RAC AGENDA – August 2025

1. Welcome, RAC Introductions and RAC Procedure
   - RAC Chair

2. Approval of Agenda and Minutes
   - RAC Chair

3. Wildlife Board Meeting Update **INFORMATIONAL**
   - RAC Chair

4. Regional Update **INFORMATIONAL**
   - DWR Regional Supervisor

5. Statewide Angler Survey Results **INFORMATIONAL**
   - Craig Walker, Asst. Chief of Fisheries

6. Blue Ribbon Economic Survey Results **INFORMATIONAL**
   - Trina Hedrick, Coldwater Sportfish Coordinator

7. Mid-plan Review – Mountain Goat and Bighorn Sheep **ACTION**
   - Rusty Robinson, Once-in-a-Lifetime Species Coordinator

8. SER Big Game Management Plans **ACTION**
   - Dustin Mitchell, Southeastern Wildlife Manager

CR RAC – August 26th, 6:00 PM
Wildlife Resource Conference Room
1115 N. Main Street, Springville
https://youtube.com/live/quAMrparfew

NR RAC – August 27th, 6:00 PM
Weber County Commission Chambers
2380 Washington Blvd. #240, Ogden
https://youtube.com/live/AFP16kQm4i8

SR RAC – September 2nd, 6:00 PM
DNR Richfield City Complex
2031 Industrial Park Road, Richfield
https://youtube.com/live/REyVR7mavuE

SER RAC – September 3rd, 6:00 PM
John Wesley Powell Museum
1765 E. Main St., Green River
https://youtube.com/live/OrDz5I81Mzk

NER RAC – September 4th, 6:00 PM
Wildlife Resources Conference Rm
318 North Vernal Ave, Vernal
https://youtube.com/live/2m6WXSeIFBk

Board Meeting – September 18th, 9:00 AM
Eccles Wildlife Education Center
1157 S. Waterfowl Way, Farmington
https://youtube.com/live/PB0dsu8FmIo

SPENCER J. COX
Governor
DEIDRE M. HENDERSON
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
JOEL FERRY
Executive Director
Division of Wildlife Resources
RILEY PECK
Division Director

MEMORANDUM

TO: Wildlife Board and Regional Advisory Council Members

FROM: Rusty Robinson, Once-in-a-lifetime Species Coordinator

DATE: August 4, 2025

SUBJECT: Midplan Review and Updates for Bighorn Sheep and Mountain Goat Statewide Management Plans

Both statewide management plans for bighorn sheep and mountain goats are 10-yr plans expiring in 2028, and both are subject to review within that time frame. The DWR convened an advisory committee to review both plans. Recommendations for updates are as follows:

<u>Proposed Bighorn Sheep Statewide Management Plan Updates:</u>

- Updating the state code references to reflect recent legislation
- Adding a statement about the process leading up to a transplant (regarding the public process and writing unit/mitigation plans)
- Adding statements about involving public hunters in disease prevention and response, while also prioritizing herd health and fair chase standards
- Adding Fremont Island to the potential Rocky Mountain bighorn reintroduction list
- Adding the Boulder as a potential release site for future desert bighorn reintroductions
- Replacing Appendix A from the 2012 WAFWA guidelines (about managing domestic sheep and goats in wild sheep habitat) with the updated 2025 guidelines
- Updating citations and references

<u>Proposed Mountain Goat Statewide Management Plan Updates:</u>

- Updating the state code references to reflect recent legislation

The DWR is also addressing two priorities outlined by the committee to: 1) streamline the bighorn removal MOU process and 2) utilize public hunters when appropriate to aid in disease prevention and response.

RR

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UTAH DNR WILDLIFE RESOURCES

UTAH MOUNTAIN GOAT
STATEWIDE MANAGEMENT PLAN

UTAH DIVISION OF WILDLIFE RESOURCES
DEPARTMENT OF NATURAL RESOURCES

UTAH DIVISION OF WILDLIFE RESOURCES
STATEWIDE MANAGEMENT PLAN FOR MOUNTAIN GOAT

I. PURPOSE OF THE PLAN

A. General

This document is the statewide management plan for mountain goats in Utah. The plan will provide overall guidance and direction to Utah's mountain goat management program. The plan assesses current information on mountain goats, identifies issues and concerns relating to mountain goat management in Utah, and establishes goals and objectives for future mountain goat management programs. Strategies are also outlined to achieve the goals and objectives. This plan will be used to help determine priorities for mountain goat management and provide the overall direction for management plans. Unit management plans will be presented to the Utah Wildlife Board when one of the following criteria are met: 1) a new mountain goat unit is being proposed, 2) the current unit requires a significant boundary change, 3) a change to the unit population objective is being proposed, or 4) the unit has not yet had a management plan approved by the Utah Wildlife Board. All other changes to unit management plans will be approved by the Division Director.

B. Dates Covered

The statewide mountain goat plan was approved by the Utah Wildlife Board on November 29, 2018 and will be subject to review within 10 years (reviewed in 2025).

II. SPECIES ASSESSMENT

A. Natural History

Mountain goats (*Oreamnos americanus*) are not true goats as the name suggests, but share the family Bovidae with true goats (*Capra* spp.), gazelles (*Gazella* spp.) and cattle (*Bos* spp.). They are in the subfamily Caprinae along with 32 other species including sheep (*Ovis* spp.) and muskoxen (*Ovibos* spp.). Mountain goats are the only living species in the genus *Oreamnos*.

Mountain goat males, females, and young are known as billies, nannies, and kids, respectively. Kids are born after a gestation period of approximately 190 days most often as singles, but twins are not uncommon. Kids are normally born in mid-May to early-June. Compared to similarly sized ungulates, mountain goats have a surprisingly late age of first reproduction. In established populations, females often do not give birth until 4 or 5 years old (Festa-Bianchet et al. 1994). In newly translocated populations, females can reproduce as early as 2 or 3 years old (Bailey 1991, Festa-Bianchet and Côté 2008).

Like many ungulates, mountain goats put on weight and fat reserves during the spring and summer months for use during winter. For this reason, weights vary greatly depending on when they are measured. In late summer, a typical mature male will weigh about 175-225 pounds. Females are smaller and typically average between 125 and 150 pounds. Both males and

females continue to gain body mass until about 6 years old when they are considered fully-grown. The maximum life span of mountain goats is typically around 15 years old for males and 18–20 years old for females (Festa-Bianchet and Côté 2008).

Both male and female mountain goats have horns. For both sexes, horn growth begins at birth and the vast majority of horn growth occurs during the first 3 years of life. Horn growth for mature adult goats (4+) is minimal. There is little sexual dimorphisms exhibited in mountain goats. Horn length of males and females is similar, but male horns tend to be 10-20% thicker at the base than females (Festa-Bianchet and Côté 2008).

The mating period for mountain goats peaks in mid-November and individual females come into estrus for about 2 days. During this time, males seek out females in estrus and defend them from other males. Unlike most ungulates where males fight by clashing or locking horns or antlers, mountain goats have an antiparallel fighting style. During these interactions, males circle each other with each goats head aligned with the others rump. Outside the mating season, males and females generally remain segregated.

B. Management

1. UDWR Regulatory Authority

The Utah Division of Wildlife Resources (UDWR) presently operates under authority granted by the Utah Legislature in Title 23a of the Utah Code. The UDWR was created and established as the wildlife authority for the state under Section 23a-2-201~~23-14-1~~ of the Code. This Code also vests UDWR with its functions, powers, duties, rights, and responsibilities. UDWR's duties are to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state.

The UDWR is charged to manage the state's wildlife resources and to assure the future of protected wildlife for its intrinsic, scientific, educational, and recreational values. Protected wildlife species are defined in code by the Utah Legislature. Mountain goats have been listed as a protected species in Utah since 1919.

2. Population Status

Mountain goats currently inhabit several mountain ranges in Utah including numerous peaks along the Wasatch Front, Uinta Mountains, Tushar Mountains, and La Sal Mountains (Figure 1). All current populations are the result of introductions; the first of which occurred in 1967 when 6 mountain goats (2 billies, 4 nannies) were released in the Lone Peak area (Table 1). Within Utah, 30 separate transplant events have occurred and 276 mountain goats have been released. Initial transplants used mountain goats from Olympic National Park in Washington as the source herd. After those transplanted herds became established, they became source herds for future transplants. The Tushar Mountains population has been the most common Utah source herd because of its rapidly growing population and relative ease of accessibility. The number of mountain goats in Utah had generally increased from 1967 to 2011 reaching nearly 2,100 animals; since that time, the estimated number of mountain goats in Utah has decreased and stabilized at approximately 1,900 animals (Figure 2).

3. Past and Current Management

In Utah, mountain goat populations are surveyed via helicopter every 2-3 years (Table 2). During these flights, biologists survey all potential mountain goat habitat in August or September and classify all observed animals as adults, or kids. Previous studies have shown that sightability is usually around 80-85% for mountain goats (Rice et al. 2009). In addition to the helicopter surveys, most biologists conduct ground-based or fixed-wing classification counts on units during years when they are not surveyed with a helicopter. This provides biologists with data on annual production and greatly improves our population models for those units.

Mountain goats are managed as an once-in-a-lifetime species in Utah. The first mountain goat hunt in Utah was held on Lone Peak in 1981 where 1 permit was issued. Since 1981 the greatest number of permit issued in a given year was 175 in 2012 (Table 3). From 1981 to 2017, a total of 1,851 permits have been issued resulting in the harvest of 1,759 mountain goats (1,158 billies and 601 nannies). Success rates for mountain goats in Utah are high and average 95%. On the Beaver and Ogden units, where additional measures are needed to control goat populations, UDWR has issued nanny-only permits in addition to any-goat permits. On units where population control is not needed, any goat permits have been issued to harvest any adult goat. Historically, 66% of mountain goat hunters with any-goat permits have harvested billies. The average age of mountain goats harvested in Utah was 4.4 years old in 2017 (Table 4). Demand for permits is extremely high making these permits difficult to draw (Table 5). In 2017, a total of 12,657 hunters applied for the 104 public draw permits available resulting in drawing odds of 1 in 121.

C. Habitat

Mountain goats are obligate occupants of subalpine and alpine environments in Utah. Elevations of up to 13,000 feet are frequented in summer, and winter habitat may be high as 12,000 feet on windblown ridges of some units. Mountain goats prefer steep and rugged areas where these sure-footed animals can escape predators; typically selecting for escape terrain with an intermediate slope typically between 20 and 50 degrees (Gross et al. 2002). Mountain goats in Utah are often found above tree-line as well as in forested subalpine zones where they utilize a variety of grasses, forbs, shrubs, and lichens. Exposed, precipitous cliffs are an essential component of mountain goat habitat. Suitable sites encompass most aspects of mountain goat habitat needs including escape terrain, feeding sites, and birthing and nursery areas.

Food habits of goats are extremely variable among different geographic populations. In general, summer diets are typically dominated by succulent grasses and forbs. Winter diets may include a much higher browse or shrub component, and may even include Ponderosa pine, lodgepole pine, or alpine fir as well as the mosses and lichens that can be found on these trees. Other components of goat habitat that may be locally important include mineral licks and dusting areas used to alleviate heat or ectoparasite load.

III. ISSUES AND CONCERNS

A. 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 to this document (Appendix A). 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.

B. Habitat Impacts

Mountain goat utilization of the available forage should be closely monitored. UDWR is committed to working closely with land management agencies to monitor habitat conditions in mountain goat habitat. Although goat densities in Utah are typically low, local areas may exhibit heavy use if animals congregate in specific areas. If mountain goat use is demonstrated to be excessive, UDWR will work cooperatively with the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) to manage goat populations to acceptable numbers. As part of this plan, target population sizes for individual goat herd units will be reviewed for existing management units or developed for new units. Where habitat monitoring data exists, those data will be used to help determine the target population size.

In addition to their direct utilization of forage, mountain goats will also disturb soil to bed and dust bathe. In unregulated populations of mountain goats, this disturbance has caused concern. In regulated populations and at the densities observed in Utah, this disturbance is considered normal behavior of goats and other ungulates. Comparable disturbance is observed at elk wallows and on bighorn sheep lambing and wintering cliffs, even at low population densities. UDWR has observed habitat recovery in these disturbed sites, including at alpine elevations in Utah when the disturbance is caused by mountain goats.

C. Disease

Little information is available relative to disease in mountain goats (Côté and Festa-Bianchet 2003). However, there are some documented occurrences of disease that may be of concern for mountain goats in Utah including contagious ecthyma, Johne's disease, and respiratory pneumonia. Contagious ecthyma is a highly contagious parapox virus that causes blister-like sores to form on the face and muzzle of infected animals. The virus can lay dormant in soil for long periods and enters the host through skin abrasions. Lesions can be extremely painful causing an animal to not feed, leading to emaciation and ultimately death. It is believed that mountain goats may suffer severely from this disease with documented outbreaks resulting in deafness, blindness, and ultimately death (Samuel et al. 1975). Lesions typically last about 2-4

weeks after which an animal may recover. This disease has been observed in domestic sheep flocks for over 200 years (Lance et al. 1981).

Between 1972 -1978, the Colorado Division of Wildlife collected several bighorn sheep and a sympatric mountain goat carcass with lesions consistent with infection from the bacteria *Mycobacterium avium*, commonly referred to as Johne's disease or paratuberculosis (Williams et al. 1979). Mountain goats are believed to be highly susceptible to the disease, leading to severe gastrointestinal distress, emaciation, dry or rough hair coat, and death (Williams et al. 1983). The disease primarily affects lambs and transmission of the disease may occur *in utero* or in the first few months of life through ingestion of contaminated food, water, dust, or feces (Kimberling 1988). This disease is most commonly associated with cattle; however adult sheep, goats, and llamas can be carriers (Garde et al. 2005).

Respiratory pneumonia associated with *pasteurella* spp. and *mannheimia* spp. of bacterium have been reported sporadically in mountain goats, but large scale die-offs have rarely been documented (Garde et al 2005). Several strains of the bacteria are carried as common commensals in the upper respiratory tract. Transmission of these bacteria can occur through direct contact or aerosolization (Garde et al. 2005). In 2010, the Nevada Department of Wildlife documented a pneumonia related die-off in mountain goats and sympatric bighorn sheep in the Ruby Mountains (Peregrine Wolff, personal communication Nevada Department of Wildlife). Disease transmission between mountain goats and bighorn sheep is not well understood and UDWR will continue to investigate the important relationship between these two species. Other concerns include myopathy that may result from selenium deficiency (Côté and Festa-Bianchet 2003) and possibly some parasites such as lungworm.

D. Predation

Predation does not seem to be a limiting factor to mountain goat population growth in Utah. This is likely due to the absence of many mountain goat predators from Utah. Festa-Bianchet and Côté (2008) found that grizzly bears (*Ursus arctos*), wolves (*Canis lupus*) and cougars (*Puma concolor*) were the most effective predators of mountain goat in British Columbia. Cougars are potential predators of mountain goats in Utah, but are more likely to target easier prey such as mule deer, elk, and bighorn sheep. If predation is shown to be an issue on a particular unit, UDWR can increase predator hunting in specific areas or establish a predator management plan for that unit.

E. Wilderness and Park Management

Many wilderness areas in Utah currently have populations of mountain goats. These areas include the High Uintas, Lone Peak, Mt. Olympus, Twin Peaks, and Mt. Timpanogos. In order to properly manage mountain goat populations in these areas, it is critical that biologists have all possible management tools available to them if needed. These include but are not limited to the use of aircraft for surveys, transplants (captures and releases), hunting, and research projects. Any future wilderness designations or park expansions should also allow for these activities. UDWR must continue to work cooperatively with the USFS and BLM on wilderness-related issues to ensure the proper management of mountain goats in these areas. Certain activities

proposed in wilderness areas may necessitate coordination with appropriate land management agencies.

F. Competition with Bighorn Sheep

Mountain goats and Rocky Mountain bighorn sheep typically occur in broadly similar habitats, at similar elevations, and consume many of the same forages. Thus, the potential exists for competition between these two species, particularly when seasonal habitat overlap occurs (Hobbs et al. 1990, Laundre 1994, Gross 2001). However, even where both are present, resource partitioning appears to minimize conflicts (Laundre 1994). Specifically, there is enough disparity in site selection, seasonal use, and forage preference such that range overlap does not result in as much direct competition as expected when each species' habitat requirements are considered separately.

In Utah, sympatric bighorn sheep and goat populations are found only in the eastern Uinta Mountains and to a lesser extent along the Wasatch Front. In these areas, the abundance of alpine habitat combined with the low densities of mountain goats and bighorn sheep, greatly minimizes any interspecies competition. Range overlap of mountain goats and bighorn sheep does not currently occur in other areas of Utah, largely due to domestic and wild sheep disease issues that prohibit wild sheep. In some areas, there is also a general lack of suitable bighorn sheep wintering areas.

G. Poaching

Poaching of mountain goats is less common than other ungulate species due to the remote nature of their habitat. There are some documented cases of mountain goat poaching in Utah, but they are rare. Poaching likely has no population level effect, but does reduce hunting opportunity for law-abiding hunters. Mountain goat populations are small and due to their low reproductive rate, only a small proportion of the population can be harvested. With less than 200 permits currently issued, one poached animal is proportionately a large loss in opportunity.

Most poaching cases of mountain goats occur when a hunter with a female-only permit mistakenly identifies an animal and accidentally harvest a male. Typically, the hunters report their mistake, but this situation can lead to overharvesting males if this becomes too prevalent. Other poaching incidents usually occur when a hunter cannot access the goat he shot due to the rugged terrain or the animal was damaged from falling after it was shot. UDWR investigates all reported poaching cases. The high profile nature of mountain goats and their limited distribution adds concern to these investigations.

H. Transplants

All of the mountain goat populations that currently exist in Utah are a result of transplants or dispersal from transplants. Although mountain goats can pioneer to new areas when densities are sufficiently high, transplants continue to be the preferred method used to establish new mountain goat populations and supplement existing ones. Mountain goat transplants in Utah have typically been successful provided the habitat on the site is suitable and a sufficient number

of goats have been released. Transplant sites are carefully selected using habitat models, vegetation surveys, and meetings with interested stakeholders.

Although most suitable mountain goat habitat in Utah is already occupied, several potential sites for new transplants still exist (Appendix B). Additionally, some existing units may need to be augmented to bolster population growth. It is critical that UDWR work closely with the USFS and BLM to ensure the success of any future relocation efforts. Careful monitoring of vegetation will be needed to alleviate concerns for alpine vegetation.

There are a number of mountain goat populations in Utah that could serve as source herds for augmentation or to start new populations within Utah or in other states. For many of these populations, wilderness designated lands are one of the largest barriers to catching animals. UDWR, USFS, and BLM will need to work cooperatively to determine the suitability of helicopter access for possible transplant and GPS collaring projects.

IV. USE AND DEMAND

In Utah, mountain goats are one of the easier to draw permits for an once-in-a-lifetime species, likely due to the extremely rugged terrain they inhabit. Even so, the demand for these permits is still high and far exceeds permit supply. In Utah for 2012, applications exceeded available permits by 68:1 for residents and 621:1 for nonresidents. Applications for both resident and nonresidents have increased every year since the initiation of Utah's draw system (Table 5).

In addition to hunting, viewing mountain goats is one of the most exhilarating and memorable experiences available to users of high alpine areas in Utah. The closeness of some of Utah's mountain goat populations to the Wasatch front helps contribute to the interest of wildlife viewers in watching mountain goats. Public perception of goat viewing opportunities is overwhelmingly positive, and the Watchable Wildlife events for mountain goats are some of the most popular events hosted by the UDWR. UDWR's goal is to foster and promote these opportunities wherever possible and enable people to see this unique species.

V. CONCLUSION

Mountain goats personify the high lonesome reaches of western North America. Goats are adapted to live in the highest, coldest, snowiest and most precipitous reaches of our classic western mountain ranges. The image of a solitary goat on a ridiculously narrow rock ledge on a seemingly inaccessible cliff is one that once seen is never forgotten. For over 50 years, UDWR has carefully managed Utah's mountain goat populations so herds are productive and balanced with available habitat. UDWR plans to continue this management approach, while also establishing new mountain goat populations where possible. This will allow UDWR to expand both hunting and viewing opportunities for mountain goats while ensuring their long-term viability in Utah.

VI. STATEWIDE MANAGEMENT GOALS AND OBJECTIVES

A. Population Management Goal: Establish sustainable populations of mountain goats by utilizing suitable habitat within the state to create and foster individual populations.

Objective 1: Increase mountain goat populations within the state as conditions allow.

Strategies:

a. Develop or revise all management plans for individual units making sure to include population goals and objectives.
b. Survey all herd units by helicopter every 1–3 years to monitor population size and composition.
c. Use population or sightability models to determine the relationship between population surveys and population size.
d. Utilize GPS collars to better understand movements and aid in estimating abundance of mountain goats.
e. Translocate and/or harvest animals from populations where habitat concerns exist due to high goat densities or where populations are above objective.
f. Augment existing populations where needed to improve herd distribution, link small populations, and improve genetic diversity (Appendix B). Depending on location, augmentation activities may need to be coordinated with the appropriate federal land management agency.
g. Transplant mountain goats to establish new populations in accordance with Utah Code 23a-2-209 and 23a-2-210~~23-14-21~~ (Appendix B). Depending on location, augmentation activities may need to be coordinated with the appropriate federal land management agency.
h. Participate in research efforts to monitor adult and kid survival and determine reasons for poor kid recruitment and population declines in units where needed.
i. Support law enforcement efforts to reduce illegal taking of mountain goats.

B. Habitat Management Goal: Provide good quality habitat for healthy populations of mountain goats.

Objective: Maintain or improve mountain goat habitat to enhance individual population success and promote the overall sustainability of mountain goats statewide.

Strategies:

a. Identify mountain goat habitats and work with land managers to protect and enhance these areas.
b. Assist land management agencies in monitoring mountain goat habitat. Habitat monitoring by the land management agencies will be contingent on available funding and personnel.
c. Work with land managers to minimize and mitigate loss of mountain goat habitat.
d. Inform and educate the public concerning the needs of mountain goats.

C. Recreation Goal: Provide quality opportunities for hunting and viewing mountain goats.

Objective 1: Increase hunting opportunities as populations allow while maintaining high quality hunting experiences.

Strategies:

a. Recommend mountain goat permits (including female only permits) to make progress towards population objectives contained in unit management plans.
b. Recommend mountain goat permits to harvest 5%-25% of the counted adult population.
c. Use subunits to maximize hunting opportunities and improve hunter distribution.
d. When feasible, use multiple seasons to maximize hunting opportunities and minimize hunter conflicts.
e. Require mountain goat orientation course for all hunting permit holders. Encourage hunters to avoid harvesting nannies with hunter's choice permits.
f. Explore providing a greater variety of hunting opportunities by utilizing more primitive weapons, variation in season length, and more variable season dates.

Objective 2: Increase public awareness and expand opportunities to view mountain goats.

Strategies:

a. Look for ways to expand mountain goat viewing opportunities for the public.
b. Ensure that information about mountain goats published on the Division's website, social media channels, and print products is current and accurate.
c. 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.

Figure 1. Mountain goat distribution, Utah 2017.

