

**BIGHORN SHEEP UNIT MANAGEMENT PLAN**  
**SAN JUAN WMU #14**  
**Lockhart / North / South / San Juan River**  
**August 2019**

**BOUNDARY DESCRIPTIONS**

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Grand and San Juan counties -

**Lockhart** – Grand and San Juan counties-Boundary begins at the Colorado River and US-191 at Moab; south on US-191 to SR-211; west on SR-211 to the Canyonlands National Park boundary; north on this boundary to the Indian Creek and Colorado River confluence; north on the Colorado River to US-191 at Moab. EXCLUDES ALL NATIONAL PARKS.

**North** – San Juan County-Boundary begins at the Colorado River and Dark Canyon drainage bottom; north along the Colorado River to the confluence with Indian Creek; southeast along Indian Creek to the Canyonlands National Park boundary; south along this boundary to SR-211 at Canyonlands National Park entrance; south on SR-211 to the Bridger Jack Road; west on this road to the North Cottonwood Creek; south on this creek to the USFS boundary line; west on the USFS boundary line to Dark Canyon drainage bottom; west along this drainage bottom to the Colorado River. EXCLUDES ALL NATIONAL PARKS.

**South** – San Juan County-Boundary begins at the Colorado River and the mouth of Dark Canyon; east along the bottom of Dark Canyon to USFS boundary; south along this boundary to the Bears Ears road; south along this road to SR-275; south on this road to SR-95; west on SR-95 to SR-276; west on SR-276 to the eastern shoreline of Lake Powell at Halls Crossing; north on this shoreline and the Colorado River to Dark Canyon. Boundary questions? Call the Price office, 435-613-3700.

**San Juan River** – San Juan County-Boundary begins at the eastern shoreline of Lake Powell and SR-276 at Halls Crossing; east on SR-276 to SR-95; east on SR-95 to SR-261; south on SR-261 to US-163; south on US-163 to the San Juan River at Mexican Hat; west along the San Juan River to the eastern shoreline of Lake Powell; north on this shoreline to SR-276 at Halls Crossing.

## LAND OWNERSHIP

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Land ownership and approximate area of modeled bighorn sheep habitat for the San Juan bighorn sheep management sub-units.

### Lockhart

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Bureau of Land Management	160,167	83.1%
Utah State Institutional Trust Lands	23,034	12.0%
National Parks	5,731	3.0%
Private	3,632	1.9%
State Sovereign Land	61	<0.1%
Utah State Parks	28	<0.1%
Utah Division of Wildlife Resources	17	<0.1%
<b>Totals</b>	<b>192,670</b>	<b>100%</b>

### North

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Bureau of Land Management	120,332	49.4%
National Parks	112,037	46.0%
Utah State Institutional Trust Lands	10,566	4.3%
Private	874	0.4%
<b>Totals</b>	<b>243,813</b>	<b>100%</b>

### South

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Bureau of Land Management	277,602	72.9%
National Parks	74,699	19.6%
Utah State Institutional Trust Lands	28,090	7.4%
Private	274	0.1%
National Forest	5	<0.1%
<b>Totals</b>	<b>380,669</b>	<b>100%</b>

## San Juan River

Ownership	MODELED BIGHORN HABITAT	
	Area (acres)	%
Bureau of Land Management	115,916	53.4%
National Parks	92,830	42.8%
Utah State Institutional Trust Lands	8,012	3.7%
Private	218	0.1%
Tribal	131	0.1%
Utah State Parks	10	<0.1%
<b>Totals</b>	<b>217,118</b>	<b>100%</b>

## UNIT MANAGEMENT GOALS

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The San Juan unit is located primarily south of Moab, between the Colorado River and US-191, and north of the San Juan River (Figure 1). Desert bighorn habitat within the San Juan unit consists primarily of the rugged, deep canyons along the east side of the Colorado River corridor. There is over 200 square miles of excellent bighorn habitat along this river corridor excluding the national park. The river corridor and its numerous side canyons provide high quality bighorn habitat characterized by steep talus slopes, open canyon bottoms and broad mesa tops. The bighorn populations in the North San Juan and Lockhart subunits are contiguous with the sheep herd in the adjacent national park. The north side of the San Juan River is historical desert bighorn habitat, but until 2008, was not believed to be occupied by bighorns. There is a sustainable bighorn population on the south side of the San Juan River on the Navajo Indian Reservation. Specific goals are to:

- 1) Manage for a healthy population of desert 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

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Bighorn Sheep are native residents to the majority of the area. However, bighorns have been transplanted to portions of the unit in order to promote genetic diversity and to augment and expand the existing population for hunting and viewing opportunities.

