2009 the UDWR reintroduced 60 sheep that were captured from two different areas in Montana, the Benchmark/Willow Creek area and the Sun River area. There were a total of 44 ewes, 6 lambs, and 10 rams. The sheep were released at two different sites on the Avintaquin unit, 30 were released in Lake Canyon and 30 in the Right Fork of Indian Canyon. Eight of the original transplanted sheep had to be euthanized to prevent them from potentially spreading disease back to the rest of the transplant stock after they left the unit and went into areas with high probability of contact with domestic sheep.

Of the 60 sheep released, 33 of them were equipped with VHF radio collars in order to monitor movements and survival. The radio collared animals are also used to conduct ground surveys for production rates and population estimates. In 2012 and 2014-2019 many additional sheep were captured and collared to replace collared sheep that had died. The UDWR will continue to capture and collar additional sheep as needed to strive to maintain enough active collars to monitor the population effectively.

Currently, this population is below its population objective. This population experienced a respiratory disease related die off beginning in late 2015. Many sheep were found dead, with many others observed coughing. The population went from an estimated 120-150 sheep in 2014 to an estimation of only 20-30 sheep in 2019.

Tribal Trust Lands are located across the subunit. Bighorn sheep are likely to continue using available habitat that includes some Tribal Trust Lands. As with management of other big game species within the exterior boundary, bighorn sheep management will be in accordance with the Cooperative Agreement between the Ute Tribe and the state of Utah.

ISSUES AND CONCERNS

- Potential Habitat: We modeled potential bighorn sheep habitat on the Wasatch Mountain, Avintaquin unit using methodology outlined by O'Brien et al. (2014). Bighorn sheep select habitat based on the proximity of steep-sloped escape terrain, forage availability,

ruggedness, and horizontal visibility (Bleich et al. 1997, Valdez and Krausman 1999, Sappington et al. 2007). Bighorn sheep habitat is located throughout the unit in suitable rugged locations (Figure 1).

Livestock Competition: Bighorn sheep annual use of forage classes, when compared to cattle, differ significantly (Dodd and Brady 1988). Likewise, bighorn sheep generally avoid areas where cattle are present (Bissonette and Steinkamp 1996), and also select areas with a much higher degree of slope (Ganskopp and Vavra 1987). For these reasons, competition between cattle and bighorns should not be a significant concern within this unit. Because of the risk of pathogen transmission between bighorns and domestic sheep, the areas where domestic sheep are present are not suitable for bighorn sheep.

Disease: Disease, especially bacterial pneumonia, has been responsible for numerous declines in bighorn populations throughout North America (Cassirer and Sinclair 2007). Pneumonia outbreaks typically affect all age/sex cohorts and are usually followed by several years of annual pneumonia outbreaks in lambs that dramatically reduce population growth (Spraker et al. 1984, Ryder et al. 1992, George et al. 2008). These events are attributed to the transfer of pathogens from domestic sheep (*Ovis aries*) or goats (*Capra aegagrus hircus*) to wild sheep through social contact (Singer et al. 2000, Monello et al. 2001, Cassirer and Sinclair 2007). Disease-induced mortality rates in bighorn sheep vary substantially by population due to multiple processes including contact rates, social substructuring, pathogen virulence, and individual susceptibility (Manlove et al. 2014, 2016). Therefore, spatial separation from domestic sheep and goats is the most important factor in maintaining overall herd health. It is not the intent of this plan or the DWR to force domestic sheep operators off public lands or out of business. Rather, the intent is to look for opportunities that will protect bighorn sheep populations while working with the domestic sheep industry and individual grazers.

Predation: Cougar predation may limit bighorn sheep in locations where predator populations are largely supported by sympatric prey populations (Hayes et al. 2000, Schaefer et al. 2000, Ernest et al. 2002), which, in this case, includes a limited amount of mule deer. It has been hypothesized that declines in sympatric ungulate populations can increase predation on bighorn sheep as cougars switch to bighorns as an alternate prey source (Kamler et al. 2002, Rominger et al. 2004). It is anticipated that cougars will be the main predator of bighorns in the Wasatch Mountain, Avintaquin unit. If predation becomes a limiting factor, predator control work will be administered within the guidelines of the DWR Predator Management Policy. Predator management is coordinated with USDA Wildlife Services.

POPULATION MANAGEMENT

Population Management Objective:

1) Manage for a population of 125-350 bighorn sheep throughout suitable habitat within the unit boundary. The population objective is well below the recommended 1.3-1.9 sheep / km^2 (Van Dyke 1983).

Population Management Strategies:

1) Conduct ground classification once each year in late November and early December to obtain annual production estimates and population estimates. Early summer classification will be done each year on an opportunistic basis.
2) Since this population is primarily monitored from the ground through the use of GPS collars, DWR will strive to maintain between 10 and 20 active collars depending on the size of the population to monitor the status of the herd and generate annual estimates of survival. The primary method for deploying collars on this population will be done through ground tranquilization and helicopter capture.
3) All population data will be collected and submitted on standardized forms, including all GIS flight and collar data (waypoints, flight paths, etc.).