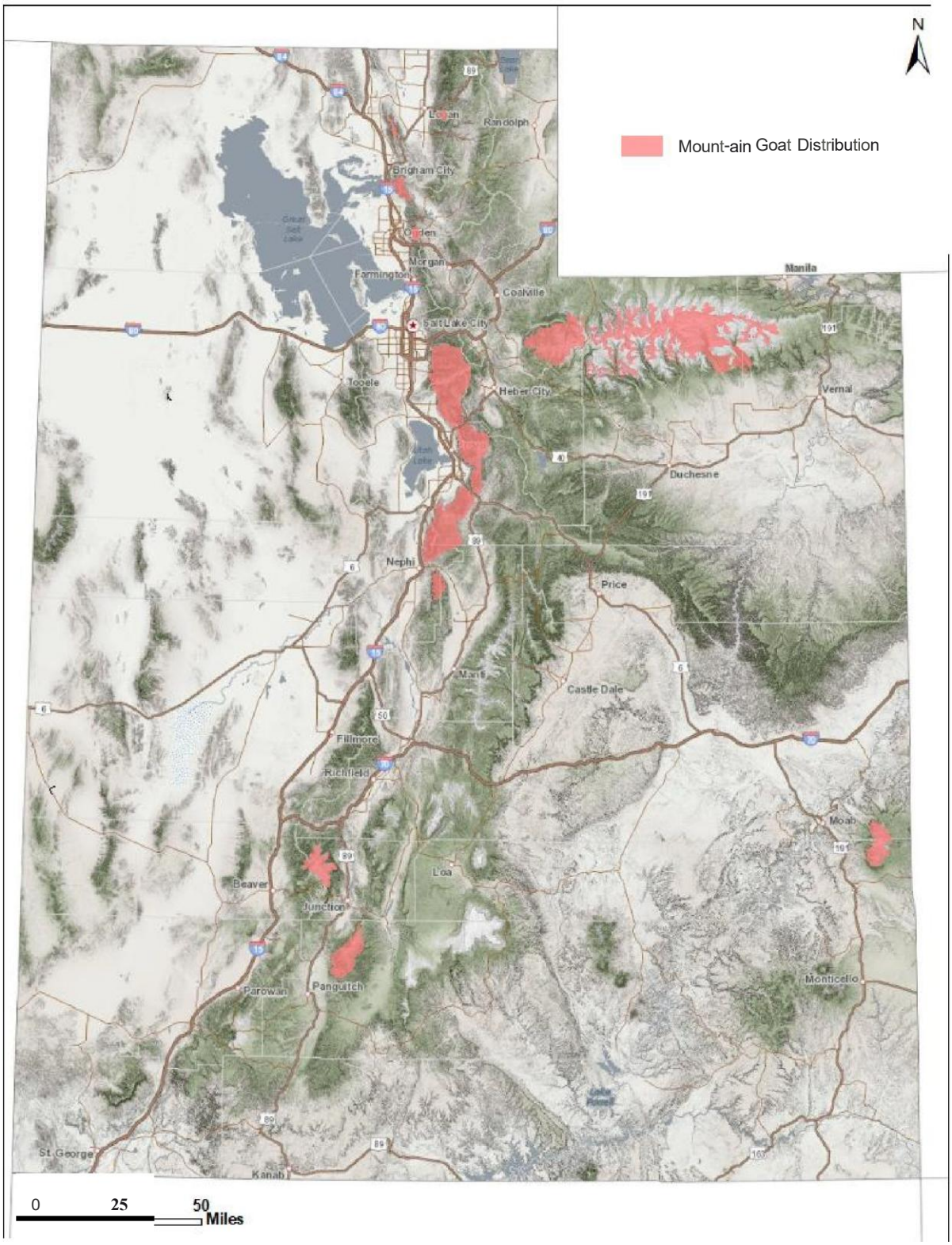

Figure 2. Mountain goat population trends, Utah 1975–2017.

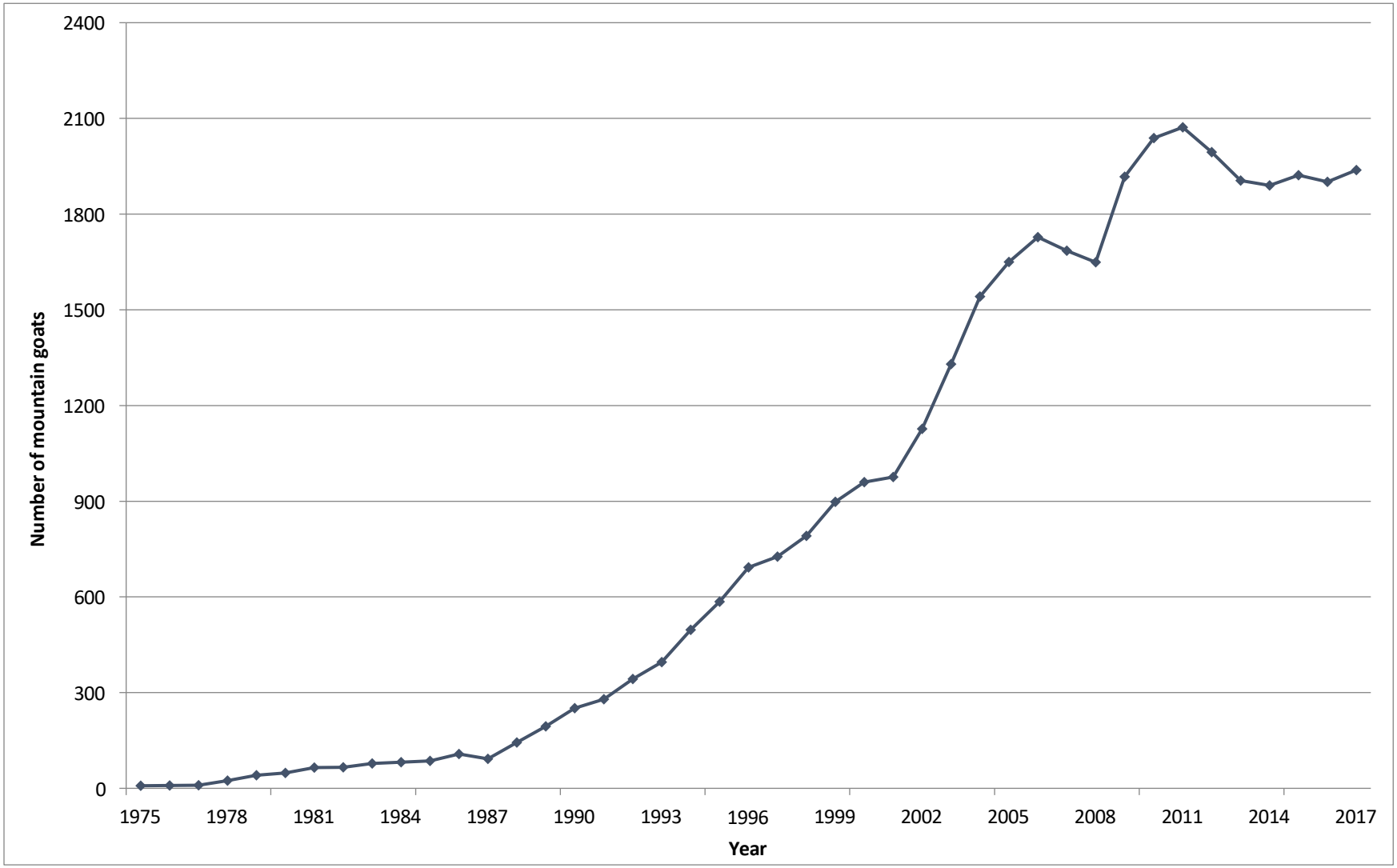

Table 1. History of mountain goat transplants, Utah 1967–2017.

Unit #	Unit	Area Released	Year	# Released	Source
3	Ogden	Willard Peak	1994	5	Lone Peak, UT
3	Ogden	Willard Peak	2000	4	Provo Peak, UT
7	Kamas	Bald Mountain, Uintas	1987	7	Lone Peak, UT
7	Kamas	Bald Mountain, Uintas	1988	16	Olympic NP, WA
8 / 9	North Slope/South Slope	Whiterocks Canyon, Uintas	1989	9	Olympic NP, WA
8 / 9	North Slope/South Slope	Whiterocks Canyon, Uintas	1989	1	Kamas, UT
8 / 9	North Slope/South Slope	Whiterocks Canyon, Uintas	1992	13	Lone Peak, UT
8 / 9	North Slope/South Slope	Chepeta Lake, Uintas	1996	7	Tushar Mountains, UT
8 / 9	North Slope/South Slope	Liedy Peak, Uintas	1996	3	Tushar Mountains, UT
8 / 9	North Slope/South Slope	Marsh Peak, Uintas	1996	5	Tushar Mountains, UT
8 / 9	North Slope/South Slope	Brown Duck Peak, Uintas	1997	7	Tushar Mountains, UT
8 / 9	North Slope/South Slope	South Fork of Rock Creek, Uintas	1997	5	Tushar Mountains, UT
8 / 9	North Slope/South Slope	Center Park, Uintas	2000	8	Tushar Mountains, UT
8 / 9	North Slope/South Slope	Jefferson Park, Uintas	2000	9	Tushar Mountains, UT
13	La Sal Mountains	Beaver Basin	2013	20	Tushar Mountains, UT
13	La Sal Mountains	Beaver Basin	2014	15	Tushar Mountains, UT
16	Central Mountains	Loafer Mountain	2007	20	Tushar Mountains, UT
16	Central Mountains	Nebo	2013	10	Tushar Mountains, UT
16	Central Mountains	Nebo	2013	11	Willard Peak, UT
17	Wasatch Mountains	Lone Peak	1967	6	Wantachee, WA
17	Wasatch Mountains	Mount Olympus	1981	10	Olympic NP, WA
17	Wasatch Mountains	Mount Olympus	1981	4	Unknown
17	Wasatch Mountains	Mount Timpanogos	1981	10	Olympic NP, WA
17	Wasatch Mountains	Provo Peak	1989	7	Olympic NP, WA
17	Wasatch Mountains	Provo Peak	1990	5	Mount Timpanogos, UT
22	Beaver	Tushar Mountains	1986	6	Lone Peak, UT
22	Beaver	Tushar Mountains	1986	1	Mount Timpanogos, UT
22	Beaver	Tushar Mountains	1988	17	Olympic NP, WA
24	Mt Dutton	Cottonwood Peak & Mt Dutton Peak	2013	25	Willard Peak, UT
24	Mt Dutton	Cottonwood Peak & Mt Dutton Peak	2015	21	Willard Peak, UT
—	Idaho	Lemhi Mountains	2007	24	Tushar Mountains, UT
—	South Dakota	Black Hills	2013	22	Tushar Mountains, UT

Table 2. Mountain goat trend counts by unit, Utah 2008–2017.

Unit	Year established	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beaver	1986	133	206	—	240	—	222	—	215	—	—
Mt Dutton	2013	—	—	—	—	—	25*	—	—	47	—
Central Mountains, Loafer Mountain	2007	—	—	—	—	26	—	19	37	—	20
Central Mountains, Nebo	2007	—	—	—	—	22	—	20	29	—	91
Kamas / Chalk Creek	1987	37	108	—	91	—	—	129	—	—	103
North / South Slope, High Uintas Central	1989	153	210	—	197	—	—	206	—	—	220
North / South Slope, High Uintas East	1996	95	81	—	89	—	—	64	—	—	55
North / South Slope, High Uintas Liedy Peak	1996	58	77	—	41	—	—	44	—	—	52
North / South Slope, High Uintas West	1987	236	294	—	440	—	—	392	—	—	303
Ogden, Willard Peak	1994	115	193	218	252	—	205	197	188	148	—
Wasatch Mountains, Box Elder Peak	1967	—	—	54	—	30	—	34	31	—	36
Wasatch Mountains, Lone Peak	1967	—	—	67	—	13	5	27	41	—	44
Wasatch Mountains, Provo Peak	1989	—	—	104	—	79	—	75	76	—	53
Wasatch Mountains, Timpanogos	1981	—	—	118	—	64	—	76	92	—	81
La Sal, La Sal Mountains	2013	—	—	—	—	—	20*	—	—	43	56

*Initial transplant

Table 3. Mountain goat harvest statistics, Utah 1981–2017.

Year	Permits issued	Billy harvest	Nanny harvest	Total harvest	Hunters afield	Success rate (%)	Mean days hunted
1981	1	1	0	1	1	100	2
1982	1	0	1	1	1	100	2
1983	3	3	0	3	3	100	4.3
1984	4	2	1	3	4	75	4
1985	3	3	0	3	3	100	5.3
1986	4	2	2	4	4	100	6.5
1987	4	3	1	4	4	100	3.8
1988	4	3	1	4	4	100	3.5
1989	5	4	1	5	5	100	3.6
1990	6	4	0	4	6	67	4.8
1991	6	3	3	6	6	100	7
1992	8	8	0	8	8	100	5.8
1993	7	6	1	7	7	100	4.3
1994	10	10	0	10	10	100	—
1995	12	10	2	12	12	100	—
1996	19	16	2	18	19	95	4.2
1997	19	17	2	19	19	100	—
1998	19	18	0	18	19	95	3.5
1999	20	18	2	20	20	100	—
2000	29	19	9	28	29	97	3.2
2001	30	21	9	30	30	100	—
2002	36	25	10	35	36	97	—
2003	41	32	9	41	41	100	2.3
2004	46	31	15	46	46	100	2.6
2005	68	42	21	63	65	97	3.5
2006	94	48	38	86	93	92	3.3
2007	96	55	36	91	96	95	3.3
2008	95	58	30	88	93	95	2.9
2009	108	77	30	107	107	100	2.8
2010	115	70	41	111	114	97	3.0
2011	143	91	42	133	142	94	3.4
2012	175	94	73	167	174	96	2.6
2013	170	87	70	157	166	95	2.7
2014	115	74	36	110	115	96	3.1
2015	118	77	35	112	117	96	3.2
2016	106	63	40	103	104	99	3.8
2017	111	63	38	101	107	94	3.5

Table 4. Mountain goat average age of harvest, Utah 2010–2017.

Management unit	Average age								3-year average
	2010	2011	2012	2013	2014	2015	2016	2017	
Beaver	4.9	4.9	5.0	3.5	5.1	4.7	4.6	3.9	4.4
Kamas/Chalk Creek	4.6	6.5	3.3	6.3	5.0	5.3	6.7	2.0	4.7
North / South Slope, High Uintas Central	5.8	4.0	3.6	4.8	3.5	4.8	5.4	3.2	4.5
North / South Slope, High Uintas East	5.0	11.0	7.0	4.7	6.5	7.8	3.5	6.3	5.9
North / South Slope, High Uintas Liedy Peak	3.5	3.8	7.5	10.0	6.0	3.0	7.0	4.0	4.7
North / South Slope, High Uintas West	3.0	4.8	4.8	4.5	5.8	4.8	5.8	5.7	5.4
Ogden, Willard Peak	3.7	4.1	3.9	3.6	2.8	3.6	3.7	2.9	3.4
Wasatch Mountains, Box Elder Peak	9.0	—	6.0	7.7	5.0*	6.0*	2.0*	3.5*	3.8
Wasatch Mountains, Lone Peak	10.0	3.0	3.5	9.0	—	—	—	—	—
Wasatch Mountains, Provo Peak	5.8	4.0	4.0	5.3	5.5	10.0	3.0	6.7	6.6
Wasatch Mountains, Timpanogos	6.4	4.5	3.0	6.3	—	—	—	—	—
Central Mountains, Nebo	—	—	—	3.0	2.0	3.0	—	3.5	3.3
Mt Dutton	—	—	—	—	—	—	—	2.0	2.0
Statewide average	4.7	4.5	4.4	4.3	4.6	4.6	4.5	4.0	4.4

*Combined hunts: Box Elder Peak, Lone Peak, Timpanogos

Table 5. Resident and nonresident drawing odds of obtaining mountain goat hunting permits, Utah 1998–2017.

Year	Residents			Nonresidents		
	Applicants	Permits	Odds	Applicants	Permits	Odds
1998	568	18	1 in 31.6	44	1	1 in 44
1999	748	20	1 in 37.4	93	1	1 in 93
2000	904	24	1 in 37.7	142	2	1 in 71
2001	1103	27	1 in 40.9	194	2	1 in 97
2002	1505	33	1 in 45.6	244	2	1 in 122
2003	1793	37	1 in 48.5	275	3	1 in 92
2004	2072	40	1 in 51.8	333	3	1 in 111
2005	2384	59	1 in 40.4	464	5	1 in 93
2006	2747	83	1 in 33.1	660	6	1 in 110
2007	3351	84	1 in 39.9	683	5	1 in 137
2008	3405	83	1 in 41.0	732	7	1 in 105
2009	3577	91	1 in 39.3	2869	9	1 in 319
2010	3911	97	1 in 40.3	3194	10	1 in 319
2011	4005	118	1 in 33.9	3446	11	1 in 313
2012	4220	144	1 in 29.3	3779	17	1 in 222
2013	4620	144	1 in 32.1	4134	14	1 in 295
2014	5113	92	1 in 55.6	4599	10	1 in 459
2015	5492	93	1 in 59.1	5108	10	1 in 510
2016	5860	90	1 in 65.1	5497	8	1 in 687
2017	6441	94	1 in 68.5	6216	10	1 in 621

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Appendix A

MOUNTAIN GOATS IN UTAH: AN OVERVIEW

History

The mountain goat of western North America is one of two known members from the genus *Oreamnos*. The other member of the genus, *Oreamnos harringtoni*, is extinct. The closest extant relative is the chamois of Europe. Because of the harsh sites that mountain goats inhabit, the fossil record is not extensive. The genus likely derived from parent stock in Asia and entered North America sometime during the Pleistocene. It was likely completely isolated from that parent stock by the late Pleistocene (18,000 years ago).

During and since the Pleistocene, the distribution and status of goat populations likely varied widely since mountain goats specialized to occupy a narrow range of habitats. These habitats are tied closely to alpine cliffs, which means any glacial encroachment or retreat would have likely changed habitat suitability on all mountain ranges in western North America. This would have also caused an altitudinal shift in habitats within individual mountain ranges. During the full glacial period of the late Pleistocene, Harrington's mountain goats were present farther south than any mountain goats live today. This is documented by fossils recovered from the San Josecito Cave site, in Nuevo Leon, Mexico, at an altitude of 2300 meters. There were likely no goats present in much of Canada and Alaska because suitable cliff sites were buried by glaciers. With the end of the Pleistocene and the associated glacial retreat, suitable habitats for mountain goats would have become available northward and upward from the southern terminus in Mexico. As these habitat changes progressed, Utah would have provided a major pathway for goat redistribution from south to north. The central mountain ranges of Utah, along with the Rocky Mountains of Colorado, would have provided appropriate habitats for goat redistribution in response to changing climate. A strong case can be made that Utah would have been intermediate between both extremes. Given the variety and extent of mountain ranges through the length of the state, habitat at some elevation could have been provided during most if not all of the Pleistocene, and evidence from fossil sites in nearby areas support that premise. Pleistocene goat remains have been identified from the Smith Creek Cave site on the Utah-Nevada border near Baker, Nevada; at three sites in the Laramie Mountains in southeastern Wyoming; and at Rampart Cave and the Stanton site along the Colorado River corridor in northern Arizona. As conditions became warmer and drier in the Intermountain region after the Pleistocene, a dramatic restructuring of goat distributions could have occurred.

Recent Distribution

The distribution of mountain goats at the time of European contact with western mountain ranges is very poorly documented. This is likely a byproduct of the remote habitats used by mountain goats. Given the climatic conditions of the past 200 years, goat habitat would have been limited to the highest and most inaccessible alpine expanses in the Intermountain region. Only in Alaska and Northwest Canada would goats have been found near the valleys and basins that provided access for Europeans. Even early trappers would have been unlikely to encounter goats in their normal pursuit of beaver, since goats persist yearlong at high elevations in most ranges.

By the early part of the 20th century, European settlement and an interest in wildlife had set the stage for increasing recorded knowledge of the status and distribution of goats. By mid-century,

a well-documented analysis of goat distributions had emerged. A USFS report that was published in the Twelfth Biennial Report of the Fish and Game Commissioner of the State of Utah in 1917-1918, estimated 25 mountain goats on the Wasatch Forest. This figure was listed in addition to mountain sheep numbers. The Wasatch Forest at that time also included the Uinta Mountains; site locations, unfortunately, were not listed. A separate report from a District Ranger in Kamas stated that both mountain sheep and goats were present in the High Uintas. By the middle of the 20th century no native goat populations were known to persist in Utah, Colorado, Nevada, or Wyoming.

Currently, however, there are populations of mountain goats in all these states. All are the result of introductions of goats by state wildlife departments during the last 50+ years. Many, if not all, of these populations are healthy and viable, indicating that these populations all occupy habitat suitable for mountain goats. The status of these areas at the time of European settlement is not fully known.

The Intermountain Region Since the Pleistocene

The most recent glacial age ended about 14,000 years ago, and the interglacial period that we currently occupy had gained primacy. Conditions became significantly warmer and in many cases drier. Mountain goat habitat, which once existed as far south as Mexico was no longer suitable. The progression from full glacial advance to present day conditions was far from linear. Small scale returns to colder and snowier conditions occurred as recently as the 1800's. During the Middle Holocene, there was a period of several thousand years (from about 7,000 to 4,500 years ago) when climatic conditions were substantially warmer and probably drier than those today. Data indicate this period was pervasive enough that the Great Salt Lake may have been nearly dry.

Based on our knowledge of goat habitat requirements and climatic conditions in the early Holocene, goats could have found suitable habitat in many mountain ranges of Utah and the Intermountain area after the end of glaciation. These habitats were likely similar to those present today, though perhaps more extensive, given the cooler temperatures. During the Middle Holocene, however, the dramatic warming would have shifted goat habitat much higher on occupied mountain ranges. Data from the Snowbird Bog pollen sites indicate that timberline may have been 1000 feet or more higher in altitude than that found today. Given the observed altitudinal depth of current habitats, this compression would have eliminated suitable sites on most Intermountain ranges, and restricted those found in larger and more northerly ranges. Thus goat populations surviving after the Pleistocene in high elevation habitats may have been eliminated or restricted.

Since that period, however, conditions have reverted to a cooler and wetter pattern. Suitable goat habitat exists on many mountain ranges in Utah and surrounding states, as demonstrated by the survival of transplanted populations. If these ranges were devoid of goats at the time of European contact, why had goats not re-colonized there? Certainly goat populations had followed the ebb and flow of glacial periods for perhaps millions of years. However, one new factor was inserted at the end of the Pleistocene; humans. Humans became for the first time a member of the North American ecosystem. After that time, aboriginal people were widespread and important modifiers of both vegetative and animal communities. Although the extent and type of modifications are debated, the conclusion of nearly all recent research has been that impacts by aboriginal people were greater than previously thought. Some of the most obvious

and dramatic impacts would have been extensive and widespread burning, transportation of propagules of plant species beyond the range of "natural" movement, and manipulation or even elimination of populations and even species of large vertebrates.

It is known that goats were contemporaneous with aboriginal hunters at the end of the Pleistocene. The loss of goats during the Holocene may have been directly aided by opportunistic hunting of goats. It is well documented that native peoples hunted mountain sheep in alpine areas throughout the Intermountain area. Goats would have been an appropriate alternative prey item for these big game hunters.

Whatever the extent of this aboriginal pressure, it is obvious that recolonization of suitable habitats by goats had to be accomplished through the barrier of a thriving culture of big game hunters. These big game hunters likely only killed goats opportunistically, since their survival was dependent upon the vast array of other ungulates available to them. Given their highly selective habitat requirements, relatively low densities, and low fecundity, it would have been difficult for goats to recolonize these now suitable habitats. Currently, with a vast ocean of human habitation surrounding islands of goat habitat, the prospects for natural expansion of goat populations, except for unoccupied habitats immediately adjacent to existing populations, is unlikely.

An interesting footnote to this scenario can be added for the current status of moose. This species has since the turn of the century greatly extended its range southward into the Intermountain Area. The prospects for moose pioneering after the Pleistocene should have been as poor as for goats in the face of a thriving big game hunting culture. However, the encroachment of Europeans eliminated the two prime predators of moose - wolves and aboriginal big game hunters. After the turn of the century, wildlife laws and enforcement reduced the killing of moose by early settlers. As such, moose, with their higher mobility and broader habitat requirements than mountain goats, were able to colonize areas far to the south of what had been considered its historically occupied range.