Currently, all subunits in this population are under population objective and increased monitoring efforts are needed to make appropriate management decisions. Transplant efforts of wild sheep from the Zion and Potash units have recently occurred on the San Juan, North and

San Juan River subunits. A disease assessment was conducted recently on all of the San Juan subunits which indicated exposure to *Mycoplasma ovipneumoniae*.

## **ISSUES AND CONCERNS**

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Potential Habitat: We modeled potential bighorn sheep habitat on the San Juan 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 San Juan 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

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### Population Management Objective:

- 1) Achieve a population of 750 desert bighorn sheep distributed throughout suitable habitat on the subunits as follows:
  - San Juan, Lockhart: 200 bighorn sheep
  - San Juan, North: 125 bighorn sheep
  - San Juan, South: 300 bighorn sheep
  - San Juan, San Juan River: 125 bighorn sheep

These population objectives were selected based on what can reasonably be achieved, given the habitat requirements of desert bighorn sheep and what is available within the unit, and are well within the recommended densities of 1.3-1.9 sheep per square kilometer (Van Dyke 1983).

### Population Management Strategies:

- 1) Monitor the bighorn sheep population using aerial surveys and GPS telemetry to assess population trends and health.
- 2) Initiate predator management as specified in predator and bighorn sheep unit management plans. Wildlife Services or other contracted personnel may be needed in remote or hard to access areas to help reduce cougar numbers.
- 3) Document instances of interaction between wild sheep and domestic sheep and goats to allow conflicts to be evaluated and dealt with in a timely manner. Follow established guidelines in UDWR GLN-33 for dealing with domestic sheep and goats that wander into bighorn sheep units.

### Population Monitoring Plan:

Monitor population size and composition every 2 to 3 years by helicopter. This unit will likely require approximately 30 hours to conduct a complete trend count. Work with NPS to monitor bighorn sheep within adjacent nation parks. Conduct ground classification as conditions permit to obtain annual production estimates. All population data will be collected and submitted on standardized forms, including all GIS data (waypoints, flight paths, etc.).

### Trend Count and Classification Data

#### San Juan, Lockhart

Year	Pop Est.	Total Count	Total Ewes	Total Lambs	Total Rams	Rams > 6 yrs old	Lambs/100 Ewes	Rams/100 Ewes
2008	118	59	33	6	20	6	18	61
2010	92	46	25	8	13	8	32	52
2012	80	40	26	6	8	3	23	31
2014	140	84	54	12	18	4	22	33
2017	92	55	32	9	14	6	28	44

**San Juan, North**

Year	Pop Est.	Total Count	Total Ewes	Total Lambs	Total Rams	Rams > 6 yrs old	Lambs/100 Ewes	Rams/100 Ewes
2008	-	-	-	-	-	-	-	-
2010	34	17	11	1	5	3	9	45
2012	14	7	3	2	2	0	67	67
2014	23	14	8	3	3	0	38	38
2017	57	34	18	5	11	3	28	61

**San Juan, South**

Year	Pop Est.	Total Count	Total Ewes	Total Lambs	Total Rams	Rams > 6 yrs old	Lambs/100 Ewes	Rams/100 Ewes
2008	244	122	64	20	38	7	31	59
2010	114	57	40	1	16	5	3	40
2012	78	39	24	2	13	5	8	54
2014	75	45	27	8	10	0	30	37
2017	103	62	38	8	16	3	21	42

**San Juan, San Juan River**

Year	Pop Est.	Total Count	Total Ewes	Total Lambs	Total Rams	Rams > 6 yrs old	Lambs/100 Ewes	Rams/100 Ewes
2012	26	13	9	2	2	0	22	22
2014	63	38	24	5	9	1	21	38
2017	70	42	33	2	7	1	6	21

**Transplant Plan:**

These units should be managed to maintain and protect established bighorn sheep numbers and achieve unit population objectives. Augmentation priorities will be:

- San Juan River near Nokai Dome
- North San Juan subunit
- South San Juan south of Red Canyon near Lake Powell

All transplanted bighorns should be tested for disease at time of capture. All initial transplanted sheep will be monitored via GPS collars for general movements and annual survival. As transplants progress, only ear tags may be used to evaluate success of transplants. These subunits will not likely serve as source populations for at least the next 5 years or the life of this plan. UDWR will maintain working relationships with all

interested parties and invite them to participate in bighorn sheep related activities, regarding transplant efforts.