Predator Management:

The Avintaquin Unit is a Harvest Objective cougar unit. Over the last 4 years the average number of cougars killed per year is 13. The current total quota for lions on the unit is 20. A predator management plan is currently in place for this subunit. Lion management will be accomplished through established UDWR policy and procedures for bighorn sheep units. Additional lion removal efforts should take place prior to any transplant efforts.

Research Needs:

1) There are no new research needs at this time specific to this unit. The population monitoring plan calls for 10-20 collars to be maintained in the population. These collars will serve as a tool to improve ground classification and generate annual estimates of survival. Additional objectives could be assessed as needs arise, but primary objectives for GPS collars should be focused on general population status.

DISEASE MANAGEMENT

Disease Management Objective:

1) Maintain a healthy population of Rocky Mountain bighorn sheep on the unit.
2) Strive for spatial separation from domestic sheep and goats.

Disease Management Strategies:

Disease Monitoring: The DWR may perform periodic live captures to assess herd health, as well as take advantage of opportunistic sampling of hunter harvested bighorns or bighorns that are found dead. This unit was disease tested in 2016 and 2017 during helicopter capture work. Six sheep were captured and tested in 2016 and nine in 2017. All captured sheep tested positive for *Mycoplasma ovipneumonia*. If possible, all sheep captured in the future will be tested to aid in the development of a current disease profile.

Spatial Separation: Work with land management agencies and private landowners to implement agency guidelines for management of domestic sheep and goats in bighorn areas. There are several USFS domestic sheep grazing allotments west of the unit and one allotment on the unit:

Avintaquin – This Ashely National Forest allotment is south of Strawberry and under two miles from documented wild sheep locations

- Removal of wild sheep found within the boundary of this allotment or outside of the bighorn sheep management unit boundary is recommended to maintain separation and protect wild sheep.
- Outreach efforts will continue to occur with domestic operators.

Risk Management and Response Plan:

High risk areas are within the USFS domestic allotment boundaries described above. Additionally, wild sheep have wandered to the north near the county line by Deep Creek Canyon. Any wild sheep found within these areas north of Highway 40 should be immediately removed. A "geofence" for GPS collared bighorn will be established to alert the Division if collared bighorn leave the unit or stay too close to the domestic allotment. There is substantial habitat connectivity with the Nine Mile bighorn sheep unit. Monitoring of these connective habitats and potential removal of sheep within these areas will be considered to protect both herds. All wandering wild sheep and stray domestic sheep and goat issues will be handled following the UDWR GLN-33. Mapping of wild sheep removal zones for the Avinatquin Unit is included as an appendix to this guideline. The need to disease test wandering sheep from this unit will be evaluated on a case by case basis.

HABITAT MANAGEMENT

Habitat Management Objectives:

1) Maintain or improve sufficient bighorn sheep habitat to achieve population objectives.
2) Continue to identify crucial bighorn sheep habitats and work with the Forest Service, private landowners, and the Ute Tribe to protect these areas.
3) Assist land management agencies in monitoring bighorn habitat to detect changes in habitat quantity or quality.
4) Work with land managers to minimize and mitigate loss of bighorn habitat due to human disturbance and development.

Current and Potential Wild Sheep Distribution:

Bighorn sheep have established 4 core areas of use on the Avintaquin unit, the highest densities of sheep are in the Right Fork of Indian Canyon, followed by Lake Canyon, and Avintaquin Canyon. A map of modeled and occupied bighorn sheep habitat is included in Figure 1.

Potential Threats to Habitat

Human disturbance can result in abandonment or degradation of bighorn habitat. Human disturbance of bighorn on this unit is expected to be high in most areas do to energy development activity. This includes UDWR lands, Tribal Lands, private lands, and USFS lands.

Vegetation Management Projects

1) Initiate vegetative treatment projects to improve bighorn habitat lost to natural succession or human impacts.
2) Cooperate with Forestry, Fire and State Lands and the USFS to utilize controlled burns and/or mechanical treatments to remove conifer encroachment on open hillsides to increase and improve bighorn habitat across the unit.
3) Identify specific habitat restoration projects to immediately benefit bighorn sheep:
    - Timber Canyon
    - Lake Canyon
    - Avintaquin Canyon
    - Right Fork of Indian Canyon

Water Management Projects:

1) Work with the USFS, and private landowners to locate and improve water sources across bighorn habitat.
2) Cooperatively modify or improve existing water developments and guzzlers for bighorns.
3) Install new water developments or guzzlers in bighorn habitat where water may be scarce or lacking in the following canyons.
    - Timber Canyon
    - Lake Canyon
    - Avintaquin Canyon
    - Right Fork of Indian Canyon

RECREATION MANAGEMENT

Recreation Management Objectives:

1) Provide hunting opportunities on the Wasatch Mountain, Avintaquin unit that are a quality experience.
2) Increase public awareness and expand viewing opportunities of bighorn sheep.