Oreamnos speciation

The relationship between the two known species of *Oreamnos* (Harrington's goat and mountain goat) warrants some discussion. Essentially, the largest difference between the two species is size. Harrington's goat is up to 30% smaller than the existing mountain goat species and has minor skull variances. This difference is derived from skulls from a few well-documented sites in Arizona, Mexico, California, and Nevada. Overall, though, the fossil record is poor because of the low probability of preservation in the harsh sites frequented by goats. The existing fossils all came from protected cave sites which are rare. Nearly all such sites are from isolated areas at the southern extreme of past mountain goat range and were likely in areas isolated from other goat populations after the end of the Pleistocene. Caution must be exercised in projecting the importance of a character such as relative size in assessing its evolutionary significance and the relationship between the two *Oreamnos* species. Body size may be one of the most labile of morphological traits, especially in extremes of climatic conditions. Purdue and Reity (1993) have demonstrated tremendous shifts in body size in white-tailed deer during the past 4,400 years in Georgia and South Carolina. They consider climate changes with resultant habitat quality to be the driving factor for this change. They indicate that body size tends to be quite responsive to changes in certain environmental factors that in turn serve as the ultimate source of

selection. This is dramatically demonstrated by ungulates on islands, which may frequently be dwarfed in response to reduced food resources.

A careful consideration of these factors will generate caution in inferring about the relationship between *O. harringtoni* and *O. americanus*. The fossil records are non-existent between isolated southerly sites and the range of "modern" goats. It is possible that the Harrington population documented by cave sites were "islands" by the late Pleistocene. Kurten (1980) postulates that Harrington's goat was in fact an extension of *O. americanus* that became isolated at the end of the Pleistocene, and body size would have been driven by limited resources. Since their habits were probably like those of modern goats, they would have been subjected to resource limitations in their peripheral occurrences.

Appendix B

Notwithstanding the following list, any existing mountain goat populations can be augmented. All suitable mountain goat habitat within the following units/subunits will be considered for augmentation/reintroduction.

Potential mountain goat transplant sites by region, Utah 2018.[1]

Region	Unit	Transplant Site	Transplant Type
Central	Central Mountains	Loafer Mountain	Augmentation
	Central Mountains	Manti	Initial transplant
	Central Mountains	Mount Nebo	Augmentation
	Oquirrh-Stansbury	Stansbury Mountains	Initial transplant
	Wasatch Mountains	Box Elder Peak	Augmentation
	Wasatch Mountains	Lone Peak	Augmentation
	Wasatch Mountains	Provo Peak	Augmentation
	Wasatch Mountains	Timpanogos	Augmentation
	West Desert	Deep Creek Mountains	Initial transplant
Northeastern	North / South Slope	High Uintas Central	Augmentation
	North / South Slope	High Uintas East	Augmentation
	North / South Slope	High Uintas Liedy Peak	Augmentation
	North / South Slope	High Uintas West	Augmentation
Northern	Cache	Wellsville Mountains	Augmentation
	Cache	Logan Peak	Augmentation
	Cache	Mount Naomi	Augmentation
	Kamas	Uintas	Augmentation
	Ogden	Ogden Peak	Augmentation
	Ogden	Willard Peak	Augmentation
Southeastern	La Sal	La Sal Mountains	Augmentation
Southern	Beaver	Tushar Mountains	Augmentation
	Mt Dutton	Mt Dutton	Augmentation
	Monroe	Monroe	Initial transplant
	Panguitch Lake	Panguitch Lake	Initial transplant
	Plateau, Boulder	Boulder	Initial transplant
	Plateau, Thousand Lakes	Thousand Lakes	Initial transplant

[1] In accordance with Utah Code ~~23-14-21~~ 23a-2-209 and 23a-2-210.

UTAH BIGHORN SHEEP
STATEWIDE MANAGEMENT PLAN

UTAH DIVISION OF WILDLIFE RESOURCES
DEPARTMENT OF NATURAL RESOURCES

UTAH DIVISION OF WILDLIFE RESOURCES
STATEWIDE MANAGEMENT PLAN FOR BIGHORN SHEEP

I. PURPOSE OF THE PLAN

A. General

This document is the Statewide Management Plan for bighorn sheep in Utah (hereafter referred to as the "Plan"). This Plan provides overall guidance and direction to Utah's bighorn sheep management program. This Plan assesses current information on bighorn sheep, identifies issues and concerns relating to bighorn sheep management in Utah, and establishes goals and objectives for future bighorn management programs. Strategies are also outlined to achieve goals and objectives. This Plan helps determine priorities for bighorn management and provide the overall direction for management plans on individual bighorn units throughout the state. Unit management plans will be presented to the Utah Wildlife Board when one of the following criteria are met: 1) a new bighorn sheep unit is being proposed, 2) the current unit requires a significant boundary change, 3) a change to the unit population objective is being proposed, or 4) the unit has not yet had a management plan approved by the Utah Wildlife Board. All other changes to unit management plans will be approved by the Division Director.

This Plan, among other things, outlines a variety of measures designed to abate or mitigate the risk of comingling and pathogen transmission between domestic and wild bighorn sheep. This Plan is not intended to be utilized to involuntarily alter domestic sheep grazing operations in Utah. The only mechanism acceptable to the Utah Division of Wildlife Resources (UDWR) for altering domestic sheep grazing practices to avoid risk of comingling is through voluntary actions undertaken by the individual grazers. UDWR does not support any form of involuntary restriction, reduction, limitation, termination, or conversion of permitted domestic sheep grazing for purposes of protecting bighorn sheep on public or private property.

The ability to successfully manage current populations of bighorn sheep and to restore bighorns to historical habitat is highly dependent on public tolerance for those existing and new populations. There are very few areas in Utah with suitable bighorn habitat that are not impacted by human development or are not in proximity to domestic sheep or domestic sheep grazing. Remaining areas of unoccupied suitable habitat have domestic sheep in the vicinity that create a moderate risk of comingling. Broad-based public support for new bighorn populations cannot be achieved if it comes at the expense of local domestic sheep operations. That public support, particularly with the agriculture industry, is critical to UDWR's ability to successfully maintain and expand bighorn sheep and other wildlife populations throughout the state. That public support is more vital to the successful conservation of bighorn sheep than abating the moderate risk of comingling and disease presented by domestic sheep. If UDWR adopts a zero sum game approach in abating comingling through involuntary grazing restrictions, conversions, and terminations, it will create a divide between agriculture and wildlife management detrimental not only to bighorn sheep conservation, but wildlife in general.

Statute charges the UDWR in Utah Code Section 23a-2~~1~~4-102~~3~~ to establish policies that "recognize the impact of wildlife on humans~~man~~, human~~his~~ economic activities, private property rights, and local economies" and to "balance the habitat requirements of wildlife with

the social and economic activities of humans~~man~~." Considering this, the UDWR will not manage bighorn sheep to the involuntary exclusion of domestic sheep. The two must both exist in Utah with a proper balance between the two entities.

B. Dates Covered

The Plan was approved by the Utah Wildlife Board on November 29, 2018 and will be subject to review within 10 years (reviewed in 2025).

II. SPECIES ASSESSMENT

A. Natural History

Bighorn sheep are found in western North America from central British Columbia to Mexico and from California to the Dakotas and are beautiful and impressive large mammals native to North America. They are named for the massive horns grown by the males of the species. Horns grow throughout life and typically reach maximum size at 8 to 10 years of age. Females also have horns that are similar in size to yearling males. Males, females, and young of the year are called rams, ewes, and lambs respectively. Rams normally separate themselves from groups of ewes and lambs, except during the breeding season, which can occur from August to November for desert bighorns and from October to early December for Rocky Mountain bighorns. During that time, rams engage in impressive head butting clashes to establish dominance. Gestation is about 180 days. Lambs, which are nearly always singles, are born in February to May for desert bighorns and April to early June for Rocky Mountain bighorns.

Bighorn sheep are native to Utah with suitable habitat throughout the state (Figure 1). Archeological evidence indicates they were well known to the prehistoric inhabitants of Utah, since bighorns are depicted in pictographs and petroglyphs more than any other form of wildlife. Historical records of the first European explorers and settlers in the state also confirm the abundance of bighorns. Father Escalante noted in his journal as he crossed the Colorado River in Utah - "through here wild sheep live in such abundance that their tracks are like those of great herds of domestic sheep" (Rawley 1985). Explorers, trappers, pioneers and settlers also recorded numerous observations of bighorn sheep throughout the state. Evidence of bighorn sheep is so plentiful and suitable habitat so abundant, that it is believed bighorns inhabited almost every mountain range in Utah prior to European settlement (Dalton and Spillett 1971). Rocky Mountain bighorns *(Ovis canadensis canadensis)* are generally recognized to have inhabited northern and central Utah, whereas desert bighorns *(Ovis canadensis nelsoni)* were found in southern Utah. California bighorns *(Ovis canadensis californiana)* historically inhabited portions of the Great Basin in Nevada and Idaho. Although it is not known conclusively whether or not California bighorns inhabited Utah, recent studies indicate there is no genetic or taxonomic distinction between Rocky Mountain and California bighorns (Ramey 1993). Thus, they should be considered the same subspecies (Rocky Mountain bighorn sheep). Some mixing and interbreeding of Rocky Mountain and desert bighorns likely occurred where their ranges converged in Utah, making a clear distinction of historical ranges difficult.

Native populations of Rocky Mountain bighorn sheep were nearly extirpated following pioneer settlement. A few scattered sightings of bighorns persisted in northern Utah as late as the 1960's. Factors contributing to their decline included competition with domestic livestock for forage and space, vulnerability to domestic livestock-borne diseases, habitat conversions away from native grasslands towards shrub lands due to excessive grazing and fire suppression, and unregulated hunting (Shields 1999).

Utah's desert bighorn sheep populations also struggled to survive civilization. Whereas some herds suffered early extirpation, others remained relatively undisturbed until the 1940's and 1950's, when uranium was discovered on the Colorado Plateau. By the 1960's, only a small population of desert bighorns remained in Utah along the remote portions of the Colorado River. Desert bighorn populations were thought to have declined for the same reasons previously described for Rocky Mountain bighorns.

B. Management

1. UDWR Regulatory Authority

The UDWR presently operates under authority granted by the Utah Legislature in Title 23a of the Utah Code. UDWR was created and established as the wildlife authority for the state under Section 23a-2~~1~~4-201~~1~~. Title 23a of the Utah Code also vests UDWR with its functions, powers, duties, rights, and responsibilities. UDWR's duties are to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state.

The UDWR is charged to manage the state's wildlife resources and to assure the future of protected wildlife for its intrinsic, scientific, educational, and recreational values. UDWR is further charged in Section 23a-2~~1~~4-1023~~(2)~~ (b) to develop wildlife management policies that: 1) "recognizes the impact of wildlife on humans~~man~~, human~~his~~ economic activities, private property rights, and local economies;" and 2) "seek to balance the habitat requirements of wildlife with the social and economic activities of humans~~man~~." Protected wildlife species are defined in code by the Utah Legislature.

2. Population Status

Rocky Mountain Bighorn

Rocky Mountain bighorn sheep currently exist in the northern half of the state (Figure 2). The current statewide population estimate for Rocky Mountain bighorns managed by UDWR is approximately 1,500 animals (Figure 3). Utah currently has 14 individually managed populations of Rocky Mountain bighorn sheep, all of which are the result of transplant efforts. Three of these populations are showing increasing trends, 2 are stable, and 8 are showing declining trends or have low numbers of sheep (Table 1). The 14th population, the Stansbury Mountains, recently underwent a disease event and the area was subsequently depopulated. In January 2018, UDWR reintroduced 59 bighorn sheep to the Stansbury Mountain from other source herds within Utah.

In addition to UDWR managed herds, populations of Rocky Mountain bighorn sheep populations are also found in Dinosaur National Monument and on Ute tribal lands in northeastern Utah.

Desert Bighorn

Desert bighorns inhabit the slickrock canyons, rocky slopes, and canyonlands areas of southern Utah (Figure 2). Significant populations occur across the Colorado Plateau including the San Rafael Swell and throughout the Colorado River and its many tributaries. The current population estimate for desert bighorns in Utah managed by UDWR is nearly 2,900 animals (Figure 3). Utah currently has 13 individually managed populations of desert bighorn sheep. Five of these populations are showing an increasing trend while 7 are maintaining stable numbers (Table 2). The 13th population, San Juan North, was tested in 2017 and those animals found actively at risk of spreading disease were culled. Healthy bighorns were then translocated into this herd to augment the loss of sick bighorns. In addition to UDWR managed herds, desert sheep populations also occur in Arches, Canyonlands, Capital Reef, and Zion National Parks, and on Navajo tribal lands.

3. Population Surveys

In Utah, bighorn sheep populations are surveyed via helicopter every 2–3 years (Table 1 & Table 2). During these flights, biologists survey all potential bighorn sheep habitat during the peak of the rut in late October to December depending on the management unit. All observed animals are counted and classified as ewes, lambs, and rams, with rams being further classified as Class I (2.5 years old), II (2.5–5.5 years old), III (6.5–7.5 years old), or IV (8.5+ years old) (Geist 1971). Previous studies have shown that sightability on bighorn sheep populations varies between 60-70%, depending on the unit and conditions. In addition to the helicopter surveys, many bighorn sheep populations in Utah have radio and GPS collared bighorns. These collars allow biologist to monitor annual survival and movements. The collars also allow biologists to locate animals and collect ground classification data in years without helicopter surveys. In conjunction with Brigham Young University, Utah State University, Utah Wild Sheep Foundation (UWSF), and Sportsmen for Fish and Wildlife (SFW), UDWR has conducted and participated in many valuable bighorn sheep research projects. Findings from those research projects have greatly improved the current knowledge of bighorn sheep and have improved management practices.

4. Hunting

Bighorn sheep are managed as an once-in-a-lifetime hunting species in Utah. The first hunt for bighorn sheep in Utah was held in 1967 for the desert subspecies on the San Juan Unit (Table 3). A total of 10 permits were issued, 9 hunters went afield, and all 9 harvested rams. The first hunt for Rocky Mountain bighorns in Utah was in 1991 on the Book Cliffs Rattlesnake Unit. Two permits plus 1 high-bid permit were issued and all 3 hunters harvested rams. Since the initial hunts, the total number of bighorn sheep permits has generally been increasing. The highest number of desert bighorn sheep permits issued in a given year in Utah was in 2017 when 59 permits were issued. For Rockies, the highest number of permits issued in a given year was in

2013 with 46 permits being issued. From 1967 to 2017, a total of 1,831 people hunted bighorn sheep (534 Rocky Mountain, 1,297 desert) resulting in the harvest of 1,622 bighorn sheep (529 Rocky Mountain, 1093 desert). Success rates for bighorn sheep in Utah are high and average 99% for Rockies and 84% for deserts. Demand for bighorn sheep permits is extremely high, and demand is increasing faster than natural reproduction can sustain (Table 4 & Table 5). In 2017, a total of 30,128 hunters applied for the 81 public draw permits available, resulting in drawing odds of 1 in 372.

5. Transplants

In partnership with local conservation groups including SFW and UWSF, and in coordination with federal land management agencies, UDWR has been involved in an aggressive program to restore bighorn sheep to their native habitat over the last 40 years. Extensive efforts have been made to reintroduce and augment populations of both Rocky Mountain and desert bighorn sheep (Table 6, Table 7). Rocky Mountain bighorns were first translocated into the state near Brigham City in 1966, whereas desert bighorns were first translocated into Utah in 1973 in Zion National Park. Since restoration efforts began, over 1,200 Rocky Mountain bighorn sheep and over 1,000 desert bighorns have been released in areas of historical habitat. Most desert bighorn transplants have been successful, whereas there have been some failures of Rocky Mountain bighorn transplants. Although the exact reasons behind the transplant failures are unknown, disease issues, predation, and not moving enough animals have all been hypothesized as potential reasons. UDWR will continue to pursue opportunities to transplant bighorn sheep when beneficial while coordinating efforts with federal land management agencies, private land owners, and local governments. As all current populations of bighorn sheep in Utah have been influenced by translocations in some form with variable degrees of success, UDWR recognizes, understands, and accepts the risk of failure associated with all future translocation efforts.

C. Habitat

Bighorn sheep are uniquely adapted to inhabit some of the most remote and rugged areas in Utah. They exist in some of the most hostile climatic conditions ranging from the hot, dry canyonlands of southern Utah to the cold, snowy alpine regions of Utah's northern mountains. Bighorns are sometimes referred to as a wilderness species because of the naturally remote and inaccessible areas they inhabit. Bighorns prefer open habitat types with adjacent steep rocky areas for escape and safety. Habitat is characterized by rugged terrain including canyons, gulches, talus cliffs, steep slopes, mountaintops, and river benches (Shackleton et al. 1999). The diet of mountain sheep is comprised primarily of grasses and forbs, although sheep may also utilize shrubs depending on season and availability. Most Rocky Mountain bighorns typically have seasonal migrations with established winter and summer ranges, whereas most desert bighorns generally do not have distinct summer and winter migrations. Extensive historical bighorn habitat occurs throughout Utah (Figure 1). However, not all habitat is currently suitable for reestablishment of bighorn populations. Vegetative changes, human encroachment, and domestic sheep grazing make some areas unsuitable for bighorn restoration. Habitat management practices include voluntary grazing allotment conversions from domestic sheep to cattle, vegetative treatments, and water developments. UDWR considers grazing conversions and restrictions "involuntary" when the party negotiating for the conversion/restriction threatens

to seek more burdensome grazing restrictions, reductions, or conversions in court or through other regulatory means unless the livestock grazer consents to the requested conversion/restriction. UDWR, in partnership with conservation groups and land managers has been extremely helpful in negotiating, funding, and participating in habitat projects.

III. ISSUES AND CONCERNS

A. Disease

Disease is a significant concern for bighorn sheep management. Respiratory diseases have resulted in large-scale population declines in bighorn sheep populations across the western U.S., including in Utah (Cassirer et al. 2017). Other diseases such as contagious ecthyma, bluetongue, and psoroptic mange have been detected in Utah's bighorn sheep populations with limited impacts.

The etiology of respiratory disease of bighorn sheep is thought to be polymicrobial, however, multiple members of the Pasteurellaceae family of bacteria as well as *Mycoplasma ovipneumoniae* have particularly been associated with respiratory disease, death, and reduced lamb recruitment in bighorn sheep (Miller et al. 2012, Besser et al. 2012b).

Within the Pasteurellaceae family, the bacteria *Pasteurella multocida*, *Mannheimia haemolytica* and *Bibersteinia trehalosi* are commonly detected during respiratory disease outbreaks of bighorn sheep (Besser et al. 2012b). Within each species of these bacteria, there are several biovariants and subtypes that may be further classified by virulence or ability to produce leukotoxin, which can cause extensive lung tissue damage when associated with pneumonia (Miller et al. 2012). *Mannheimia haemolytica* and *B. trehalosi* are also frequently detected in the upper respiratory tract of healthy wild and domestic ruminants and likely act as opportunistic pathogens in animals during times of stress, or secondary to primary infections with *Mycoplasma ovipneumoniae* (Besser et al. 2012b, Cassirer et al. 2017). *Pasteurella multocida* is less commonly cultured from the upper respiratory tract of bighorn sheep, but was detected in association with large die-offs of Rocky Mountain bighorn sheep in the Goslin Mountain, Mount Nebo, Rock Canyon, and Stansbury Mountains; as well as in respiratory disease outbreaks in bighorn sheep populations of Idaho, Washington, Oregon, Colorado, Montana, South Dakota (Spraker et al. 1984, Weiser et al. 2003, Besser et al. 2012b).

Over the last decade, much attention has focused on *M. ovipneumoniae* as an important component of pneumonia outbreaks in bighorn sheep (Besser et al. 2012b, Cassirer et al. 2017). *Mycoplasma ovipneumoniae* is primarily carried in the respiratory tract of asymptomatic domestic sheep and goats (Besser et al. 2012a, Besser et al. 2012b, Cassirer et al. 2017). While not a virulent pathogen all on its own, *M. ovipneumoniae* colonizes the respiratory tract, inhibiting the normal mucociliary clearance used to expel bacteria that enter the lungs under normal conditions. When this clearance is impaired, bacteria that enter the lungs, particularly virulent opportunistic bacteria such as the described Pasteurellaceae, start to replicate, overcoming the body's natural defenses and thus causing pneumonia. Bighorn sheep appear to be very susceptible to such infections. For example, *Mycoplasma ovipneumoniae* was detected in >95% of 44 affected bighorn sheep lungs sampled in eight pneumonia outbreaks that occurred

between 2009–2010 in the western U.S., but was absent in lung tissues of 5 animals obtained from two populations unaffected by pneumonia (Besser et al. 2012b). A wide variety of strains of *M. ovipneumoniae* have been detected (Cassirer et al. 2017), and infection with one strain does not appear to induce cross-immunity with other strains (Cassirer et al. 2017). Respiratory disease outbreaks can therefore occur repeatedly in the same population with introduction of new *M. ovipneumoniae* strains (Cassirer et al. 2017). While some bighorn sheep that survive an initial outbreak may be able to clear *M. ovipneumoniae* and other pathogens from their respiratory tract, others may become persistently infected and continue to shed the bacterium intermittently, resulting in reinfection of lambs that subsequently may succumb to pneumonia (Cassirer et al. 2017). The presence of persistently infected bighorn sheep in a bighorn population may therefore lead to long periods of recurrent disease and low lamb recruitment as immunity is not transferred from ewe to lambs (Cassirer et al. 2017). The presence of sinus tumors, which has been detected in multiple bighorn sheep populations across the western U.S., may also negatively affect the clearance of pathogens from the respiratory tract of surviving bighorn sheep and result in a higher number of persistently infected animals (Fox et al. 2015).

There are several examples of epizootic outbreaks of pneumonia in bighorn sheep due to contact with domestic sheep in the literature (Jessup 1985, Foreyt 1990, Martin et al. 1996). Furthermore, controlled experimental studies commingling domestic sheep infected with *M. ovipneumoniae* with healthy bighorn sheep resulted in fatal pneumonia of the bighorn sheep; whereas commingling of domestic sheep free of *M. ovipneumoniae* with healthy bighorn sheep did not result in development of respiratory disease or fatalities in 3 of 4 bighorn sheep for over 100 days (Besser et al. 2012a). Similarly, there are documented instances of contact between uninfected bighorn sheep and domestic sheep in Utah that have resulted in varying degrees of disease to the population of wild bighorns; in some cases the result being no perceived disease in the bighorns (Shannon et al. 2014). This makes it clear that pathogens like *M. ovipneumoniae* are the concern and not the domestic animals themselves. Commingling with domestic goats carrying *M. ovipneumoniae* resulted in sublethal pneumonia in bighorn sheep, suggesting that goat strains possibly are less virulent than domestic sheep strains (Besser et al. 2017). After introduction of disease into a bighorn sheep population, the disease may continue to be transmitted among bighorn sheep (Cassirer et al. 2017). Other factors that may contribute to the severity of a disease outbreak in bighorn sheep could include various forms of stress including overcrowding, poor nutrition, human disturbance, loss of habitat, weather conditions, infection with parasites such as lungworm (*Protostrongylus spp*) or mites (*Psoroptes ovis)* (Lange et al. 1980, DeForge 1981, Foreyt and Jessup 1982, Spraker et al. 1984, Clark and Jessup 1992, Bunch et al. 1999, Monello et al. 2001).