### **Predator Management:**

The San Juan bighorn sheep subunits are within the San Juan cougar hunt subunits (Desert & Mountains). These subunits are managed as Harvest Objective units. Over the last three years the average number of cougars killed per year is 0.7 on the Desert subunit and 18 on the Mountains subunit. The 2019 quota for cougar on the Desert subunit is unlimited and 25 for the Mountains subunit. A predator management plan is currently in place for this unit for bighorn sheep and mule deer. If cougar predation is shown to have adverse impacts on bighorn sheep, cougar management will be accomplished through established UDWR policy and procedures.

### **Research Needs:**

- 1) Primary objectives for research on the unit should focus on disease issues and low lamb survival.
- 2) Secondary objectives should focus on dispersal movements of newly transplanted bighorns.
- 3) The San Juan River population should be monitored to assess the possibility of wild sheep crossing the San Juan River and potentially being exposed to pathogens from domestics.

## **DISEASE MANAGEMENT**

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### **Disease Management Objective:**

- 1) Maintain a healthy population of desert bighorn sheep on the San Juan 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 herd has experienced low lamb production and population declines in previous years. The specific cause(s) are unknown but is believed that disease has been a factor. This area and subunits are a high priority for disease testing and monitoring as potential transplant sites and also has herds with low lamb recruitment. Disease assessments have been conducted throughout these units between 2012 and 2019, wherein a total of 103 bighorns have been sampled. All subunits were found to be positive for *Mycoplasma ovipneumoniae*, which is considered an important pathogen in the bighorn sheep respiratory disease complex. All newly transplanted sheep should be tested and the results stored in the statewide database. Once disease profiles are established for source herds, disease testing of transplanted sheep to these subunits may decrease.

Spatial Separation: Work with land management agencies and private landowners to implement agency guidelines for management of domestic sheep and goats in bighorn areas. In addition to the high risk of pathogen transmission between bighorn across the subunits, there is 1 area of concern that challenges effective separation:

- Bighorn sheep and farm flocks on the Navajo Indian Reservation on the south side of the San Juan River: The Navajo bighorn herd on the south side of the river have most likely been exposed to domestic sheep and goats from scattered farm flocks on the reservation. This bighorn herd has been thriving for many years. However, there has been some recent indication that disease may be causing low lamb survival in this herd. This is a considerable concern for exposure to bighorns on the San Juan River unit near Johns Canyon.

### **Risk Management and Response Plan:**

All wandering wild sheep and stray domestic sheep and goat issues will be handled following the UDWR GLN-33. The area of greatest concern for dispersing bighorns occurs along the San Juan River. Any wild sheep dispersing from the north side to the south side of the river should be removed immediately. The need to test wandering bighorn sheep from these subunits will be evaluated on a case by case basis.

## **HABITAT MANAGEMENT**

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### **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 land managers and private landowners 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 throughout these subunits, but densities are highest near the major river corridors and side canyons. A map of modeled and occupied 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 these subunits is expected to be low to moderate. If disturbance becomes an issue, UDWR will work with and support federal agencies (BLM, NPS) on travel management plans and other land use plans. Furthermore, the public will be made



aware through town council and other local meetings in an effort to get local support to reduce human disturbance to bighorn sheep.

**Vegetation Management Projects:**

- 1) Initiate vegetative treatment projects to improve bighorn habitat lost to natural succession or human impacts.
- 2) Cooperate with the BLM, on their administered lands, to utilize controlled burns and/or mechanical treatments, to remove pinyon-juniper cover on mesa tops, in order to increase and improve bighorn habitat across subunits.
- 3) Identify specific habitat restoration projects to immediately benefit bighorn sheep:
  - Found Mesa
  - Lone Butte
  - Wingate Mesa
  - Jacob's Chair
  - Piute Pass

**Water Management Projects:**

- 1) Work with the BLM, 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 lacking.
  - Dripping Spring
  - John's Canyon

**RECREATION MANAGEMENT**

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**Recreation Management Objectives:**

- 1) Provide hunting opportunities on the San Juan 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.

## Harvest Statistics

### **San Juan, Lockhart**

Year	Permits	Mean Days Hunted	Harvest	Satisfaction
2009	2	13.0	100%	5.0
2010	2	6.5	100%	4.5
2011	2	16.5	50%	3.5
2012	2	19.0	50%	3.5
2013	1	5.0	100%	5.0
2014	1	4.0	100%	5.0
2015	1	5.0	100%	5.0
2016	1	10.0	100%	5.0
2017	2	10.0	100%	4.5
2018	2	7.5	100%	4.5

### **San Juan, North**

Currently this subunit is not hunted; there are no recent harvest data available.

