

**BIGHORN SHEEP UNIT MANAGEMENT PLAN
CENTRAL MOUNTAINS, NEBO
August 2019**

BOUNDARY DESCRIPTION

Juab, Millard, Sanpete, Sevier and Utah counties—Boundary begins at US-6 and I-15 at Spanish Fork; southeast on US-6 to US-89 near Thistle; south on US-89 to US-50 at Salina; northwest on US-50 to I-15 at Scipio; north on I-15 to US-6 at Spanish Fork. Excludes all CWMUs. USGS 1:100,000 Maps: Maps: Delta, Manti, Nephi, Provo, Salina. Boundary questions? Call the Springville office, 801-491-5678.

LAND OWNERSHIP

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

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Private	88,254	29.3%
National Forest	81,512	27.1%
Tribal	49,832	16.6%
Bureau of Land Management	49,028	16.3%
Utah Division of Wildlife Resources	29,074	9.7%
Utah State Institutional Trust Lands	2,889	1.0%
Utah State Parks	442	0.1%
Totals	301,031	100%

HISTORY AND CURRENT STATUS

Bighorn sheep are native to Mount Nebo and existed on the mountain as late as 1927 (Dalton and Spillett 1971), but were finally extirpated. In a two-year period from 1981 to 1982 a total of 48 bighorn sheep from Whiskey Basin, WY were released into a fenced paddock on Mount Nebo. When lambs were born, the sheep were released from the enclosure and appeared to do well initially. However, the severe winters in 1983 and 1984, coupled with other factors, precipitated a steady decline. By 1987, five ewes were all that remained (Smith et al. 1988). In 2004, another attempt was made to restore Rocky Mountain bighorn to the Nebo unit with a transplant of 18 bighorns from Augusta, MT. A supplemental transplant of 25 bighorns from the same source herd was conducted in 2007. Since then, domestic sheep allotments have been converted to cattle

allotments, and mountain lion permits have been increased to reduce risk of disease and predation on bighorn sheep. However, domestic sheep have been observed with bighorns or in bighorn habitat multiple times (up to 6 times per year), and disease risk continues to threaten the persistence of this population (Shannon et al. 2008). Multiple disease events have been documented (Shannon et al. 2014), and the population typically hovers between 30 and 60 individuals.

ISSUES AND CONCERNS

Habitat: We modeled potential bighorn sheep habitat on the Central Mtns, Nebo 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 (Figure 1). Additional habitat exists in areas that have become dominated by old growth vegetation that have reduced value to bighorns. Fire would help return these areas into productive early successional stages and would allow bighorn sheep to expand their range throughout the Central Mtns, Nebo unit.

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 of their ranges 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.

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 mule deer, domestic cattle, mountain goats, and elk. 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). Cougars are the main predator of bighorns on the Central Mtns, Nebo 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. Predator reduction work already occurs on the unit in conjunction with livestock losses, and therefore any additional work that may be done would be mutually beneficial to both livestock and other big game species.

POPULATION MANAGEMENT

Population Management Objectives:

- 1) Achieve and maintain a population objective of 125 total Rocky Mountain bighorn sheep.

Population Management Strategies:

Transplants: Given the exposure of this herd to pneumonia related pathogens, it is not anticipated that transplants to or from this unit will occur unless repeated testing shows that the pathogens are cleared from the population. This is to protect naïve bighorns from being exposed to disease and to prevent disease outbreaks.

Monitoring: Monitoring of bighorn sheep will be conducted every 2-3 years by aerial survey to determine lamb recruitment, population status, ram-to-ewe ratios, range distribution, and ages and quantity of rams. This population will likely require 4-6 hours to conduct a complete trend count. Additional ground classification may be conducted as conditions permit. GPS collars with mortality signals may be used to document cause-specific mortality and identify annual survival estimates. If bighorn sheep are found wandering into areas where there is high risk of contact with domestic sheep or goats, the DWR may remove these animals in accordance with the Utah Bighorn Sheep Statewide Management Plan.

Predator Management: Predator management will be coordinated with USDA Wildlife Services on an as-needed basis. If predation becomes a limiting factor on bighorns, predator control work will be administered within the guidelines of the DWR Predator Management Policy.

DISEASE MANAGEMENT

Disease Management Objectives:

- 1) Maintain a healthy population of Rocky Mountain bighorn sheep on the Central Mtns, Nebo unit.
- 2) Maintain spatial separation from domestic sheep and goats as well as other bighorns thought to be infected.

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.

Spatial Separation: Active domestic sheep allotments and farm flocks with domestic sheep will be evaluated for potential of disease risk. The DWR may delineate areas where there is high risk for domestic sheep and goats to come in contact with wild sheep or where wild sheep may stray and come in contact with domestics. These areas will be considered areas of concern. Lethal or non-lethal removal of bighorns may be warranted in these areas to prevent comingling. Likewise, wandering domestic sheep or goats found near bighorn where not permitted may be removed in

accordance with DWR guidelines GLN-33. The need to test wandering sheep or domestics 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 objective.
- 2) Support and encourage regulated livestock grazing and maintain/enhance forage production through range improvement projects on the Central Mtns, Nebo unit.
- 3) Improve habitat and water availability where possible.

Habitat Management Strategies:

Monitoring: The DWR will assist land management agencies in monitoring bighorn habitat to detect changes in habitat quantity and quality.

Habitat Improvement: Vegetative treatment projects to improve bighorn habitat lost to natural succession or human impacts will be sought out and initiated. The DWR will cooperate with land management agencies to utilize seeding, prescribed burns, and/or mechanical treatments for conifer removal in order to increase and improve bighorn habitat across the unit. Habitat restoration projects will be planned and executed through the Utah Watershed Restoration Initiative program, allowing for public input to ensure that projects that are beneficial to both bighorn sheep and other species are given priority.

RECREATION MANAGEMENT

Recreation Management Objectives:

- 1) Increase hunting opportunities while maintaining quality hunting experiences.
- 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. Permit recommendations will be made based on 12-25% of the counted ram population (yearling and older) or 30-60% of the counted rams 6 years of age or older. Hunting seasons will be recommended to provide maximum recreational opportunity while not imposing on UDWR management needs. Hunting may be used as a tool to regulate density of bighorn sheep to reduce risk of pathogen transmission. Size and age class of harvested rams will be monitored. Ewe hunts may be utilized as a tool for maintaining population objective.

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.

PUBLIC INVOLVEMENT

Public Involvement Objective:

- 1) Provide opportunities for local stakeholders and cooperating agencies to be involved in the management process and to jointly resolve potential issues involving bighorn sheep.

Public Involvement Strategies:

Plan Revision: If the population objective or unit boundary are to be revised in the future, the public will be allowed to be included in the decision making process through public RAC and board meetings.

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Figure 1. Central Mtns, Nebo bighorn sheep unit management unit boundary, suitable habitat, and occupied habitat. Juab, Millard, Sanpete, Sevier and Utah counties, UT, USA.