After introduction of respiratory disease into a bighorn sheep population, options for clearing the disease from the population through active management are limited. Augmenting actively diseased populations with healthy bighorn sheep, without efforts to stop the pathogen transmission prior to augmentation, is unlikely to be successful as the healthy bighorn sheep will likely become infected from the resident population. Because of the lack of cross-reactivity between *M. ovipneumoniae* strains and the role of other bacteria in inducing respiratory disease, augmentation with other infected bighorn sheep may cause renewed disease outbreaks in both the augmented population and augmenting animals. Targeted removal of chronic shedders may be an option in easily accessible populations with low *M. ovipenumoniae* prevalence that can be

tested repeatedly (Cassirer et al. 2017). In populations that are not easily accessible for repeated testing, targeted removal of shedding bighorns after a single test may also be an option, but those animals that may potentially clear the pathogen would also be removed from the population. Complete depopulation of infected herds followed by subsequent reintroduction with healthy bighorns may be effective in isolated populations with low numbers. UDWR will continue to seek options for management and improvement of bighorn sheep populations already affected by respiratory disease.

Although population connectivity is generally desirable for genetic flow, increased connectivity elevates the risk of transmission of respiratory disease between bighorn sheep herds. Therefore, maintaining more isolated bighorn sheep populations may outweigh the benefits derived from connected populations in some instances. Connectivity between herds of bighorn sheep is not always the goal of the UDWR. Genetic exchange, one of the core functions of population connectivity, can be achieved through managed translocations and other efforts. For those reasons, it is critical for future management that we understand herd connectivity and the distribution of pathogens in Utah bighorn sheep.

Because of the aforementioned disease concerns, the Western Association of Fish and Wildlife Agencies (WAFWA) Wild Sheep Working Group published the "Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat" in 2007, and updated that document in 2012, then again in 2025 (Appendix A). That document provides general guidelines to state wildlife agencies, federal land management agencies, wild sheep conservation organizations, domestic sheep and goat producers/permittees, and private landowners for reducing conflicts between wild sheep and domestic sheep and goats. While the WAFWA guidelines are generally helpful, the unique social, political, and biological environment in Utah requires a tailored approach in managing bighorn sheep on a sustainable basis. For the purposes of this Plan, "sustainable" means preserving and maintaining bighorn sheep within the state at the species level using the management practices outlined in this Plan. Because bighorn sheep are heavily impacted by human activities, they often require intensive management. Therefore, management is essential to maintaining bighorn sheep within the state on a sustainable basis. The objective of UDWR and this Plan is to expand bighorn sheep populations, where feasible, and to maintain bighorn sheep on a sustainable statewide basis without requiring or causing involuntary relinquishment of livestock grazing opportunity on public and private lands. UDWR supports an active livestock industry exercising responsible grazing practices that: 1) maintain private lands as open space; 2) benefit rangeland health; 3) reduce frequency and intensity of rangeland fires; and 4) maintain water distribution facilities effectively expanding wildlife distribution to areas where water is the limiting factor for wildlife. All of these responsible grazing practices provide habitat that benefit wildlife. UDWR is charged in Section 23a-2-102~~23-14-3(2)~~ (b) to develop wildlife management policies that: 1) "recognizes the impact of wildlife on humans~~man~~, human~~his~~ economic activities, private property rights, and local economics;" and 2) "seek to balance the habitat requirements of wildlife with the social and economic activities of humans~~man~~." UDWR recognizes the economic importance of the domestic sheep industry, and it is not the intent of this Plan or UDWR 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. Because of the unique mosaic of bighorn sheep habitat in Utah and its pervasive proximity to domestic sheep and goats on private and public lands, and the susceptibility of bighorn sheep to diseases

harbored by domestic sheep and goats, it is impossible to completely remove all risk of pathogen transmission. UDWR fully understands and accepts the risks of disease in bighorn sheep populations, and will employ a variety of strategies to manage around this risk to ensure sustainable populations of bighorns can exist in balance with domestic sheep grazing.

UDWR recognizes that voluntary conversions, as defined in Section II. C. of this Plan, from sheep and goat to cattle or horse on public grazing allotments may be beneficial to promote healthy populations of bighorn sheep. UDWR also recognizes that voluntary conversions from cattle or horse to sheep or goat on public grazing allotments can be beneficial to promote healthy populations of bighorn sheep when such conversions allow a livestock operator to move domestic sheep or goats that present a risk of transmitting pathogens to allotments where that risk is diminished. UDWR does not support involuntary conversions or relinquishment of public land grazing AUMs or allotments for the benefit of wildlife. UDWR supports increases in public land grazing AUMs where the forage conditions that precipitated reductions have adequately improved. UDWR does not support the conversion of public land grazing allotments to domestic sheep or goats in established bighorn sheep management units. UWSF has been instrumental in resolving bighorn/domestic sheep issues, and their efforts have resulted in protection of many bighorn sheep populations by reducing the potential for the transmission of disease.

Section ~~23-14-3(2~~23a-2-102~~)~~ charges UDWR to manage and maintain bighorn sheep on a sustainable basis, in general. It does not require individual population sustainability. As such, population objectives established by UDWR for individual bighorn sheep herds are flexible targets used to evaluate the effectiveness of past management strategies and to assist in identifying appropriate management strategies for the future. These population objectives are a balance between habitat carrying capacity, social tolerance, and managing the risk of pathogen transmission; they are not a metric for evaluating population sustainability or viability. They instead inform UDWR on possible management strategies at the individual population level that will help in managing for a sustainable statewide population of bighorn sheep.

Response and control of a disease outbreak will be conducted using standardized current protocols for sampling and testing (~~Foster 2004, WAFWA Wildlife Health Committee (WHC), UC-Davis 2007~~Justice-Allen et al. 2024). Accurate cause of death should be determined for bighorn sheep through a full necropsy when possible. Bighorn sheep that are suspected of harboring infectious pathogens or that have been in contact with domestic sheep or goats, may pose a risk for pathogen transmission, and removal of such high risk animals should be decided on a case by case basis.
The isolation of an affected bighorn sheep herd from other unaffected bighorn sheep herds should also be ensured to the largest extent possible. Many of Utah's isolated bighorn sheep populations present minimal risk of transmission to other bighorn.

B. Predation

Predators have played an important role in the evolution and development of adaptive strategies in bighorn sheep (Geist 1999). However, predation can be a serious limiting factor to bighorn herd establishment or expansion. In some states, excessive predation has resulted in substantial herd reductions (Wehausen 1996, Creeden and Graham 1997, Rominger et al. 2004). Mountain lions are the most significant predators of bighorns in Utah. Coyotes, bobcats, and golden eagles

may occasionally take bighorn sheep but should not be considered a serious threat to bighorn sheep herds.

Mountain lion populations should be managed at levels that will allow for the establishment of healthy and sustainable populations of bighorn sheep. This may require removal of mountain lions that are negatively impacting bighorn populations until herds are well established. In established small herds where mountain lion harvest is typically low or non-existent because of topography and access, a consistent effort to improve mountain lion harvest opportunity may need to be considered. These efforts could include not closing sheep units to harvest (i.e., no quotas) and maintaining a liberal policy of removing lions on sheep units when there is opportunity. In some cases, the use of USDA Wildlife Services or other contracted personnel may also be needed to help control cougar populations. Bighorn sheep unit management plans and predator management should specify conditions for predator management in bighorn areas.

C. Habitat Degradation or Loss

Bighorn habitat can be degraded, fragmented, or lost to a variety of causes including human disturbance, energy development, and natural succession. Reductions in the quality or quantity of habitat can result in corresponding losses to bighorn populations (DeForge 1972, Hamilton et al. 1982). Human disturbance may cause bighorn sheep to change use areas and abandon certain habitats because of those disturbances. Loss of preferred habitat can compel bighorns into habitats that reduce productivity, decrease survival rates, and increase risk of pathogen transmission. Human disturbance is also thought to be a possible stress inducer, which may lead to disease problems in some populations (DeForge 1981, Bunch et al. 1999). Working with federal land management agencies to protect the habitat needed for healthy herds may improve herd health.

Energy development is an important facet of Utah's economy. DWR recognizes the value of balancing this industry with the needs of bighorn sheep and other wildlife. However, energy development in bighorn habitat, if not properly managed and mitigated, can result in direct loss of habitat. Infrastructure and disturbance associated with energy development has the potential to displace bighorns from habitat that would otherwise be suitable. Best management practices should be employed in coordination with federal land management agencies when planning energy development in bighorn sheep habitat. Mineral exploration for oil, gas, uranium, and other minerals has been extensive in bighorn areas. Habitat managers for the Bureau of Land Management and U.S. Forest Service should carefully coordinate with the State of Utah and energy development companies to monitor those activities to minimize and mitigate impacts to bighorn sheep.

Plant succession can also dramatically affect habitat quality. Encroachment by pinyon-juniper and other shrubs has resulted in the fragmentation and loss of large expanses of bighorn habitat. Vegetative treatments, including fire management and mechanical treatments, can restore and improve bighorn habitat to its condition prior to settlement times.

D. Wilderness and Park Management

Administration of wilderness areas and national parks has presented problems for bighorn sheep managers in some states (Arizona Game and Fish 1989 and Bleich 1999). Utah currently has a good working relationship with federal land management agencies, which has allowed and promoted good bighorn sheep management programs. Future wilderness designation and park expansions should specifically allow for activities required for proper management of bighorn populations such as the use of aircraft for surveys, transplants, research projects, and the ability to access and maintain water developments constructed specifically for bighorn sheep. It is critical to the future of bighorn sheep in those areas to maintain the use of those valuable management tools. Certain activities proposed in wilderness areas may necessitate coordination with appropriate land management agencies.

E. Poaching

Although poaching is not a problem for overall bighorn populations, it can have a detrimental effect on hunter harvest opportunities. Bighorn sheep are highly prized by hunters and legal hunting permits are difficult to obtain. Bighorns often inhabit very remote areas that are difficult to monitor and patrol. Thus, the incentives and opportunities for poaching exist.

F. Competition

Competition for forage and space by domestic livestock, feral animals, and other wild ungulates can affect bighorn populations (Bailey 1980). Competition is most likely to occur where habitat is limited such as in winter ranges and lambing areas and during periods of extreme weather such as droughts or heavy snow. Competition with livestock for forage is minimal for most bighorn populations in Utah since bighorns utilize steep, rugged terrain generally not used by livestock. However, some feral animals, such as burros and goats, and some wild ungulates may use the same ranges as bighorn sheep making competition possible. Bighorn habitat should be monitored to assure proper range management and minimize competition.

G. Transplants

Transplanting bighorn sheep is a primary tool for restoration and management of bighorn populations. All bighorn sheep transplants in Utah will be subject to unit management plan adoption and public review ~~done~~ in accordance with Utah Code 23a-2-209 ~~23-14-21~~ and in coordination with federal land management agencies. Mitigation plans will be completed prior to reintroductions in accordance with Utah Code 23a-2-210. Several issues need to be considered prior to releasing bighorns in new areas or into existing herds, and those issues are detailed in the 2025~~12~~ WAFWA guidelines (Appendix A). Bighorns should only be released in areas where there is a high probability of success as determined by GIS modeling and habitat evaluations. Furthermore, pre-transplant health screening of both the source stock and receiving population is critical in order to evaluate the risk of disease introduction. Additional screening should be conducted on all individual bighorn sheep destined for translocation and any animal that appear unfit for translocation should not be moved. Sufficient numbers should be released to assure genetic diversity and to help new herds reach self-sustaining levels.

UDWR has established a current list of units/subunits that serve as potential augmentation or reintroduction sites for bighorn sheep (Appendix B). All suitable bighorn sheep habitat found within those units/subunits will be available for augmentation/reintroduction. The exact release site for transplanted sheep depends on accessibility and weather conditions and will be determined closer to the time of release.

Currently, UDWR obtains bighorn sheep for transplants from source herds within Utah as well as surrounding western states and Canadian provinces. As Utah's bighorn sheep populations continue to grow, UDWR will work towards transplanting more sheep from Utah populations and reduce the reliance on sheep coming from out of state, with the ultimate goal of only using Utah bighorn sheep populations that are known to be healthy as transplant source herds. This practice will also be important to appropriately manage the number of bighorn sheep in thriving populations. Monello et al. (2001) found that 88% of pneumonia induced die-offs occurred at or within 3 years of peak population estimates. By monitoring growing bighorn herds and by using healthy bighorn populations as source herds, UDWR will minimize the risk of introducing a new disease to uninfected populations and decrease the chances of having population die offs in both source and release herds.

In addition to conducting pre-transplant health screening of source or receiving herds, all bighorn sheep brought into Utah from other states will be tested for diseases and must meet health requirements established by UDWR and the state veterinarian for the Utah Department of Agriculture and Food (UDAF). All bighorn sheep relocated from source herds within the state will also be pre-screened for those same diseases and tested during the translocation in order to prevent inadvertently moving disease between bighorn sheep populations. Current protocols for sampling, testing, and responding to disease outbreaks will be used as a standard for Utah transplants and disease monitoring (~~Foster 2004, WAFWA Wildlife Health Committee (WHC), UC Davis 2007~~Justice-Allen et al. 2024).

IV. USE AND DEMAND

Bighorn sheep are considered one of the most sought after and highly prized big game animals in North America. Demand for bighorn sheep hunting opportunities far exceeds the current availability of hunting permits (Table 4 & Table 5). Currently in Utah, applications exceed available permits by 161:1 for residents and 2,599:1 for nonresidents. Additionally, applications for both resident and nonresidents have increased every year since the initiation of Utah's draw system.

Great demand also exists for information concerning bighorn sheep and bighorn viewing opportunities. Many people who have no interest in hunting bighorns are very interested in learning more about bighorn sheep and observing them in the wild. Informational programs and viewing opportunities currently offered for bighorn sheep include UDWR sheep viewing days and guided hikes at Antelope Island State Park.

Finally, public interest and legal mandates require management of bighorn sheep for their intrinsic value. Bighorn sheep are an important part of fragile ecosystems throughout Utah and should be properly managed regardless of recreational uses.

V. CONCLUSION

A fitting conclusion to this section of the Plan is found in the book *Mountain Sheep of North American* by Raul Valdez and Paul Krausman (1999). It states:

> ***"****Mountain sheep, like all other native fauna and flora, are part of the structure and heritage of North America. Despite all of the efforts exerted toward their conservation, wild sheep face a precarious future. They are an ecologically fragile species, adapted to limited habitats that are increasingly fragmented. Future conservation efforts will only be successful if land managers are able to minimize fragmentation. According mountain sheep their rightful share of North America and allowing them to inhabit the wilderness regions they require is a responsibility all Americans must shoulder. It is our moral and ethical obligation never to relent in the struggle to ensure their survival."*

VI. STATEWIDE MANAGEMENT GOALS AND OBJECTIVES

A. Population Management Goal: Establish and maintain a sustainable statewide population of bighorn sheep by utilizing suitable habitat within the state to create and foster individual populations.

Population Objective 1: Increase bighorn sheep populations within the state as conditions allow (as outlined in this Plan).

Strategies:

a. Develop or revise management plans for individual units with population goals and objectives. During unit plan development, all affected cooperative agencies, private land owners, local governments, and grazing permittees shall be invited to take part in the decision making process.
b. Survey all herd units every 2–3 years to monitor population size and composition as conditions and budget allow. Dependent on the terrain and canopy cover, helicopter surveys or ground-based surveys will be employed to maximize accuracy and efficiency. When feasible, invite livestock producers and sportsmen to participate in surveys.
c. Refine population or sightability models to determine the relationship between population surveys and population size.
d. When possible, use radio collars, remote cameras, and GPS collars to better understand survival, distribution, and movements of each herd. Use this information to refine estimates of population size. Explore using similar technology with domestic animals in coordination with livestock operators to better understand resource partitioning and interactions with bighorn sheep.
e. In coordination with the appropriate land management agencies, augment existing populations where needed to improve herd distribution, link small populations when deemed beneficial, and improve genetic diversity (Appendix B).
f. In coordination with appropriate federal land management agencies, transplant bighorn sheep to establish new populations in accordance with Utah Code 23a-2-209 and 23a-2-210~~23-14-21~~ (Appendix B).
g. Develop an annual transplant plan based on availability of bighorn sheep, release sites, and consistent with Appendix B.
h. Initiate predator management as specified in predator and bighorn sheep unit management plans. On remote or hard to access units, USDA Wildlife Services or other contracted personnel may be needed to help reduce cougar numbers.
i. Support law enforcement efforts to reduce illegal taking of bighorn sheep.

Population Objective 2: Actively manage individual populations of bighorn sheep to reduce risk of pathogen transmission, mitigate damages during disease events, and sustain or reestablish herds after contraction of disease.

Strategies: Reduce Risk of Pathogen Transmission

a. Strive for spatial separation between bighorn sheep and domestic sheep and goats that does not negatively impact livestock grazing by utilizing natural barriers (e.g. rivers or expanses of unsuitable habitat) and man-made barriers (e.g. fences or roads).
b. Strive for temporal separation between bighorn sheep and domestic sheep and goats by coordinating with livestock operators and federal land management agencies on active grazing allotments and private lands. If domestic sheep or goats are only present on an

allotment during defined dates, then the risk of pathogen transmission is reduced in that area outside of those dates.

c. Utilize current and emerging technologies to monitor movements of bighorn sheep and discourage temporal or spatial interaction. These technologies include but are not limited to satellite and camera collars, satellite geofencing, and remote cameras.
d. Continue to document instances of interaction between wild sheep and domestic sheep and goats so that it allows conflicts to be evaluated and dealt with in a timely manner.
e. Refine protocols that allow UDWR personnel to lethally remove bighorn sheep when high risk of pathogen transmission from domestic sheep, domestic goats, or other bighorns is suspected. This will be done to prevent bighorns that are likely infected from transmitting pathogens to healthy bighorns.
f. Pursue in good faith a protocol that would allow livestock operators to lethally remove bighorn sheep found comingling and in direct contact with domestic sheep or goats. If this protocol can be developed in ways that reduce the risk of pathogen transmission for bighorn sheep without impacting UDWR's ability to manage wildlife, then it will be proposed in the big game Rule (R657-5), presented to the Wildlife Board for approval, then implemented and enforced by UDWR. This management strategy would be unique to bighorn sheep because of the substantive peer-reviewed published research indicating the high risk of virulent pathogen transmission from domestic animals to wild sheep. Currently, this phenomenon is not proven in other species.
g. Pursuant to Section 4-25-202, UDWR personnel may immediately kill or remove estray domestic sheep and goats when their presence poses a risk of pathogen transmission to bighorn sheep. This event is a rare occurrence and should not apply to private property or permitted public allotments.
h. Utilize depredation hunts under R657-44-7, when appropriate, to remove bighorns that are outside management unit boundaries and their location presents an increased risk of pathogen transmission. Utilizing public hunters to aide in lethal removal should be prioritized secondary to overall herd health.
i. Reduce bighorn numbers in specific areas of concentration through trapping and transplanting programs to help reduce risk of pathogen transmission.
j. In areas where the density of bighorns is difficult to manage through capturing and translocating ewes, use ewe hunts to establish lower densities that will reduce the risk of pathogen transmission.
k. Establish lower ram to ewe ratios in areas with higher risk of contact with domestic sheep or goats. The goal being to minimize dispersal of rams when competing for breeding opportunities.
l. Utilize medicines or vaccines that have been proven to decrease the risk of pathogen transmission or decrease the negative effects of disease when determined to be acceptable by the DWR.

Strategies: Mitigate Damages during Disease Events

a. Use lethal removal of symptomatic infected bighorns that pose a risk of transmitting pathogens to other healthy bighorns.
b. Decrease hunting permit allocation, including suspending hunts, to maximize potential for rapid population growth.
c. Increase permit allocation, including creating new hunts, to cull infected bighorn sheep herds and reduce spread of the disease.
d. In cases of extreme morbidity and mortality, explore lethal depopulation of infected

herds in preparation for potential repopulation with healthy bighorns. Utilize public hunters, when appropriate, to aide in lethal removal of bighorns inasmuch as it falls within the principles and standards of fair chase.

Strategies: Sustain Herds after Contraction of Disease

a. Establish and maintain secure nursery herds of Rocky Mountain, California, and desert bighorn sheep. Locations for nursery herds will be selected with the goal of minimizing potential contact with domestic sheep or goats (measures including double fencing may be used to accomplish this goal). Nursery herds will be tested regularly to monitor for disease concerns.
b. Use healthy bighorns from nursery herds to reestablish depopulated herds or to augment infected herds when deemed appropriate.
c. Establish a monitoring rotation for all bighorn sheep herds to establish background disease profiles for each herd. This information will be used to determine overall herd health and the suitability of each herd for transplants.
d. Participate in research efforts to find solutions to disease problems and low lamb survival.
e. When mortality from a disease event does not merit depopulation, UDWR may capture and test bighorns from infected populations followed by selective culling of those individuals found to be harboring infectious pathogens. When multiple capturing events are feasible, this method has been proven to decrease morbidity and increase productivity
f. Improve and increase suitable habitat for bighorn sheep to reduce stress and increase productivity of the area.
g. Inform and educate the public of the potential risks to bighorn sheep from domestic-borne pathogens.
h. Work with UDAF, local governments, livestock operators, and animal industry programs to implement programs that reduce pathogen prevalence in noncommercial domestic sheep and goat herds, thereby improving health and productivity in domestic herds and reducing risk of pathogen transmission to bighorns.

B. Habitat Management Goal: Provide good quality habitat for healthy populations of bighorn sheep.

Objective: Maintain or improve bighorn sheep habitat to enhance individual herd success and thereby promote the overall sustainability of bighorn sheep statewide.

Strategies:

a. Identify valuable bighorn sheep habitats and work with land managers and private landowners to protect and enhance these areas.
b. Assist land management agencies in monitoring bighorn sheep habitat. Habitat monitoring by the land management agencies will be contingent on available funding and personnel.
c. Work with land managers to minimize and mitigate loss of bighorn habitat due to human disturbance and development.
d. Initiate vegetative treatment projects to improve bighorn habitat lost to natural succession or human impacts.
e. Under the correct circumstances, encourage land management agencies to allow fires to burn when such action improves bighorn sheep habitat.

f. Improve or maintain existing water sources and develop new water sources as needed to improve distribution and abundance of bighorn sheep. Support research and monitoring efforts to evaluate bighorn sheep use of water sources to ensure the water sources are having the desired effect.
g. Work with land management agencies and private landowners to voluntarily implement agency guidelines for management of domestic sheep and goats in bighorn areas similar to those proposed by the WAWFA Wild Sheep Working Group in Appendix A.
h. Support conservation groups' efforts to pursue willing conversions of domestic sheep grazing allotments by working with willing permittees in bighorn areas to minimize the risk of pathogen transmission.
i. Inform and educate the public concerning the needs of bighorn sheep including the effects of human disturbance and the need for habitat improvements.
j. Create preferred habitat for bighorn sheep in areas not proximate to domestic sheep and goats to attract bighorns away from risks of pathogen transmission.

C. Recreation Goal: Provide quality opportunities for hunting and viewing bighorn sheep.

Objective 1: Increase hunting opportunities as populations allow while maintaining quality hunting experiences.

Strategies:

a. Recommend permit numbers 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.
b. When feasible, use subunits and multiple seasons to maximize hunting opportunities, distribute hunters, and minimize hunter conflicts.
c. Recommend hunting seasons to provide maximum recreational opportunity while not imposing on UDWR management needs.
d. Use hunting as a tool to regulate density of bighorn sheep to reduce risk of pathogen transmission.
e. Monitor size and age class of all harvested rams.
f. Work with federal land management agencies' local access coordinators to maintain and improve access for hunting and viewing of bighorn sheep. Explore seasonal openings, modified motorized boat rules, and administrative access for surveys or maintenance.
g. Explore providing a greater variety of hunting opportunities by utilizing more primitive weapons, variation in season length, and more variable season dates.
h. Use ewe hunts to establish lower densities that will reduce the risk of pathogen transmission as well as provide recreational opportunity.

Objective 2: Increase public awareness, education, and expand opportunities to view bighorn sheep.

Strategies:

a. Look for ways to expand bighorn sheep viewing opportunities for the public.
b. Ensure that information about bighorn sheep published on the UDWR website, social media channels, and print products is current and accurate.
c. Work with partner entities (state and federal agencies, conservation groups, agricultural stakeholders) to help educate the public about the intrinsic and economic value of bighorn sheep on the landscape, as well as the threats the species face related to habitat degradation, predation, and disease.