### **San Juan, South**

Year	Permits	Mean Days Hunted	Harvest	Satisfaction
2009	3	7.7	100%	5.0
2010	3	6.7	100%	5.0
2011	2	11.0	100%	2.5
2012	2	4.5	100%	5.0
2013	2	2.5	100%	4.5
2014	2	11.5	100%	4.5
2015	1	7.0	100%	5.0
2016	1	11.0	100%	5.0
2017	2	19.5	100%	3.5
2018	1	4.0	100%	5.0

### **San Juan, San Juan River**

This is a new subunit and was combined with the San Juan, South subunit for hunting previously, but will likely be hunted as an independent subunit during the life of this plan.

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. This is a difficult considering the remoteness of the habitat currently being used by the bighorn sheep herd. Viewing opportunities do exist in John's Canyon, The Goosenecks State Park, Red Canyon, Lockhart Basin, as well as in the National Parks.

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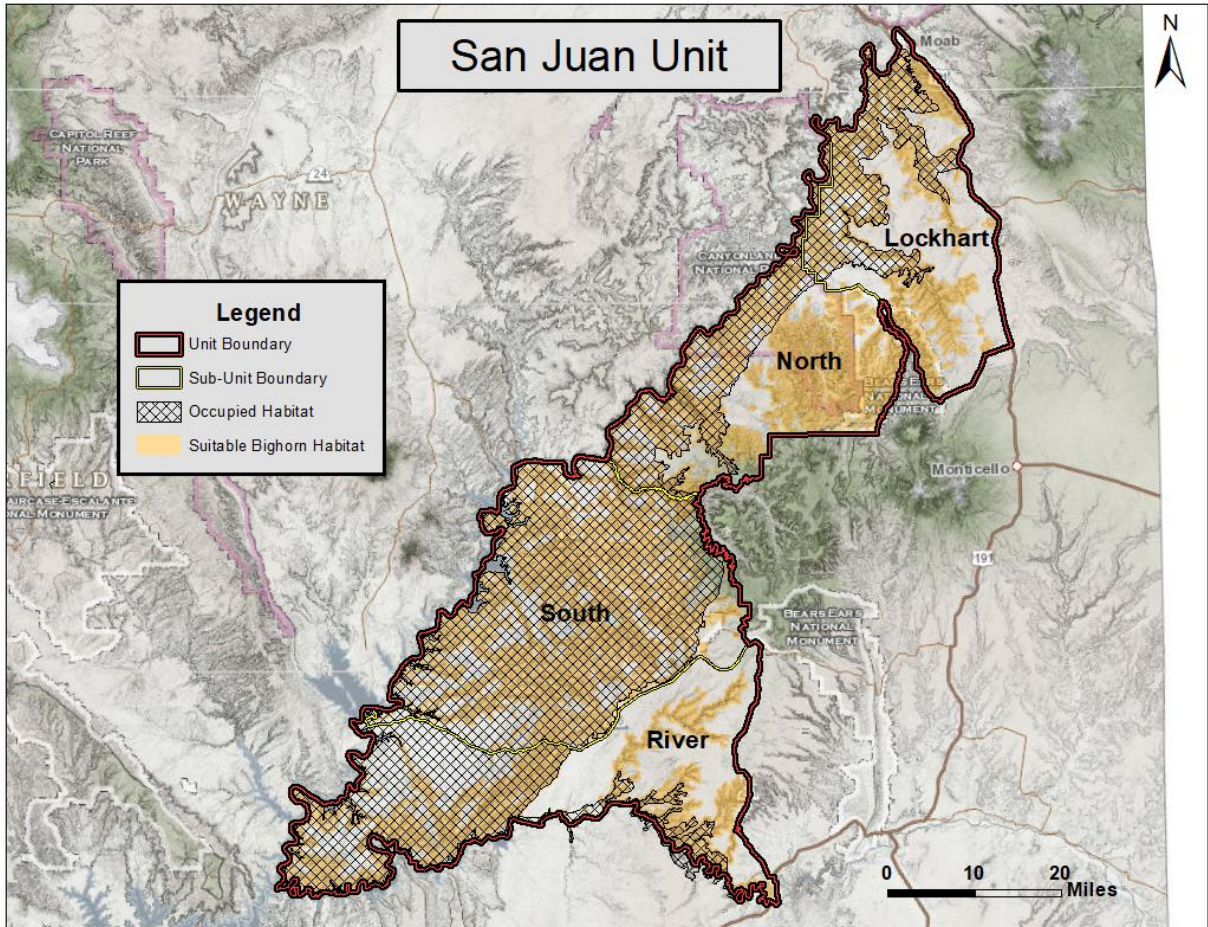


Figure 1. San Juan unit management boundary, modeled suitable bighorn sheep habitat, and currently occupied bighorn habitat.