Recreation Management Strategies:

Hunting: Hunting and permit allocation recommendations will be made in accordance with the Utah Bighorn Sheep Statewide Management Plan. Ewe hunts may be utilized as a tool for maintaining population objective. Offer maximum opportunity for hunting while not imposing on DWR management needs. Monitor size and age class of harvested rams through the horn measuring and plugging program.

Non-Consumptive Uses: The DWR will look for opportunities to increase public awareness and expand viewing opportunities of bighorn sheep through viewing events and public outreach. Significant viewing opportunities are available along in Right Fork of Indian Canyon, and Lake Canyon. Work to make public more aware of these opportunities.

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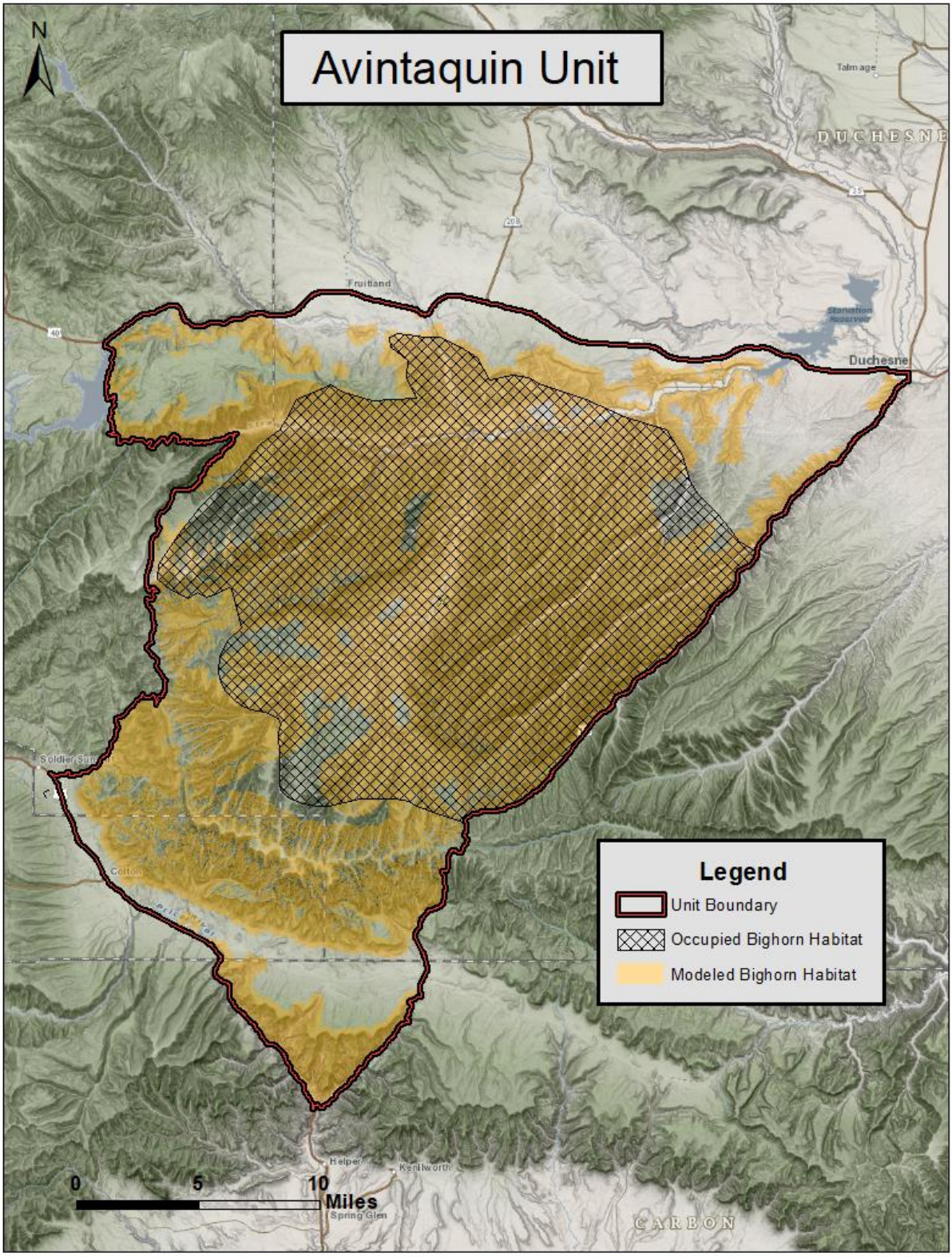

Figure 1. Wasatch Mountains, Avintaquin unit management boundary, modeled suitable bighorn sheep habitat, and currently occupied bighorn habitat.