Figure 1. Modeled suitable bighorn sheep habitat in Utah.

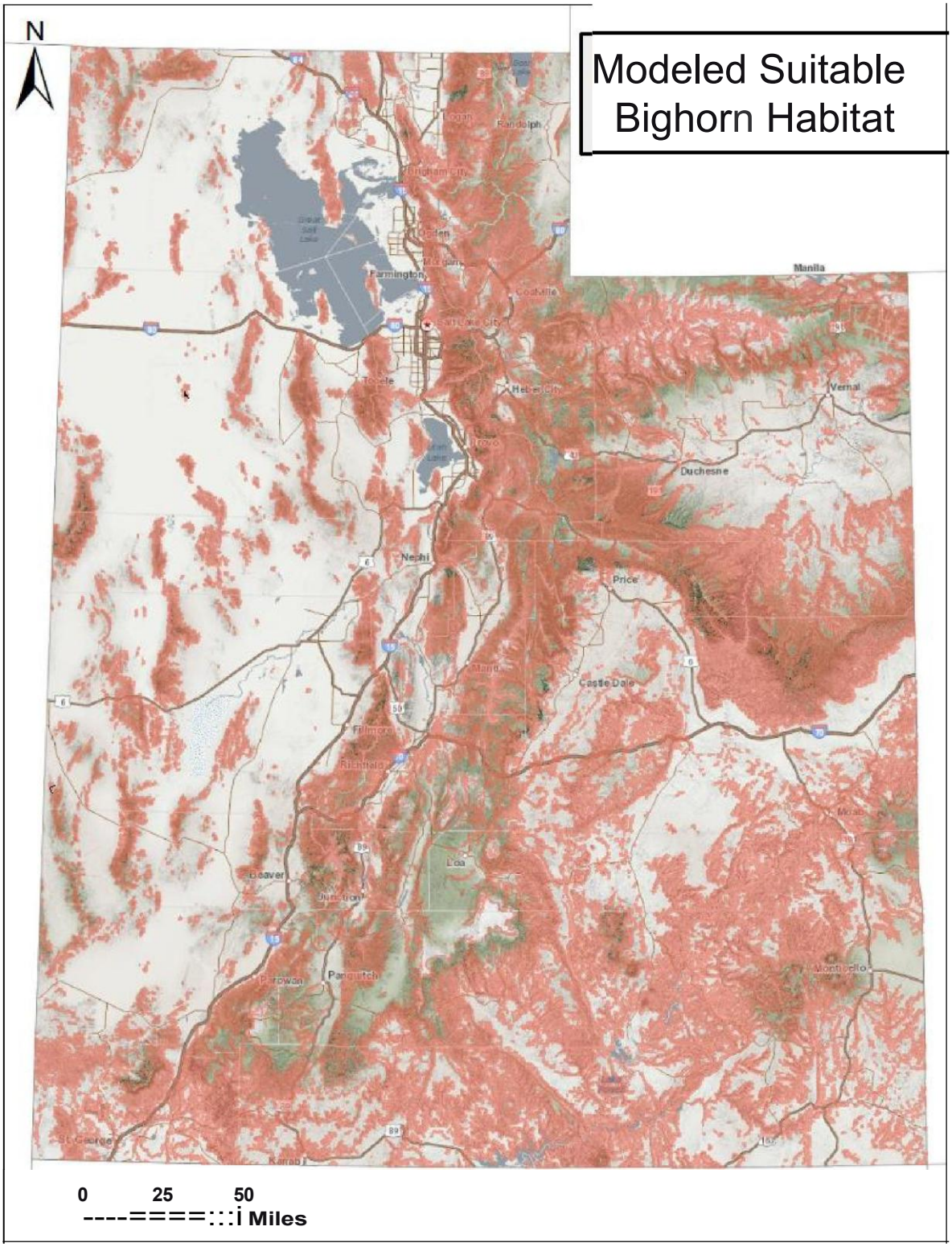

Figure 2. Bighorn sheep distribution in Utah, 2017.

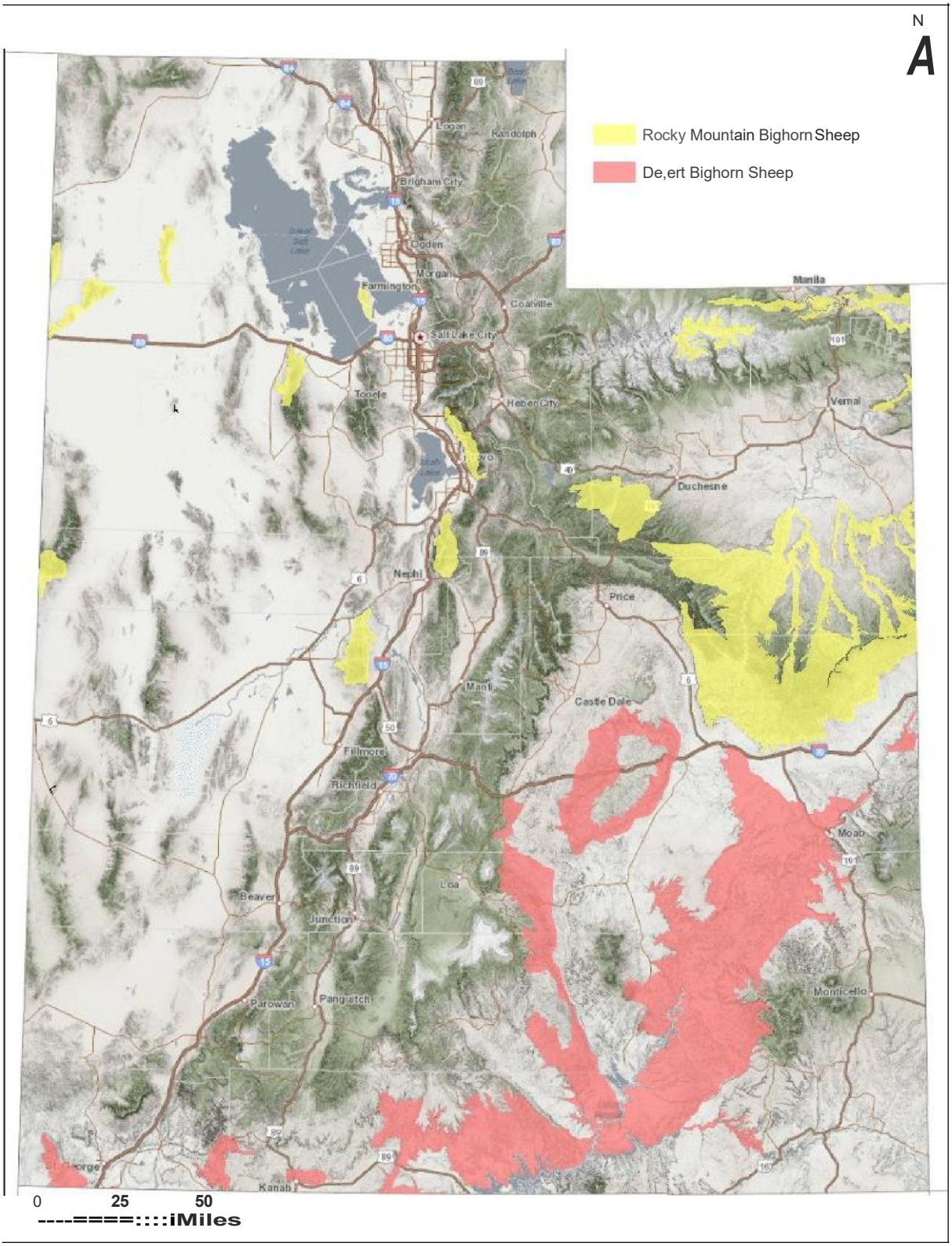

Figure 3. Bighorn sheep population trends in herds managed by the Utah Division of Wildlife Resources 1998-2017.

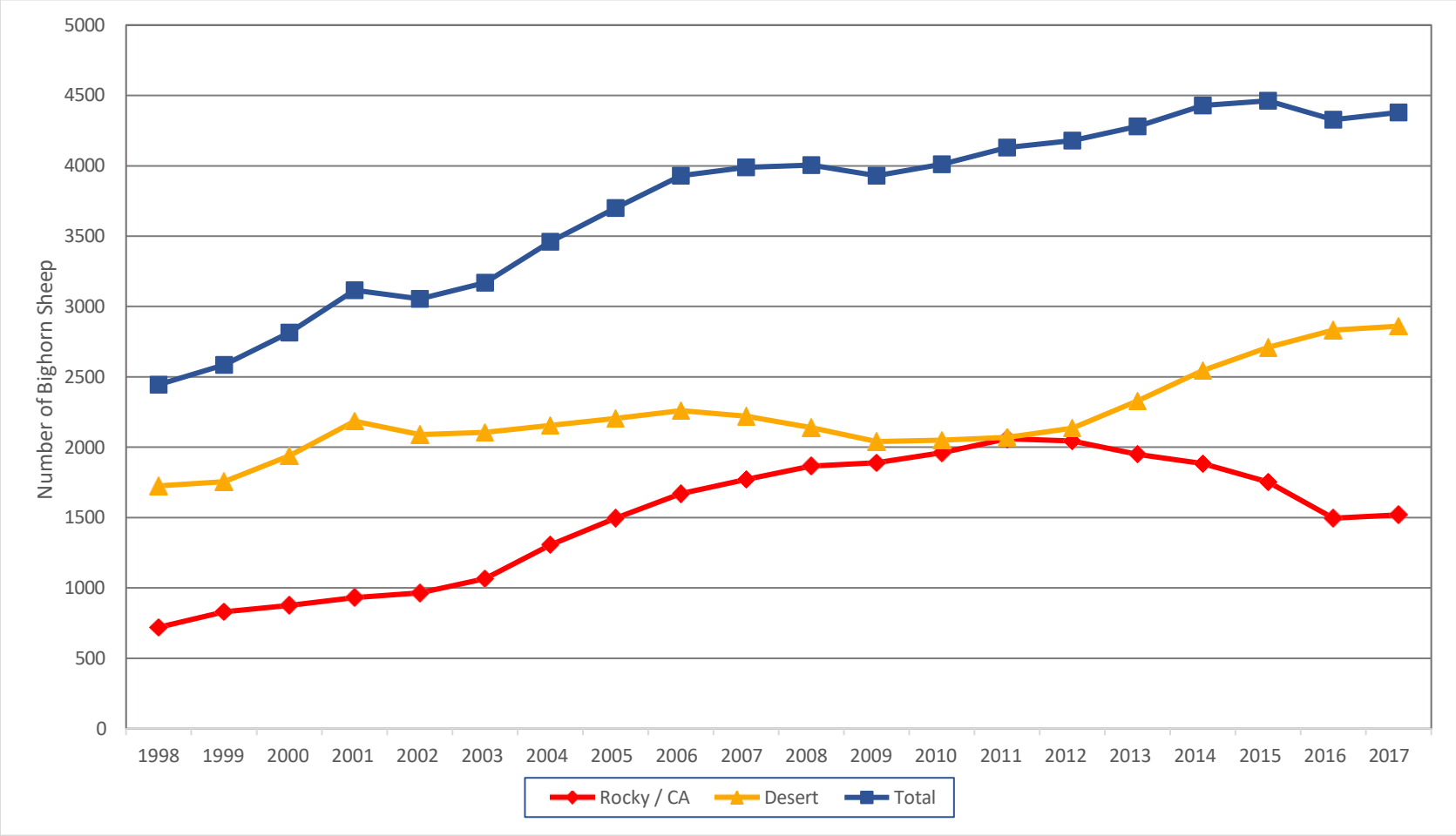

Table 1. Trend counts for Rocky Mountain bighorn sheep populations managed by UDWR, Utah 2012-2017.

Unit #	Unit name	2012	2013	2014	2015	2016	2017
1	Box Elder, Antelope Island	121	141	117	132	53†	112
1	Box Elder, Newfoundland Mountains	198	—	139	—	158	—
1	Box Elder, Pilot Mountain	42	39	28	—	24	—
8	North Slope, Bare Top Mountain	52	47	39	44	28	27
8	North Slope, Goslin Mountain	—	—	13	15	5	9
8	North Slope, Sheep Creek	63	24	33	38	27	23
8	North Slope, Carter Creek/Red Canyon	29	42	42	14	24	10
10	Book Cliffs, Rattlesnake	—	153	—	—	138	—
11	Nine Mile, Bighorn Mountain	—	333	—	—	264	—
16	Central Mountains, Nebo	—	16	—	14	—	—
17	Wasatch Mountains, Timpanogos & Provo Peak	—	33	—	32	—	—
17	Wasatch Mountains, Avintaquin	—	55	51	—	—	21
18	Oquirrh-Stansbury, Stansbury Mountains	163	—	—	140	0*	0
21	Fillmore, Oak Creek	—	—	—	—	—	67

*Population depopulated due to disease issues
†Incomplete count due to weather conditions

Table 2. Trend counts for desert bighorn sheep populations managed by UDWR, Utah 2012-2017.

Unit #	Unit name	2012	2013	2014	2015	2016	2017
12	San Rafael, Dirty Devil	66	—	60	—	86	—
12	San Rafael, North	101	94	—	124	—	—
12	San Rafael, South	—	188	—	216	—	—
13	La Sal, Potash	69	—	81	—	—	134
14	San Juan, Lockhart	40	—	84	—	—	55
14	San Juan, North	13	—	14	—	—	34*
14	San Juan, South	39	—	45	—	—	62
14	San Juan, River	—	—	38	—	—	42
15	Henry Mountains, Little Rockies	63	—	73	—	92	—
26	Kaiparowits, Escalante	71	—	92	—	—	88
26	Kaiparowits, East / West	—	339	—	355	—	—
29	Zion	—	504	—	498	—	—
30	Pine Valley, Beaver Dam	72	—	52	—	131	—

*Selective cull and augmentation took place after this survey

Table 3. Summary of bighorn sheep hunting opportunities, Utah 1967–2017.

Year	Rocky Mountain Bighorns		Desert Bighorns	
	Hunters afield	Rams harvested	Hunters afield	Rams harvested
1967	No hunt	—	9	9
1968	No hunt	—	10	3
1969	No hunt	—	10	6
1970	No hunt	—	10	4
1971	No hunt	—	10	1
1972	No hunt	—	8	1
1973	No hunt	—	No hunt	—
1974	No hunt	—	No hunt	—
1975	No hunt	—	5	2
1976	No hunt	—	10	4
1977	No hunt	—	25	10
1978	No hunt	—	23	7
1979	No hunt	—	18	3
1980	No hunt	—	19	10
1981	No hunt	—	18	5
1982	No hunt	—	11	6
1983	No hunt	—	10	9
1984	No hunt	—	14	5
1985	No hunt	—	15	12
1986	No hunt	—	14	10
1987	No hunt	—	12	7
1988	No hunt	—	15	12
1989	No hunt	—	12	10
1990	No hunt	—	15	12
1991	3	3	13	10
1992	3	3	11	10
1993	6	6	17	17
1994	6	6	19	18
1995	6	6	30	30
1996	6	5	29	28
1997	3	3	29	28
1998	5	5	31	31
1999	4	4	32	31
2000	9	9	33	33
2001	12	12	30	30
2002	13	12	40	39
2003	13	13	44	43
2004	12	12	42	40
2005	13	13	40	39
2006	20	19	41	37
2007	22	22	45	40
2008	27	27	41	39
2009	28	28	41	37
2010	34	34	50	46
2011	37	37	54	46
2012	42	42	49	41
2013	46	46	44	42

Year	Rocky Mountain Bighorns		Desert Bighorns	
	Hunters afield	Rams harvested	Hunters afield	Rams harvested
2014	44	44	46	45
2015	41	40	49	45
2016	40	39	46	41
2017	39	39	59	58

Table 4. Drawing odds of obtaining a Rocky Mountain bighorn sheep permit, Utah 2003–2017.

Year	Residents			Nonresidents		
	Applicants	Permits	Odds	Applicants	Permits	Odds
2003	1063	10	1 in 106.3	932	1	1 in 932.0
2004	1166	9	1 in 129.6	0	0	—
2005	1354	11	1 in 123.1	0	0	—
2006	1793	15	1 in 119.5	0	0	—
2007	2192	16	1 in 137.0	1131	1	1 in 1131.0
2008	2381	21	1 in 113.4	1015	1	1 in 1015.0
2009	2547	21	1 in 121.3	4323	1	1 in 4323.0
2010	2828	25	1 in 113.1	4776	2	1 in 2388.0
2011	3205	26	1 in 123.3	5001	2	1 in 2500.5
2012	3603	30	1 in 120.1	5400	2	1 in 2700.0
2013	3933	36	1 in 109.3	5759	3	1 in 1919.7
2014	4436	33	1 in 134.4	6365	4	1 in 1591.3
2015	4901	32	1 in 153.2	7187	3	1 in 2395.7
2016	5195	34	1 in 152.8	7783	3	1 in 2594.3
2017	5532	27	1 in 204.9	8712	3	1 in 2904.0

Table 5. Drawing odds of obtaining a desert bighorn sheep permit, Utah 2003–2017.

Year	Residents			Nonresidents		
	Applicants	Permits	Odds	Applicants	Permits	Odds
2003	2253	35	1 in 64.4	2266	3	1 in 755.3
2004	2653	32	1 in 82.9	3139	3	1 in 1046.3
2005	3051	32	1 in 95.3	3731	3	1 in 1243.7
2006	3467	33	1 in 105.1	3897	3	1 in 1299.0
2007	3814	35	1 in 109.0	4201	3	1 in 1400.3
2008	3827	33	1 in 116.0	3599	2	1 in 1799.5
2009	4042	33	1 in 122.5	5592	2	1 in 2796.0
2010	4386	40	1 in 109.7	6004	3	1 in 2001.3
2011	4367	39	1 in 112.0	6124	3	1 in 2041.3
2012	4607	36	1 in 128.0	6480	3	1 in 2160.0
2013	4846	30	1 in 161.5	6617	5	1 in 1323.4
2014	5147	35	1 in 147.8	7184	3	1 in 2394.7
2015	5420	37	1 in 146.5	7893	3	1 in 2631.0
2016	5777	47	1 in 122.9	8453	3	1 in 2817.7
2017	6404	47	1 in 136.3	9480	4	1 in 2370.0

Table 6. History of Rocky Mountain bighorn sheep transplants, Utah 1966–2018.

Unit #	Release Unit / Area	Year	# Released	Source
1	Box Elder, Antelope Island	1997	23	Kamloops, BC
1	Box Elder, Antelope Island	2000	6	Winnemucca NV
1	Box Elder, Newfoundland Mountains	2001	15	Antelope Island, UT
1	Box Elder, Newfoundland Mountains	2001	16	Hart Mt, NV
1	Box Elder, Newfoundland Mountains	2003	16	Antelope Island, UT
1	Box Elder, Newfoundland Mountains	2008	18	Antelope Island, UT
1	Box Elder, Pilot Mountain	1987	24	Basalt, CO
1	Box Elder, Pilot Mountain	1993	2	Bare Top Mountain, UT
1	Box Elder, Pilot Mountain	1998	13	Wells, NV
1	Box Elder, Pilot Mountain	1998	19	Contact, NV
3	Ogden, Box Elder Canyon	1966	14	Whiskey Basin, WY
3	Ogden, Box Elder Canyon	1966	20	Waterton, AB
3	Ogden, Box Elder Canyon	1969	12	Banff, AB
3	Ogden, Box Elder Canyon	1970	14	Banff, AB
8	North Slope, Bare Top Mountain	1983	19	Whiskey Basin, WY
8	North Slope, Bare Top Mountain	1984	17	Whiskey Basin, WY
8	North Slope, Sheep Creek	1989	21	Whiskey Basin, WY
8	North Slope, Sheep Creek	2000	6	Almont Triangle, CO
8	North Slope, Hoop Lake	1989	23	Whiskey Basin, WY
8	North Slope, Carter Creek / S Red Canyon	2000	10	Almont Triangle, CO
8	North Slope, Carter Creek / S Red Canyon	2001	18	Basalt, CO
8	North Slope, Carter Creek / S Red Canyon	2003	6	Desolation Canyon, UT
8	North Slope, Goslin Mountain	2005	34	Thompson Falls, MT
8	North Slope, Goslin Mountain	2007	42	Bonner, MT
8	North Slope, Goslin Mountain	2014	25	Green River, UT
10	Book Cliffs, Hill Creek	1970	9	Whiskey Basin, WY
10	Book Cliffs, Hill Creek	1973	12	Alberta, Canada
10	Book Cliffs, Hill Creek	1998	44	Kaleden, BC
10	Book Cliffs, Hill Creek	1998	20	Fowler, CO
11	Nine Mile, Bighorn Mountain	1993	26	Estes Park, CO
11	Nine Mile, Bighorn Mountain	1995	28	Georgetown, CO
11	Nine Mile, Jack Creek	2000	15	Bare Top Mountain., UT
11	Nine Mile, Jack Creek	2002	15	Sula, MT
11	Nine Mile, Trail Canyon	2009	40	Green River, UT
16	Central Mountains, Nebo	1981	27	Whiskey Basin, WY
16	Central Mountains, Nebo	1982	21	Whiskey Basin, WY
16	Central Mountains, Nebo	2004	18	Augusta, MT
16	Central Mountains, Nebo	2007	25	Augusta, MT
17a	Wasatch Mountains, Timpanogos	2000	25	Rattlesnake, UT
17a	Wasatch Mountains, Timpanogos	2001	10	Hinton, AB
17a	Wasatch Mountains, Timpanogos	2002	9	Sula, MT
17a	Wasatch Mountains, Timpanogos	2007	20	Sula, MT
17a	Wasatch Mountains, Timpanogos	2007	18	Forbes, CO
17a	Wasatch Mountains, Provo Peak	2001	22	Hinton, AB
17a	Wasatch Mountains, Provo Peak	2007	10	Sula, MT / Augusta, MT
17c	Wasatch Mountains, Lake Canyon	2009	30	Augusta, MT
17c	Wasatch Mountains, Indian Canyon	2009	30	Augusta, MT
18	Oquirrh-Stansbury, Stansbury Mountains	2005	12	Antelope Island, UT
18	Oquirrh-Stansbury, Stansbury Mountains	2006	44	Antelope Island, UT
18	Oquirrh-Stansbury, Stansbury Mountains	2008	36	Antelope Island, UT
18	Oquirrh-Stansbury, Stansbury Mountains	2018	18	Antelope Island, UT
18	Oquirrh-Stansbury, Stansbury Mountains	2018	41	Newfoundland Mountains, UT
19	West Desert, Deep Creek Mountains	1984	16	Whiskey Basin, WY
19	West Desert, Deep Creek Mountains	1989	14	Whiskey Basin, WY

Unit #	Release Unit / Area	Year	# Released	Source
21	Oak Creek Mountains	2014	24	Antelope Island, UT
21	Oak Creek Mountains	2014	9	Newfoundland Mountains, UT
21	Oak Creek Mountains	2015	16	Newfoundland Mountains, UT
21	Oak Creek Mountains	2016	49	Antelope Island, UT
21	Oak Creek Mountains	2018	15	Antelope Island, UT

Table 7. History of desert bighorn sheep transplants, Utah 1966–2018.

Unit #	Release Unit / Area	Year	# Released	Source
12	San Rafael, Dirty Devil	1991	22	North San Rafael, UT
12	San Rafael, Dirty Devil	1994	15	Potash, UT
12	San Rafael, Dirty Devil	1996	17	Potash, UT
12	San Rafael, Dirty Devil	2003	25	San Rafael, South, Chimney Cyn, UT
12	San Rafael, Dirty Devil	2007	15	San Rafael, South, UT
12	San Rafael, Dirty Devil	2007	15	Escalante, Steven's Canyon, UT
12	San Rafael, Maze (CNP)	1983	23	Island in the Sky, CNP, UT
12	San Rafael, Maze (CNP)	1985	2	Canyonlands NP, UT
12	San Rafael, North	1979	12	San Juan Unit, UT
12	San Rafael, North	1982	11	Island in the Sky, CNP, UT
12	San Rafael, North	1986	6	Canyonlands NP, UT
12	San Rafael, North	1986	18	Canyonlands NP, UT
12	San Rafael, North	1988	10	Coal Wash, UT
12	San Rafael, North Wash	1996	21	South San Rafael, UT
12	San Rafael, North Wash	1997	13	Escalante, UT
12	San Rafael, South	1983	12	Island in the Sky, CNP, UT
12	San Rafael, South	1984	16	Potash, UT
12	San Rafael, South	1985	12	Island in the Sky, CNP, UT
12	San Rafael, South	1997	4	Escalante, UT
12	San Rafael, South	1998	6	Escalante, UT
13	La Sal Potash	1991	10	Potash, UT
13	La Sal, Arches National Park	1985	6	Canyonlands NP, UT
13	La Sal, Arches National Park	1986	19	Canyonlands NP, UT
13	La Sal, Dolores Triangle	1979	7	San Juan Unit, UT
13	La Sal, Dolores Triangle	1990	20	River Mountains, NV
14	San Juan, Johns Canyon	2008	19	San Juan, South, Hite, UT
14	San Juan, Johns Canyon	2008	11	La Sal, Potash, Crystal Geyser, UT
14	San Juan, Johns Canyon	2013	16	Big Bend, Moab, UT
14	San Juan, Johns Canyon	2014	6	Big Bend, Moab, UT
14	San Juan, North	1998	6	Escalante, UT
14	San Juan, North	1999	12	Lake Mead, NV
14	San Juan, North	1999	13	Lake Mead, NV
14	San Juan, North	2017	50	Zion National Park, UT
14	San Juan, Nokai Dome	2014	26	Zion, UT
14	San Juan, Nokai Dome	2014	23	Zion, UT
15	Henry Mountains, Little Rockies	1985	18	Canyonlands NP, UT
15	Henry Mountains, Little Rockies	1985	12	Red Canyon / White Canyon, UT
25/26	Capitol Reef National Park	1984	21	Island in the Sky, CNP, UT
25/26	Capitol Reef National Park	1985	10	Canyonlands NP, UT
25/26	Capitol Reef National Park	1996	20	Island in the Sky, CNP, UT
25/26	Capitol Reef National Park	1997	20	Island in the Sky, CNP, UT
26	Kaiparowits, East	1980	20	Cataract/White Canyons, UT
26	Kaiparowits, East	1982	12	Canyonlands NP, UT
26	Kaiparowits, East	1993	13	Escalante, UT
26	Kaiparowits, East	1995	17	Escalante, UT
26	Kaiparowits, East	2009	20	Lake Mead, NV
26	Kaiparowits, East	2012	25	River Mountains, NV
26	Kaiparowits, East	2012	25	Muddy Mountains, NV

Unit #	Release Unit / Area	Year	# Released	Source
26	Kaiparowits, Escalante	1975	4	Gypsum Canyon, UT
26	Kaiparowits, Escalante	1976	12	Gypsum Canyon, UT
26	Kaiparowits, Escalante	1978	7	Cataract Canyon, UT
26	Kaiparowits, Escalante	1986	4	Canyonlands NP, UT
26	Kaiparowits, Escalante	1995	6	Escalante, UT
26	Kaiparowits, Escalante	1998	7	Escalante, UT
26	Kaiparowits, Escalante	1995	18	Escalante, UT
26	Kaiparowits, Escalante	2013	49	Muddy Mountains, NV
26	Kaiparowits, Escalante	2014	71	Muddy Mountains, NV
26	Kaiparowits, West	1995	21	Black Mountains, AZ
26	Kaiparowits, West	1995	2	Escalante, UT
26	Kaiparowits, West	1999	21	Lake Mead, AZ
26	Kaiparowits, West	2000	20	Lake Mead, NV
26	Kaiparowits, West	2006	20	Fallon, NV
26	Kaiparowits, West	1995	2	Escalante, UT
26	Kaiparowits, West	1996	20	Lake Mead, NV
29	Zion	2013	19	Zion, UT
29	Zion National Park	1973	12	Lake Mead, NV
30	Pine Valley, Beaver Dam	1994	25	Lake Mead, AZ
30	Pine Valley, Beaver Dam	2014	26	Zion, UT
30	Pine Valley, Beaver Dam	2015	12	Zion, UT

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APPENDIX A. WAFWA Wild Sheep Working Group "Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat"

Recommendations to WAFWA Agencies

WAFWA agencies should:

- assess status of the subspecies or population of wild sheep and complete risk assessments of the potential for interspecies contact for all populations of wild sheep among which foray movements are anticipated.

- remove wild sheep that potentially have associated with domestic sheep or goats and follow or develop a policy to promptly respond to wild sheep moving into areas where they may contact domestic sheep and goats.

- thoroughly explore the potential demographic consequences of translocations by considering risk of contact and habitat suitability analyses prior to implementing any such project coordinate with other agencies, indigenous governments, landowners, and stakeholders regarding management of domestic sheep or goats on or near wild sheep habitat, whether occupied or not.

- fully consider the risk of pathogen transmission when issuing or commenting on permits or regulations associated with public and private lands used for domestic sheep and goat production.

- develop educational materials and outreach programs to inform parties of the consequences of association between wild sheep and domestic sheep and goats.

- identify, evaluate, and compare historical and suitable, but currently unoccupied, wild sheep range against currently occupied wild sheep distribution and existing or potential areas where domestic sheep or goats may occur.

- collect and share data to support risk assessments among management agencies.

- complete risk assessments at least once per decade, and more often if warranted (i.e. if circumstances change), for existing and potential wild sheep habitat. These assessments should specifically identify where and to what extent wild sheep could interface with domestic sheep or goats, and the level of risk within those areas.

- complete site or herd-specific risk assessments for any translocations, population augmentations, or other restoration. Management strategies for wild sheep should minimize the likelihood of association between wild sheep and domestic sheep or goats. Agencies should:

- avoid translocations of wild sheep into areas with no reasonable likelihood of effective separation from domestic sheep or goats.

- consider the health of wild sheep herds, including *M. ovipneumoniae* status and strain type, with potential connectivity when deciding on translocations.

- re-evaluate planned translocations of wild sheep to historical ranges as potential conflicts, landscape conditions, and habitat suitability change.

- recognize that augmentation of a wild sheep herd from discrete source populations poses a risk of pathogen transmission (CAST 2008) and only use source stock verified as healthy through a proper health assessment (WAFWA 2009) for translocations. Source herds should have extensive health histories and be regularly monitored to evaluate herd health. Wild sheep managers should evaluate tradeoffs between anticipated benefits such as demographic, behavioral and genetic interchange, and the potential consequences of mixing wild sheep from various source herds.

- develop and employ mapping or modeling technology as well as ground-based land use reviews prior to translocations to compare wild sheep distribution and movements with distribution of domestic sheep or goats, and use the results to inform decisions.

- anticipate exploratory movements by wild sheep shortly after translocation, as it may enhance risk of conflict. Removal or recapture of wandering wild sheep should be considered to prevent exposure to domestic sheep or goats.

- monitor and manage wild sheep herds more intensively as the risk of association increases. The higher the risk of association between wild sheep and domestic sheep or goats, the more intensively wild sheep herds must be monitored and managed. This is particularly important when considering "new" vs. "augmented" wild sheep populations. Agencies should:

    - use technology such as GPS radio collars and geofencing to monitor movements and be alerted to mortality events that may indicate a disease event or forays that pose a potential risk of pathogen transmission.

    - develop site-specific protocols when association with domestic sheep or goats is anticipated. For example, the proportion of translocated wild sheep that must be radiocollared for achieving desired monitoring intensities should, in part, be based on the anticipated level of risk of association with domestic sheep or goats.

- use intensive monitoring to provide a mechanism for determining proximity of wild sheep to domestic sheep or goats and for evaluating post-release habitat use and movements.

- Budgets for wild sheep translocation projects should include adequate funding for long-term monitoring.

- identify, analyze, and evaluate the implications of connectivity and movement corridors between largely insular herds comprising a meta-population relative to the consequences of opportunities for increased association with domestic sheep or goats. Analyses should include distribution and continuity (Mack 2008) among populations of wild sheep and the anticipated frequency of movement among or within wild sheep range. In doing so, the benefits of genetic interchange or demographic connectivity and their resultant implications for population viability must be weighed against the risks of pathogen transmission (Bleich et al. 1990). This is especially important if dispersing or wandering wild sheep could travel across domestic sheep or goat grazing allotments or trailing routes, private land holdings, or other areas where the transmission of endemic pathogens from an infected wild herd to a naïve herd could occur.

- remove wild sheep known or suspected to have associated with domestic sheep or goats. This is considered to be an effective management tool. Exploratory movements by wild sheep can heighten the risk of association with domestic sheep and goats. Additional measures to achieve effective separation should be implemented if such association occurs, but removal of wild sheep from wild sheep range is not always the best option. This is because continuous risk of association exists during active grazing seasons when domestic sheep or goats are grazed within or in proximity to wild sheep range. As a result, removal of individual wild sheep can be an ineffective method for maintaining separation, and doing so has potentially negative consequences for population viability of wild sheep. Removal of wild sheep should occur only after critical evaluation and further implementation of measures to minimize association and enhance effective separation.

- develop a written protocol to be implemented when association between wild sheep and domestic sheep or goats is confirmed. Notification requirements, appropriate response, and post-contact monitoring options for both of the domestic species and any dispersing or wandering wild sheep should be included in such protocols. Moreover, wildlife agencies should collaborate with all appropriate parties to develop an efficacious and legal protocol when association is anticipated between feral or abandoned domestic sheep or goats for which no owner can be identified, and wild sheep.

- develop databases to report, record, and summarize associations between wild sheep and domestic sheep or goats, and the subsequent outcomes. Further, wildlife managers should encourage the public and federal or crown land managers to promptly report any

observations of wild sheep proximate to domestic sheep or goats. Consider the collaborative use of Citizen Science programs with universities, land management agencies, and NGOs to develop and post signs instructing the public to record sightings in available databases that incorporate a system to verify and validate reports, such as iNaturalist.

- coordinate with appropriate weed or pest management districts, or other local agencies or organizations involved with weed or vegetation management, to preclude use of domestic sheep or goats for vegetation control in areas where association with wild sheep is likely to occur. Agencies should provide educational information and offer assistance to such districts regarding disease risks associated with domestic sheep or goats. Specific guidelines have been developed and implemented in British Columbia (Pybus et al. 1994).

- to the extent practical, develop and standardize across jurisdictions, specific protocols for sampling, testing prior to translocation, and responding to disease outbreaks. Capture and disease-testing protocols have been developed in some jurisdictions.

- coordinate and pool resources to support the ongoing laboratory detection and interpretation of important diseases of wild sheep. Wild sheep managers also should support data sharing, development, and use of standardized protocols (WAFWA 2014). Interagency communication between wildlife disease experts, such as the WAFWA Wildlife Health Committee, should be encouraged to enhance strategies for monitoring, managing, and improving health of wild sheep populations through cooperative efforts.

- develop educational materials and outreach programs to identify and interpret the risk of association between wild sheep and domestic sheep or goats and make them available to producer groups, owners of small and large farm flocks, animals used for packing, and 4-H animals.

- encourage and possibly incentivize testing domestic sheep and goats to create and maintain *M. ovipneumoniae* free status in those flocks or herds.

- create agreements with the appropriate partner agencies or encourage legislation to allow the rapid removal of stray domestic sheep or goats near wild sheep habitat. Established protocols will allow quick response to straying events.

- evaluate the disease risks of introduction, collection, importation, possession, and hunting of free ranging or privately owned exotic sheep and goat species and consider prohibition. Management authority varies by jurisdiction and may not include a WAFWA agency.

~~**APPENDIX A. WAFWA Wild Sheep Working Group "Recommendations for Domestic**~~

Sheep and Goat Management in Wild Sheep Habitat"

Recommendations to WAFWA Agencies

- Historic and suitable but currently unoccupied wild sheep range should be identified, evaluated, and compared against currently-occupied wild sheep distribution and existing or potential areas where domestic sheep or goats may occur.

- Risk assessments should be completed at least once per decade (more often if warranted) for existing and potential wild sheep habitat. These assessments should specifically identify where and to what extent wild sheep could interface with domestic sheep or goats, and the level of risk within those areas.

- Following completion of site or herd-specific risk assessments, any translocations, population augmentations, or other restoration and management strategies for wild sheep should minimize the likelihood of association between wild sheep and domestic sheep or goats. Agencies should:

    - Avoid translocations of wild sheep into areas with no reasonable likelihood of effective separation from domestic sheep or goats.

    - Re-evaluate planned translocations of wild sheep to historical ranges as potential conflicts, landscape conditions, and habitat suitability change.

    - Recognize that augmentation of a wild sheep herd from discrete source populations poses a risk of pathogen transfer (CAST 2008) and thus, only use source stock verified as healthy through a proper health assessment (WAFWA 2009) for translocations. Source herds should have extensive health histories and be regularly monitored to evaluate herd health. Wild sheep managers should evaluate tradeoffs between anticipated benefits such as demographic, behavioral and genetic interchange, and the potential consequences of mixing wild sheep from various source herds.

    - Develop and employ mapping or modeling technology as well as ground based land use reviews prior to translocations to compare wild sheep distribution and movements with distribution of domestic sheep or goats. If a translocation is implemented and association with domestic sheep or goats occurs, or is likely to occur beyond an identified timeframe or pre-determined geographic area, domestic sheep or goat producers should be held harmless.

- The higher the risk of association between wild sheep and domestic sheep or goats, the more intensively wild sheep herds should be monitored and managed. This is particularly important when considering "new" vs. "augmented" wild sheep populations.

    - Site-specific protocols should be developed when association with domestic sheep or goats is probable. For example, decisions concerning percentage of translocated wild

sheep that must be radio-collared for achieving desired monitoring intensities should in part, be based upon the subsequent level of risk of association with domestic sheep or goats.

- Intensive monitoring provides a mechanism for determining proximity of wild sheep to domestic sheep or goats and for evaluating post-release habitat use and movements.

- Budgets for wild sheep translocation projects should include adequate funding for long-term monitoring.

- Wild sheep managers should identify, analyze, and evaluate the implications of connectivity and movement corridors between largely insular herds comprising a meta-population against opportunities for increased association with domestic sheep or goats. Analyses should include distribution and continuity (Mack 2008) among populations of wild sheep and the anticipated frequency of movement among or within wild sheep range. In doing so, the benefits of genetic interchange and its resultant implications for population viability, must be weighed against the risks of disease transmission (Bleich et al. 1990), especially if dispersing or wandering wild sheep could travel across domestic sheep or goat grazing allotments or trailing routes, private land holdings or other areas where the potential transfer of endemic pathogens from an infected wild herd to a naïve herd could occur.

- Removal of wild sheep known, or suspected to have closely associated with domestic sheep or goats is considered to be an effective management tool. Atypical movements by wild sheep can heighten risk of association with domestic sheep or goats. Additional measures to achieve effective separation should be implemented if such association occurs. However, removal of wild sheep from occupied, normally-anticipated wild sheep range is not always the best management option. Continuous risk of association exists during active grazing seasons when domestic sheep or goats are grazed within normally-anticipated wild sheep range. Thus, removal of individual wild sheep is an ineffective method for maintaining separation, and has potentially negative consequences for population viability. Removal of wild sheep should occur only after critical evaluation and further implementation of measures designed to minimize association and enhance effective separation.

- Wild sheep populations should have pre-determined population objectives, and should be managed at agreed-upon densities to minimize the potential for dispersal. Because some dispersal occurs regardless of population density, some risk of association is always present if domestic sheep or goats are within range of dispersing wild sheep.

- Agencies should develop a written protocol to be implemented when association between wild sheep and domestic sheep or goats is confirmed. Notification requirements, appropriate response and post-contact monitoring options for both domestic sheep and goats and dispersing or wandering wild sheep should be included. Moreover, wildlife agencies should collaborate with agricultural agencies, land management agencies, producers and permittees, grazing industry representatives, and wild sheep advocates to develop an effective, efficient, and legal protocol to be implemented when feral or abandoned domestic sheep or goats threaten to associate with wild sheep but for which no owner can be identified. Written

protocol examples are provided in Appendix B (British Columbia Fish, Wildlife and Habitat Management Branch) and Appendix C (Wyoming Game and Fish Department).

- Wildlife agencies should develop databases as a system to report, record, and summarize association between wild sheep and domestic sheep or goats and its outcome; the WAFWA WSWG website (http://www.wafwa.org/html/wswg.shtml) would be a logical host. Further, wildlife managers and federal/crown land managers should encourage prompt reporting by the public of observed proximity between wild sheep and domestic sheep or goats.

- Wild sheep managers should coordinate with local weed or pest management districts, or other applicable agencies or organizations involved with weed or vegetation management, to preclude the use of domestic sheep or goats for noxious weed or vegetation control in areas where association with wild sheep is likely to occur. Agencies should provide educational information and offer assistance to such districts regarding disease risks associated with domestic sheep or goats. Specific guidelines (Pybus et al. 1994) have already been developed and implemented in British Columbia, and are available at: http://www.for.gov.bc.ca/hfp/publications/00006/.

- Specific protocols for sampling, testing prior to translocation, and responding to disease outbreaks should be developed and standardized to the extent practical across state and federal jurisdictions. Several capture and disease-testing protocols have been developed and are available to wild sheep managers (Foster 2004, UC Davis 2007, WAFWA 2009). Protocols should be reviewed and updated as necessary by the WAFWA Wildlife Health Committee (WHC) and presented to WAFWA Directors for endorsement. Once endorsed, agencies should implement the protocols, and the WHC should lead an effort to further refine and ensure implementation of said protocols.

- Agencies should coordinate and pool resources to support the ongoing laboratory detection and interpretation of important diseases of wild sheep. Furthermore, wild sheep managers should support data sharing and development and use of standardized protocols (WAFWA 2009). Interagency communication between wildlife disease experts such as the WAFWA Wildlife Health Committee (WHC) should be encouraged to enhance strategies for monitoring, managing and improving health of wild sheep populations through cooperative efforts.

- Wild sheep management agencies should develop educational materials and outreach programs to identify and interpret the risk of association between wild sheep and domestic sheep or goats for producer groups, owners of small and large farm flocks, animals used for packing and 4-H animals. In some cases, regulation may be necessary to maintain separation.

APPENDIX B. Potential Bighorn Sheep Translocation Sites Utah 2018

Notwithstanding the following list, any existing bighorn sheep populations can be augmented. All suitable bighorn sheep habitat within the following units/subunits will be considered for augmentation/reintroduction.

Rocky Mountain Bighorn Sheep

Augment existing populations/management units to meet population management objectives, including:

Antelope Island
Book Cliffs
Box Elder – Pilot Mountain, Silver Island Mtns, Newfoundland Mtns
Central Mountains – Nebo
Fillmore – Oak Creek
Nine Mile
North Slope – Summit, Three Corners, West Daggett
Oquirrh-Stansbury – Stansbury Mountains
Wasatch Mountains – Avintaquin, Rock Canyon, Timpanogos
West Desert – Deep Creek Mountains

Reintroduction areas to establish new populations:

Box Elder – Bovine Mountain, Goose Creek, Raft River Mountains, Stansbury Island
Fremont Island
Ogden – Wellsville Mountains
South Slope Uintas
Wasatch Mountains – Wasatch Front
West Desert – Cedar Mountains

Desert Bighorn Sheep

Augment existing populations/management units to meet population management objectives, including:

Henry Mountains
Kaiparowits – East, Escalante, West
La Sal – Potash, Dolores Triangle
Paunsaugunt – Paria River
Pine Valley
San Juan – Lockhart, North, South, River
San Rafael – Dirty Devil, North, South
Zion

Reintroduction areas to establish new populations:

Beaver – Mineral Mountains
Boulder
Paunsaugunt
West Desert – Fish Springs, Confusion Range, House Range

SPENCER J. COX
Governor
DEIDRE M. HENDERSON
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
JOEL FERRY
Executive Director
Division of Wildlife Resources
RILEY PECK
Division Director

MEMORANDUM

TO: Utah Wildlife Board and Regional Advisory Councils

FROM: Dustin Mitchell, Southeastern Region Wildlife Program Manager

DATE: Aug 1, 2025

SUBJECT: Unit deer plans for San Juan, La Sal and Manti/San Rafael units

The Utah Division of Wildlife Resources (DWR) revises its mule deer unit plans on a 5-year rotational schedule. This occurs in conjunction with the reports of the Utah Range Trend Monitoring Project and updated Statewide Mule Deer Management Plan. For 2025, the deer unit plans for the Southeastern Region have undergone full revisions. The Statewide plan directs that unit plans with minor updates are reviewed and approved by the Division Director. Unit plans with significant changes, including changes to population objectives and/or unit boundaries are presented to the RACs and Board for approval.

There are three units or sub-units with proposed increases to the population objective. These increases are due to changes in statewide modeling efforts which have caused an increased shift in current population estimates and now exceed current population objectives. Given this factor along with recent increased or stable habitat quality ratings, an increase in the population objective is needed.

These updated plans were developed with input and unanimous support of local unit deer plan committees comprised of diverse constituencies and local stakeholders. The following table shows the unit plans with proposed changes to the population objectives.

Deer Units with Changes to Population Objectives			
Unit name	**Current objective**	**Proposed objective**	**Difference**
La Sal, La Sal Mtns	8,000	11,500	3,500
Manti/San Rafael	28,000	38,000	10,000
San Juan, Abajos	13,500	17,000	3,500

Please see the proposed unit plans in their entirety included in the RAC packet.

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UTAH DNR WILDLIFE RESOURCES

DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit # 13A
La Sal, La Sal Mountains
September 2025

BOUNDARY DESCRIPTIONS

Grand and San Juan counties—Boundary begins at I-70 and the Green River; south along this river to the Colorado River; north along this river to Kane Springs Creek; southeast along this creek to Hatch Wash; southeast along this wash to US-191; south on US-191 to Big Indian Road; east on this road to Lisbon Valley Road; east on this road to Island Mesa Road; east on this road to the Utah-Colorado state line; north on this state line to the Dolores River; west along this river to the Colorado River; north along this river to the Utah-Colorado state line; north on this state line to I-70; west on I-70 to the Green River.

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LAND OWNERSHIP

RANGE AREA AND APPROXIMATE OWNERSHIP OF MULE DEER HABITAT

Ownership	Area (acres)	Percentage (%)
Forest Service	140,539	27.15%
Bureau of Land Management	235,953	45.58%
Utah State Institutional Trust Lands	47,282	9.13%
Private	73,602	14.22%
Department of Defense	32	0.01%
National Parks	17,900	3.46%
Utah Department of Transportation	81	0.02%
Department of Natural Resources	2,260	0.44%
TOTAL	517,649	100%

UNIT MANAGEMENT GOALS

- Manage the deer population at a level capable of providing a broad range of recreational opportunities, including hunting and viewing.
- Use current research (body condition scores (BCS), survival rates, cause-specific mortality, range trend data, etc.), historic population estimates, and classification data to set realistic and attainable population objectives and use those data to evaluate population estimates using the most reliable models.
- Balance deer herd goals and objectives with impacts on human needs, such as private property rights, agricultural crops and local economies.

POPULATION MANAGEMENT OBJECTIVES

Target Winter Herd Size - Manage for a target population of 11,500 wintering deer (modeled number) during the five-year planning period.

Subunit	2015-2019 Objective	2020-2024 Objective	2025-2029 Objective
UNIT TOTAL	13,500	8,000	11,500

The 2025-2029 objectives are not necessarily the carrying capacity nor long-term objectives. Deer populations will be assessed annually using the monitoring strategies outlined below to determine the current population status and their relationship to carrying capacity. Deer populations can be very dynamic depending on a number of factors that can change carrying capacity. Deer objectives can be adjusted based on range condition and trend assessments, as well as deer body condition, productivity and survival trends. Improvements in computer population modeling has provided better estimates of current deer numbers which will aid in setting population objectives that are more realistic and attainable.

An increase in population objective to 11,500 deer will be implemented in 2025. This largely comes from improvements in modeling estimates. The 2015-2019 population objective of 13,500 was derived using harvest data from the 1980's when deer populations were at a high and the most recent population objective of 8,000 reflected population estimates from models that did not take fluctuating survival rates into account. Range Trend data will be used to assess habitat conditions. Should over-utilization and range damage by deer occur, recommendations will be made to reduce deer populations to sustainable levels in localized areas. The Desirable Components Index (DCI) scores from the 2024 range trend survey show that the unit has generally remained similar from year to year since 1994 (Figure 1). This suggests that overall, this herd has not reached or exceeded carrying capacity on the summer range and upper elevation winter ranges on years with favorable environmental conditions. Population trend, habitat, and body condition data suggest that the current objective is realistic, attainable and allows for herd growth of 2700 deer over the next 5 years.

Herd Composition - This is a general season unit and will be managed for a buck-to-doe ratio of 15-17 bucks per 100 does, in accordance with the statewide plan. Biologists will take into account current year buck/doe ratio, 3 year average buck/doe ratio and trend as well as fawn and adult survival when making permit recommendations.

Harvest - Continue general season unit buck deer hunt regulations, using archery, any weapon, and muzzleloader hunts. Antlerless removal may be implemented if needed to maintain the population below carrying capacity and to address specific localized crop depredation, range degradation or urban conflict concerns, using a variety of harvest methods and seasons.

POPULATION MANAGEMENT STRATEGIES

Monitoring

Population Size - Population estimates will be made based on fall (post-season) composition counts conducted by biologists, survival and body condition data from GPS collared deer, and hunter harvest data. These data will be used to model the winter deer herd population size. The modeled population estimate for the winter of 2024 was 8,800 deer.

Buck/doe ratios and Age Structure – Collect buck/doe and fawn/doe ratio data during fall composition counts. Monitor age class structure of the buck population through check stations, postseason classification, mandatory harvest surveys, and field bag checks.

Harvest - The primary means of monitoring harvest will be through statewide mandatory hunter harvest reporting.

Research – Continue to support research and collar efforts on this unit. These projects aim to collect annual adult and fawn survival rates, body condition scores, cause specific mortality, potential CWD transmission, mapping migration corridors, and identifying limiting factors for deer herd growth.

Table 1. Population Trends and Harvest for the La Sal Mountains (13A)

Year	Buck harvest	Permits	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2015	534	1800	45	18	7000	13500	52%
2016	587	1800	46	17	7100	13500	53%
2017	589	1800	23	11	5300	13500	39%
2018	527	1600	21	17	5500	13500	41%
2019	463	1600	34	17	5500	13500	41%
2020	425	1200	53	22	6500	8000	81%
2021	512	1400	38	16	5900	8000	74%
2022	443	1200	43	26	5500	8000	69%
2023	571	1200	47	17	5500	8000	69%
2024	616	1400	50	30	8800	8000	110%
10 Year Avg	527	1500	40	19	-	-	-

Antlerless Harvest

Use antlerless harvest to locally reduce deer populations when range conditions, deer adult and fawn survival, fawn production, and deer body condition suggest it is approaching carrying capacity.

Use antlerless harvest in combination with the Urban Deer Rule to reduce nuisance and depredation by deer.

Predator Management

Manage predators according to the predator management policy (W1AG-04) where habitat is not limiting and predators are demonstrated to have negative impacts on the population. Indices such as doe and fawn survival, body condition scores, fawn production, and cause specific mortality will be used to determine if predator management is deemed necessary.

Private Lands Management

Support programs that increase tolerance for deer on private lands including CWMU, landowner permits, and Walk-In Access programs.

Address all depredation problems in a timely and efficient manner.

Disease Management

Investigate and manage diseases that threaten mule deer populations and continue monitoring for Chronic Wasting Disease (CWD) as stated in the Statewide plan. The La Sal Mountains unit is a CWD positive unit (Map 2), displaying the highest prevalence rates in the state (~20-25%; Table 2)

Table 2. Chronic Wasting Disease sampling results 2019-2025. Note that "Percent Positive" on some sample years may not accurately reflect prevalence rate due to low sample sizes.

Fiscal Year	Positive CWD Result	Total Samples	Percent Positive
2019	9	62	15%
2020	2	10	20%
2021	8	16	50%
2022	7	35	20%
2023	18	30	60%
2024	36	165	22%

CWD Strategies

- Utilize rotational hunter harvest surveillance, targeting this unit once every several years.
- Consider compulsory testing of hunter harvested deer to increase sample size.
- Consider managing the unit toward the lower end of the buck/doe objective to minimize increase of the disease.
- Consider late season buck hunts in focal hotspots on the unit to minimize disease transmission.
- Consider increasing harvest on private lands and in urban areas working with landowners, WMAs, cities, and counties
- Educate public and enforce rules regarding carcass importation and disposal from CWD positive areas.

Urban Deer Management

Work with municipalities on localized urban deer control management actions. Work cooperatively with municipalities in developing urban deer management plans, within the guidelines set by state law and agency policies.

Poaching

While the effect of poaching on wildlife populations can be difficult to assess, the illegal take of wildlife is unacceptable. Law enforcement will continue to make mule deer protection a high priority by concentrating efforts on prioritized winter ranges. Success will only be achieved with vigilance and assistance from our conservation partners and the general public.

RECREATION OBJECTIVES

Provide mule deer hunting that encourages a variety of hunting opportunities while maintaining population objectives.

RECREATION STRATEGIES

Consider additional hunt opportunities such as early/late rifle, HAMSS or extended archery hunts as hunter crowding, disease issues and other concerns dictate.

Work with land managers to maintain access during hunting seasons where appropriate.

HABITAT MANAGEMENT OBJECTIVES

Maintain or improve mule deer habitat on the unit by monitoring, protecting, maintaining, and enhancing existing crucial habitats and mitigating losses due to natural and human impacts.

Use current range trend data and the best available science when prioritizing, designing, and implementing habitat improvement projects

Minimize deer vehicle collisions along highways on the unit by continuing to cooperate with UDOT in construction and maintenance of highway fences, passage structures and warning signs, etc.

HABITAT MANAGEMENT STRATEGIES

Monitoring

Range trend studies will be conducted by DWR to evaluate deer habitat health, trend, and carrying capacity using the deer winter range Desirable Component Index (DCI) and other vegetation data. The DCI was created as an indicator of the general health of deer winter ranges. The index incorporates shrub cover, density and age composition as well as other key vegetation variables. Changes in DCI suggest changes in winter range capacity. The relationship between DCI and the changes in deer carrying capacity is difficult to quantify and is not known.

Continue to work with and support Universities and land management agencies on habitat research projects.

Conduct cooperative range assessments to evaluate forage condition and utilization of important deer ranges. Determining opportunities for habitat improvements will be an integral part of these surveys. This will also be pivotal in determining if antlerless harvest is necessary.

Habitat Protection

Work toward long-term habitat protection and preservation through the use of agreements with federal agencies and local governments and the use of conservation easements on private lands.

Support, cooperate with, and provide input to land management planning efforts dealing with actions affecting habitat security, quality and quantity.

Work with land management agencies and energy companies to minimize and mitigate impacts of energy development activities.

Work with land management agencies in managing riparian areas in critical fawning habitat to furnish water, cover and succulent forage from mid- to late summer.

Work with private landowners, federal, state, and local governments to maintain and protect critical ranges from future losses and degradation through grazing management and trail, OHV and Travel Plan modifications.

Habitat Improvements

Continue to improve, protect, and restore summer and winter ranges critical to deer, such as aspen and sagebrush steppe communities. Cooperate with federal land management agencies and private landowners in carrying out habitat improvements such as pinion-juniper removal, reseedings, controlled burns, mechanical treatments, grazing management, water developments etc. on public and private lands. Habitat improvement projects will occur through the WRI process. Projects completed to date are summarized in Table 3 and Map 1.

Reduce expansion of pinion-juniper woodlands into sagebrush habitats and improve habitats dominated by pinion-juniper woodlands by completing habitat restoration projects like lop-and-scatter, bullhog and chaining.

Protect deer winter ranges from wildfire by reseeding burned areas, creating fuel breaks and vegetated green strips and reseed areas dominated by annual grasses with desirable perennial vegetation. Seek opportunities to increase browse in burned areas of critical winter range.

Seek out opportunities to improve fawning habitat across the unit. Consider summer range habitat improvement projects that remove encroaching trees, improve succulent vegetation and wet meadow habitat, increases aspen recruitment, enhances and/or protects riparian areas, use prescribed fire to promote early succession habitats where appropriate.

Utilize antlerless deer harvest to improve or protect forage conditions when vegetative declines are attributed to deer over utilization.

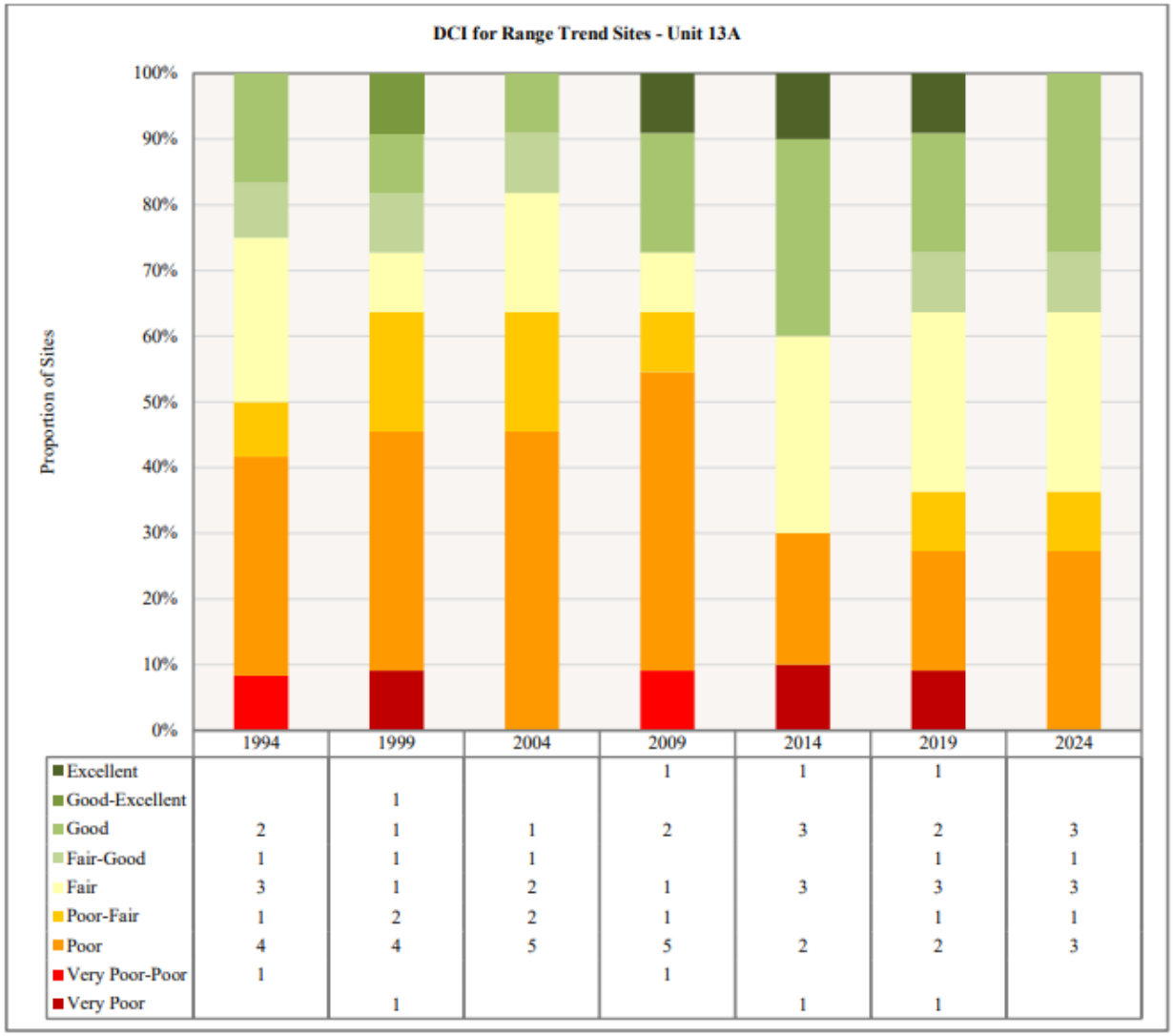
Highway mortality will continue to be monitored and the need for additional highway fences, passage structures, warning signs and other mitigation options will be evaluated.

RANGE TREND SUMMARIES AND BODY CONDITION DATA

Deer Winter Range Condition Assessment

The overall condition of deer winter and transitional range within the La Sal Mountains Management Unit has remained similar from year to year with sites averaging between poor-fair and fair condition since 1994 (Figure 1). North Beaver Mesa (13A-11), Below Polar Rim (13A-12), Lower Lackey Fan (13A-14), Hideout Mesa (13A-15), and Dolores Point (13A-18) are the main drivers for the unit's wintering habitat stability and quality, and deer winter range condition for these sites averages between fair and good. Two Mile Chaining (13A-01), Buck Hollow (13A-03), Slaughter Flat (13A-04), Amasas Back (13A-05), Round Mountain (13A-07), Black Ridge (13A-08), Upper Fisher Valley (13A-10) (suspended), and Beaver Canyon (13A-13) (suspended) are/have been considered to be between very poor-poor and poor-fair wintering habitat conditions consistently from year to year: these poor conditions suppress the unit's overall winter range quality. Range Trend sites in WMU 13A that tend to have higher winter habitat variability include Lower Lackey Fan and Hideout Mesa: this may suggest a higher potential for winter range improvement.

The overall deer winter range assessment in 2024 for WMU 13A is that the unit is in fair condition. However, North Beaver Mesa, Lower Lackey Fan, Hideout Mesa, and Dolores Point were considered to be in good condition due to the high cover of preferred browse and perennial grass. Lower Lackey Fan would benefit from an increase in native perennial grasses and forbs, while a reduction in annual grass on both Lower Lackey Fan and Hideout Mesa would increase habitat suitability in these areas. All sites would benefit from an increase in perennial forbs.



	1994	1999	2004	2009	2014	2019	2024
Excellent				1	1	1	
Good-Excellent		1					
Good	2	1	1	2	3	2	3
Fair-Good	1	1	1			1	1
Fair	3	1	2	1	3	3	3
Poor-Fair	1	2	2	1		1	1
Poor	4	4	5	5	2	2	3
Very Poor-Poor	1			1			
Very Poor		1			1	1	

Figure 1. Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 13A, La Sal Mountains

Treatments/Restoration Work

There has been an active effort to address many of the limitations on this unit through the Watershed Restoration Initiative (WRI). A total of 27,294 acres of land have been treated within the La Sal Mountains unit since the WRI was implemented in 2004. Treatments frequently overlap one another, bringing the net total of completed treatment acres to 24,468 for this unit (Table 3, Map 1). Other treatments have occurred outside of the WRI through independent agencies and landowners, but the WRI comprises most of the work done on deer winter ranges throughout the state of Utah.

Lop and scatter to remove pinyon (Pinus spp.) and juniper (Juniperus spp.) is the most common treatment type. However, mastication treatments to remove pinyon and juniper trees are also very common. Herbicide application to remove invasive species is an effective tool to manage cheatgrass (Bromus tectorum) and has been employed as a treatment method in unit 13A. Other management practices in this unit include (but are not limited to) seeding, prescribed fire, forestry practices, and shrub transplants (Table 3)

Table 3: WRI treatment action size (acres) for completed projects for WMU 13A, La Sal Mountains. Data accessed on 02/25/2025.

Type	Total Completed Acreage
Vegetation Removal/Hand Crew	**11,825**
Lop & Scatter	8,389
Lop-Pile-Burn	2,639
Cut Stump	751
Lop & Chip	39
Lop (No Scatter)	7
Bullhog	**7,157**
Full Size	6,204
Skid Steer	953
Herbicide Application	**3,424**
Spot Treatment	2,132
Aerial (Fixed-Wing)	1,292
Prescribed Fire	**2,075**
Prescribed Fire	1,896
Pile Burn	180
Seeding (Primary)	**1,971**
Broadcast (Aerial-Helicopter)	597
Broadcast (Aerial-Fixed Wing)	557
Hand Seeding	502
Ground (Mechanical Application)	274
Drill (Rangeland)	41
Planting/Transplanting	**244**
Other	161
Bareroot Stock	73
Container Stock	10
Forestry Practices	**206**
Ripping	124
Clearcutting	57
Thinning (Non-Commercial)	25
Anchor Chain	**157**
Ely (One-Way)	152
Ely (Two-Way)	4
Chain Harrow	**89**
> 15 ft. (One-Way)	89
Harrow	**53**
≤ 15 ft. (One-Way)	53
Mowing	**49**
Other	49
Seeding (Secondary/Shrub)	**21**
Hand Seeding	21
Interseeding	**18**
Interseeding	18
Other	**6**
Road Decommissioning	4
Road/Parking Area Improvements	2
Grand Total	**27,294**
***Net Total Land Area Treated**	**24,468**

Map 1: Terrestrial WRI treatments by fiscal year completed for WMU 13A, La Sal Mountains

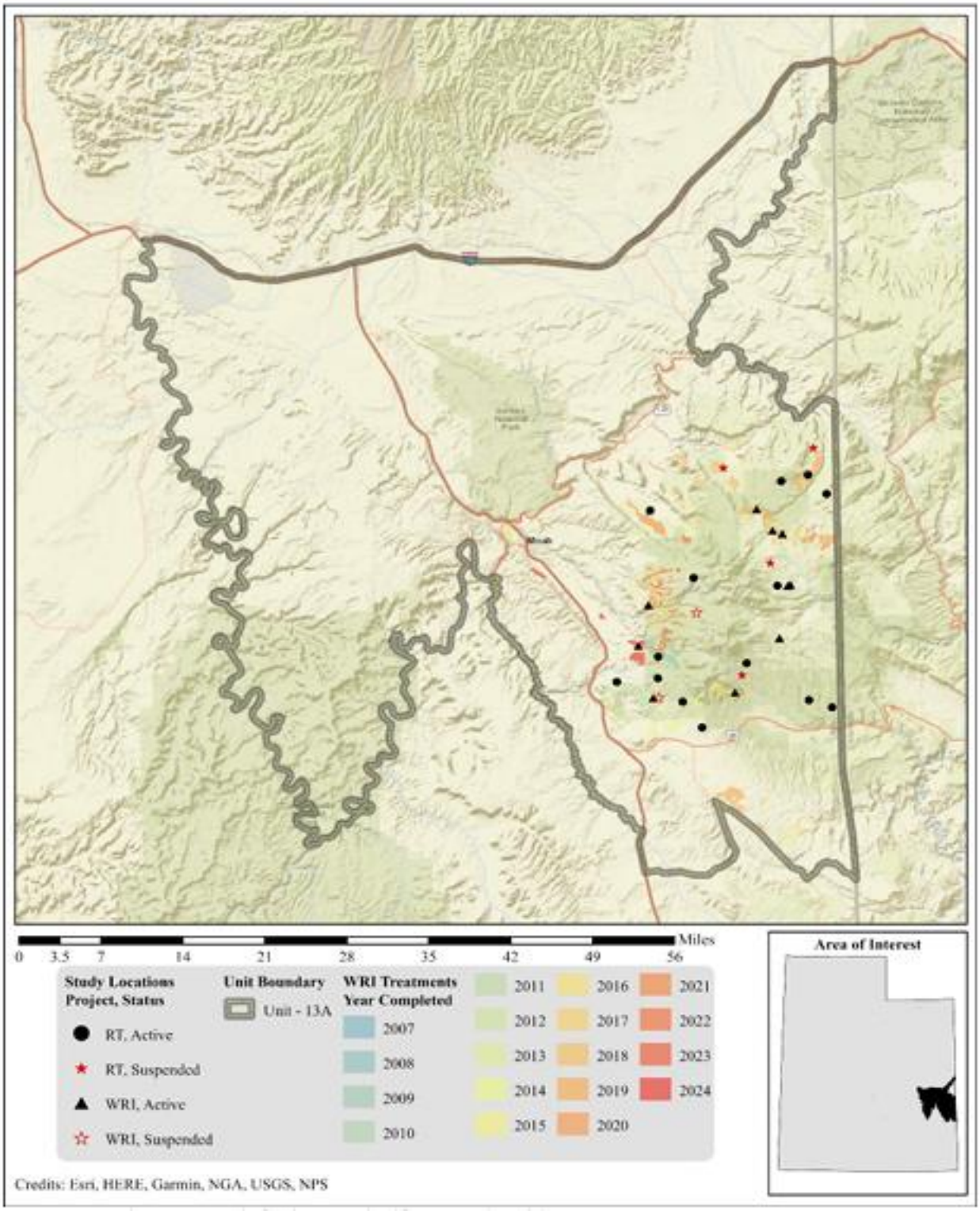
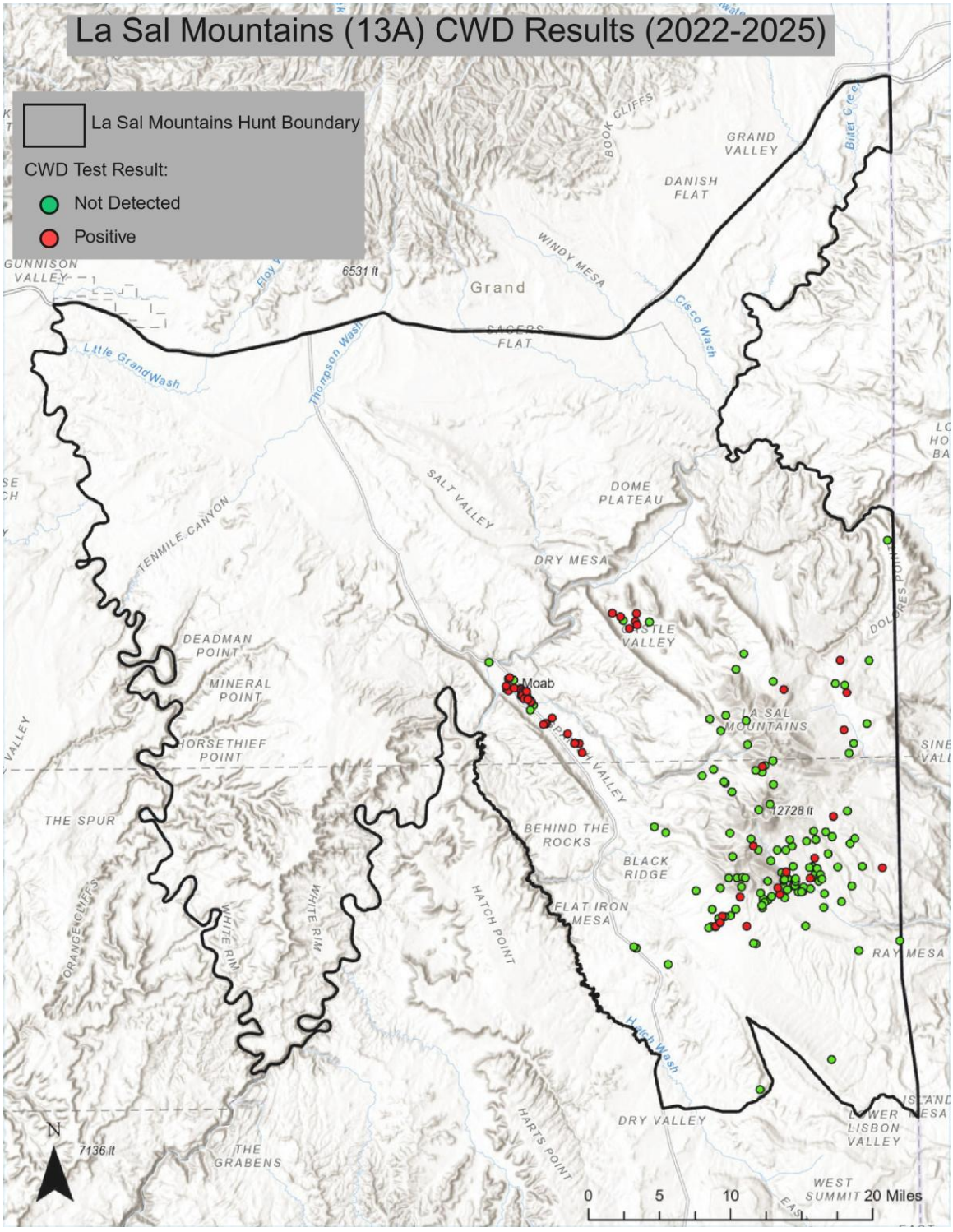


Table 4: Percent Ingesta Free Body Fat Comparisons of Captured Deer, 2014-2024.

Percent (%) Ingesta Free Body Fat (IFBF)											
Unit	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Dec-23	Dec-24
Box Elder						8.79	9.3	12.42			
Cache		11.02	9.59	13.65	10.32	13.71	12.13	12.88	10.44	14.4	12.4
Morgan							8.84	10.84		14.97	
Antelope Island						9.99					
North Slope					8.59						10.06
South Slope	11.31	9.46	9	9.56	7.24	9.9	8.52	12.18	8.65	11.02	9.11
Oquirrh-Stansbury	10.52	8.43	9.56	8.79	7.39	8.46	8.26	10.91	9.91	10.02	10.43
Chalk Creek/Kamas					7.19	11.02	10.75				
Wasatch-Manti		8.76	9.22	10.23	9.32	11.11	8.97	10.28	9.4	12.02	9.53
Wasatch East						11.51	12.26	10.78			
Wasatch-West											12.3
Southeast Manti			8.87			9.42	9.25	10.89	8.03		
Southwest Manti							7.3				
Nebo-Tintic								12.67	8.88	12.61	9.33
Book Cliffs				7.56	6.35	8.8	7.13	8.88		6.65	8.84
Range Creek									8.48	11.25	8.58
West Desert					6.33	8.04					
Monroe	8.1	8.98	8.23	9.53	6.5	10.37	8.56	11.28	8.4	12.23	8.59
Beaver						7.75	8.44	9.67			
Boulder						8.54	5.96			10.05	10.9
Kaiparowits							5.88				
Panguitch					8.76	8.64					
Pine Valley		7.42	6.68	6.54	6.91	6.86	6.77	7.71	7.25	8.92	6.89
Southwest Desert											7.28
Zion					8.48	9.04				7.21	8.36
La Sal						8.63		7.61	8.91	11.46	6.64
San Juan		9.35	9.25	7.6	7.77	9.5	8.11	8.79	7.97	9.22	7.36
Statewide	9.98	9.06	8.8	9.18	7.78	9.48	8.61	10.52	8.76	10.86	9.16
Statewide_7_Units	9.98	9.01	8.71	9.72	7.95	10.07	8.87	10.87	9.01	11.12	9.19

Unit Low

Unit High



Map 2. Chronic Wasting Disease (CWD) test results from 2022-2025 on the La Sal Mountains (13A) WMU.

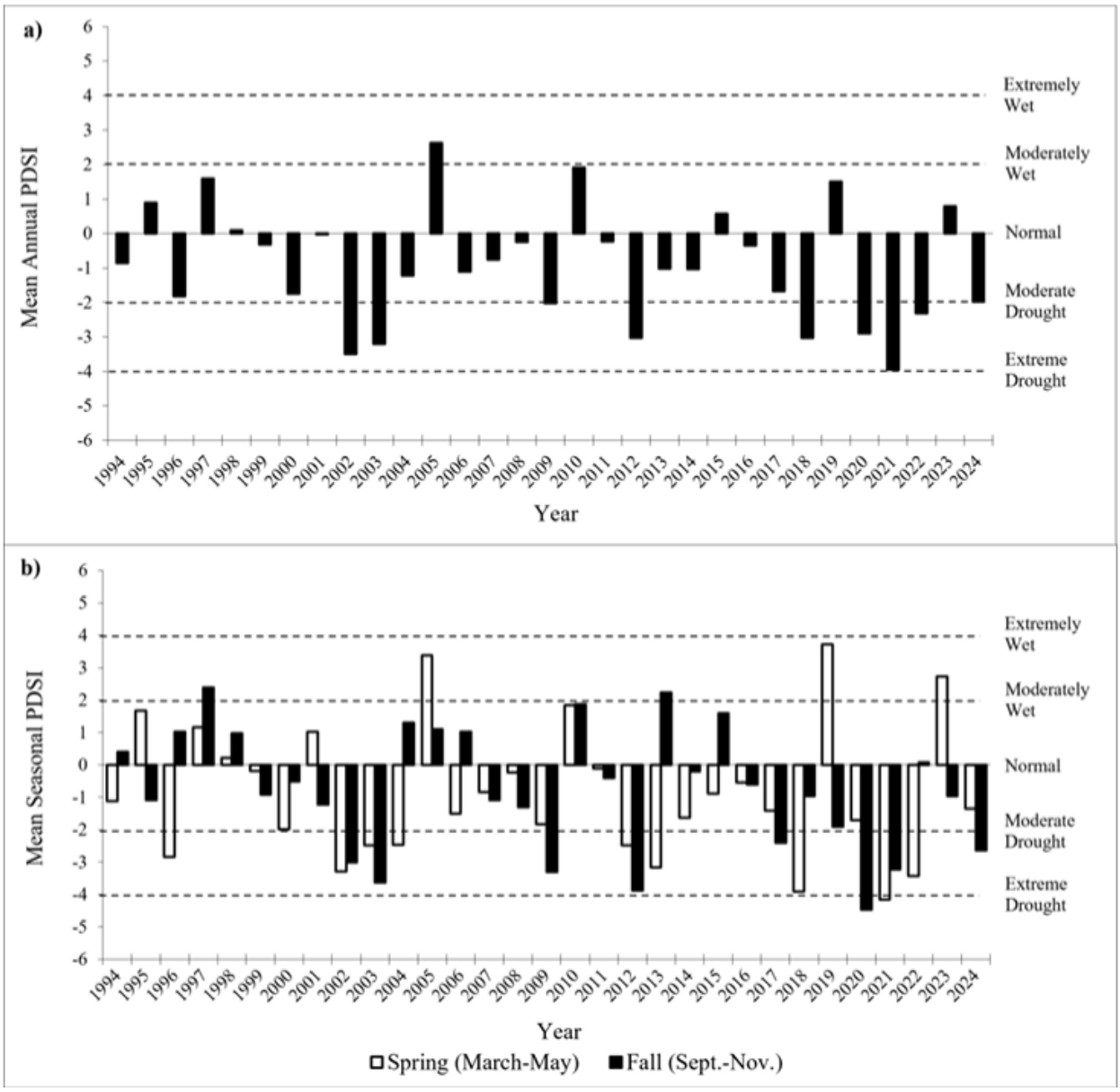


Figure 5. Drought Index, Southeast Utah. Top Graph Depicts the Entire Year; Bottom Graph Depicts Spring and Fall.

DURATION AND AUTHORITY OF PLAN

After approval by the Utah Wildlife Board this unit plan will be in effect for five years, or until amended. Unit deer plan goals, objectives and strategies are constrained within the sideboards set in the statewide deer plan, which supersedes unit plans. It is possible that changes to the statewide deer plan may affect unit plans. Additionally, changes to Utah State Code and/or Administrative Rules may also affect deer unit plans.

DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit # 16BC, Manti
and
Deer Herd Unit #12, San Rafael
September, 2025

BOUNDARY DESCRIPTION

Unit # 16B and 16C Manti Subunit - **Carbon, Emery, Sanpete, Sevier and Utah counties**—Boundary begins at the junction of US-6 and US-89 in Spanish Fork Canyon; southeast on US-6 to Price and SR-10; south on SR-10 to I-70; west on I-70 to US-89; north on US-89 to US-6 in Spanish Fork Canyon.

Unit #12 San Rafael Unit - Carbon, Emery, Sanpete, Sevier and Utah counties—Boundary begins US-6 and US-10 in Price; southeast on US-6 to Interstate 70; east on I-70 to the Green River; south along this river to the Colorado River; south along this river (and the west shore of Lake Powell) to SR-95; north on SR-95 to SR-24 (hunters may harvest deer within 2 miles south of SR-24 between SR-95 and the Notom Road); west on SR-24 to Caineville and the Caineville Wash road; north on this road to the Cathedral Valley road; northwest on the Cathedral Valley road to the Capital Reef National Park boundary; north and west on the CRNP boundary back to the Cathedral Valley road; west on this road to Rock Springs Bench and the Last Chance Desert road; north on this road to the Blue Flats road; north and east on this road to the Willow Springs road; north on this road to the Windy Peak road; north and west on this road to I-70; east on I-70 to US-10; north on US-10 to US-6 in Price.

LAND OWNERSHIP

RANGE AREA AND APPROXIMATE OWNERSHIP OF MULE DEER HABITAT FOR UNIT 16BC- MANTI

Ownership	Area (acres)	Percentage (%)
Bureau of Land Management	130,144	8.72%
USDA Forest Service	864,000	57.91%
Utah State Institutional Trust Lands	87,367	5.86%
Private	337,820	22.64%
Department of Defense	78	0.01%
Utah Department of Natural Resources	72,335	4.85%
Utah Department of Transportation	125	0.01%
TOTAL	**1,491,869**	**100%**

RANGE AREA AND APPROXIMATE OWNERSHIP OF MULE DEER HABITAT FOR UNIT 12- SAN RAFAEL

Ownership	Area (acres)	Percentage (%)
Bureau of Land Management	436,450	60.89%
Utah State Institutional Trust Lands	47,813	6.67%
Private	30,515	4.26%
National Parks	196,118	27.36%
Utah Department of Natural Resources	5,839	0.81%
Utah Department of Transportation	21	0.00%
TOTAL	**6,727**	**100%**

UNIT MANAGEMENT GOALS

- Expand and improve mule deer populations on the Manti unit within available habitats and in consideration of other land uses.
- Set realistic and attainable population management objectives that are at or below biological carrying capacity.

POPULATION MANAGEMENT OBJECTIVES

Target Winter Herd Size –Manage for a 5 year target population objective 38,000 wintering deer on the Manti unit based on the best available model and as range conditions permit. This objective can be raised or lowered in future years if deer populations, range condition, and deer body condition suggest a change is needed. Current research on survival, body condition, production data, cause specific mortality in combination with range trend data, annual browse monitoring, and past population model estimates will be used to set the objective.

New model parameters were used beginning in model year 2025. It was decided that it would be beneficial to use as much of the valuable data collected as possible (annual doe survival, annual fawn survival, and classification data) in developing population estimates. As a result of changing model parameters, population estimates for the past decade shifted up by as much as 4,000 deer over previous estimates. Much of the change in the population objective is a result of this upward shift of the population estimate using the new model parameters.

Using the new model parameters, data from the past 10 years suggest that the Manti deer population has varied between 23,000-33,000 deer (Table 1a). Long-term range trend data depicted in figures 1-3 suggest that browse cover, utilization and overall winter range health has slightly improved and is capable of sustaining at least the number of deer observed over the past decade.

Body fat data from captured deer on the Manti are relatively good and near statewide averages suggesting that overall, this herd has not reached or exceeded carrying capacity on summer range and upper elevation winter ranges (Table 2). Range and body condition data combined suggest that the proposed objective is realistic, attainable and allows for herd growth of 8,000 to 10,000 deer over the next 5 years if precipitation patterns are favorable. It is recognized that climate conditions will be the primary driver of potential population growth or decline.

Manti Subunit Objective (1998-2019)	38,000 deer
Manti Subunit Objective (2020-2024)	28,000 deer
Manti Subunit Objective (2025-2029)	38,000 deer

San Rafael Unit (1998-2019)	no population objective
San Rafael Unit (2020-2024)	no population objective
San Rafael Unit (2025-2029)	no population objective

Population estimates and objectives will not be established for the San Rafael unit. Setting management objectives for the San Rafael portion of the unit and obtaining sex-ratios would be unreliable due to low deer densities and small, isolated deer herds resulting in inadequate sample sizes. The majority of deer are concentrated on the unit where there are agricultural corridors. Deer numbers along these corridors are not declining and provide hunting opportunities for local hunters.

Herd Composition – Manage for a buck to doe ratio of 15 to 17 bucks/100 does. Biologists will take into account current year buck/doe ratio, 3 year average buck/doe ratio and trend as well as fawn and adult survival when making permit recommendations.

Harvest - General Season Unit by Unit buck deer hunt regulations, using archery, any weapon, and muzzleloader hunts. Buck permits will be adjusted to maintain buck/doe objectives. Antlerless permits will be issued to address specific localized crop depredation or range degradation concerns. In addition, antlerless harvest may be used if adult and fawn deer survival, fawn production, and deer body condition suggest the population is approaching carrying capacity.

POPULATION MANAGEMENT STRATEGIES

Monitoring

Population Size – A population estimate will be made based on fall herd composition counts conducted by biologists, survival and body condition data from GPS collared deer, and hunter harvest data. These data will be used to model the winter deer herd population size. The modeled population estimate for the winter of 2024 was 28,400 deer on the Manti.

Buck/doe ratios and Age Structure – Collect buck/doe and fawn/doe ratios data during fall composition counts. Monitor age class structure of the buck population through check stations, postseason classification, mandatory harvest surveys, and field bag checks.

Harvest – The primary means of monitoring harvest will be through statewide mandatory hunter harvest reporting.

Research – Continue to collect annual adult doe and fawn survival rates, body condition scores, and cause specific mortality on this unit from GPS collared deer. Continue research efforts to identify migration corridors and limiting factors for deer herd growth.

Table 1a. Population Trends and Harvest for Unit 16BC Manti

Year	Population Objective	Previous Model Estimate	Updated Model Estimate	Permits	Harvest	Buck/Doe Ratio	Fawn/Doe Ratio	Doe Survival %	Fawn Survival %
2010	38000	19900	20600	9101	1711	14.2	72.6	90	54
2011	38000	10900	19800	7917	1406	14	63.6	87	39
2012	38000	23600	19800	8800	2083	15.6	72.2	80	58
2013	38000	23500	22200	8800	2168	18.7	65.4	77	93
2014	38000	25100	24700	8800	2232	22.8	66.5	82	80
2015	38000	25700	26200	8950	2231	23.3	64.1	83	69
2016	38000	23300	23600	9225	2462	15.6	63.7	81	31
2017	38000	23300	23900	8800	2142	13.3	62.8	88	37
2018	38000	25700	26300	8600	2418	16.7	65.2	83	75
2019	38000	25400	23300	8100	1689	16.3	56.4	83	39
2020	28000	24400	27400	8100	1800	15.5	68.1	71	73
2021	28000	26500	28900	7500	2222	20.1	63.5	82	48
2022	28000	28400	32600	7800	2461	22	59.5	90	58
2023	28000	26500	27200	7800	1953	18.9	58.3	74	18
2024	28000	na	28400	8000	2316	19	66	83	52

Table 1b. Harvest Trends for Unit 12 San Rafael

	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	***Ave.***
Hunters Afield	1531	1492	1556	1601	1845	1952	1375	1381	1652	886	*1527*
Harvest	421	341	534	381	430	394	275	442	363	192	*377*

Antlerless Harvest

Use antlerless harvest to locally reduce deer populations when range conditions, deer adult and fawn survival, fawn production, and deer body condition suggest it is approaching carrying capacity.

Use antlerless harvest in combination with the Urban Deer Rule to reduce nuisance and depredation by deer.

Predator Management

Manage predators according to the predator management policy (W1AG-04) where habitat is not limiting and predators are demonstrated to have negative impacts on the population. Indices such as doe and fawn survival, body condition scores, fawn production, and cause specific mortality will be used to determine if predator management is deemed necessary.

Private Lands Management

Support programs that increase tolerance for deer on private lands including CWMU, landowner permits, and Walk-In Access programs.

Address all depredation problems in a timely and efficient manner.

Disease Management

Investigate and manage diseases that threaten mule deer populations. Utilize Statewide CWD Plan objectives and strategies as they apply on this unit. The Manti subunit has been CWD positive for decades and shows an average minimal prevalence of 2.2% over the past 4 years. CWD prevalence on the Manti in 2024 was 3%

CWD Strategies

- Utilize rotational hunter harvest surveillance, targeting this unit once every several years.
- Consider compulsory testing of hunter harvested deer to increase sample size.
- Consider managing the unit toward the lower end of the buck/doe objective to minimize increase of the disease.
- Consider late season buck hunts in focal hotspots on the unit to minimize disease transmission.
- Educate public and enforce rules regarding carcass importation and disposal from CWD positive areas.

Urban Deer Management

Work with municipalities on localized urban deer control management actions. Work cooperatively with municipalities in developing urban deer management plans, within the guidelines set by state law and agency policies.

Poaching

While the effect of poaching on wildlife populations can be difficult to assess, the illegal take of wildlife is unacceptable. Law enforcement will continue to make mule deer protection a high priority by concentrating efforts on prioritized winter ranges. Success will only be achieved with vigilance and assistance from our conservation partners and the general public.

RECREATION OBJECTIVES

Provide mule deer hunting that encourages a variety of hunting opportunities while maintaining population objectives.

RECREATION STRATEGIES

Consider additional hunt opportunities such as early/late rifle, HAMSS or extended archery hunts as hunter crowding, disease issues and other concerns dictate.

Work with land managers to maintain access during hunting seasons where appropriate.

HABITAT MANAGEMENT OBJECTIVES

Maintain or improve mule deer habitat on the unit by protecting, maintaining, and enhancing existing crucial habitats and mitigating losses due to natural and human impacts.

HABITAT MANAGEMENT STRATEGIES

Work with private landowners and federal, state, and local governments to maintain and protect important ranges from future losses and degradation through grazing management and OHV and Travel Plan modifications.

Continue to improve, protect, and restore sagebrush steppe and aspen habitats critical to deer.

Cooperate with federal and state land management agencies and private landowners in carrying out habitat improvements such as conifer removal, pinion-juniper removal, reseedings, controlled burns, grazing management, water developments, pond maintenance, etc. on public and private lands. Habitat improvement projects will occur through the WRI process.

Work with federal and state partners in fire management and rehabilitation on crucial deer habitat.

Work with land management agencies and energy companies to minimize and mitigate impacts of energy development activities.

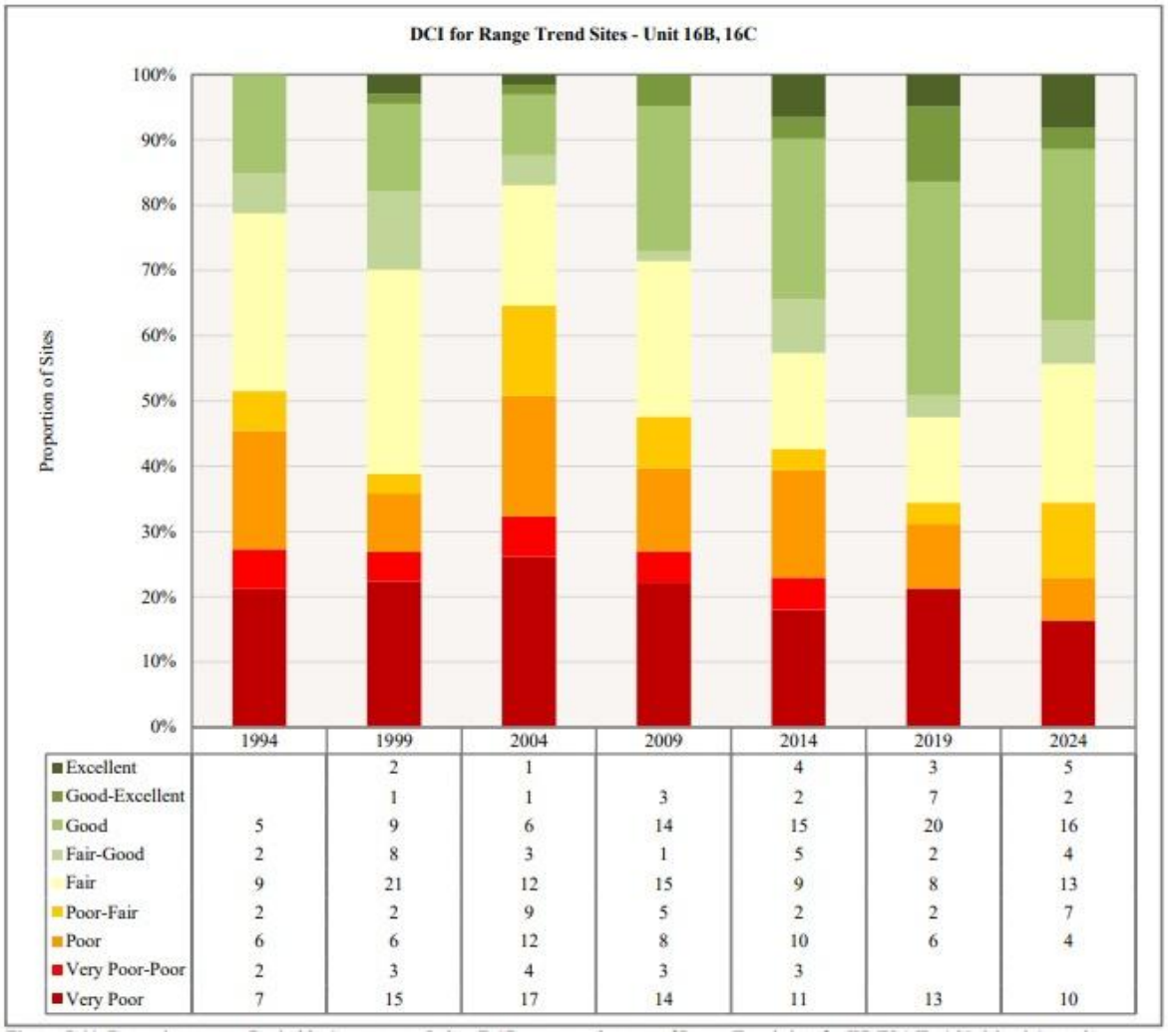
Continue to monitor permanent range trend studies on the unit.

Coordinate with counties and other partners to acquire additional crucial mule deer habitats through fee title or easement as opportunities arise.

Work with UDOT to develop measures that will minimize vehicle deer collisions.

Protect, maintain, and restore stream and riparian habitats to provide diverse foraging opportunities.

RANGE TREND SUMMARIES AND BODY CONDITION DATA



	1994	1999	2004	2009	2014	2019	2024
Excellent		2	1		4	3	5
Good-Excellent		1	1	3	2	7	2
Good	5	9	6	14	15	20	16
Fair-Good	2	8	3	1	5	2	4
Fair	9	21	12	15	9	8	13
Poor-Fair	2	2	9	5	2	2	7
Poor	6	6	12	8	10	6	4
Very Poor-Poor	2	3	4	3	3		
Very Poor	7	15	17	14	11	13	10

Figure 1. Manti Deer Winter Range Desirable Components Index (DCI) Showing Proportions of Range Sites in each Condition Class (Poor, Fair, Good, etc.) 1994-2024

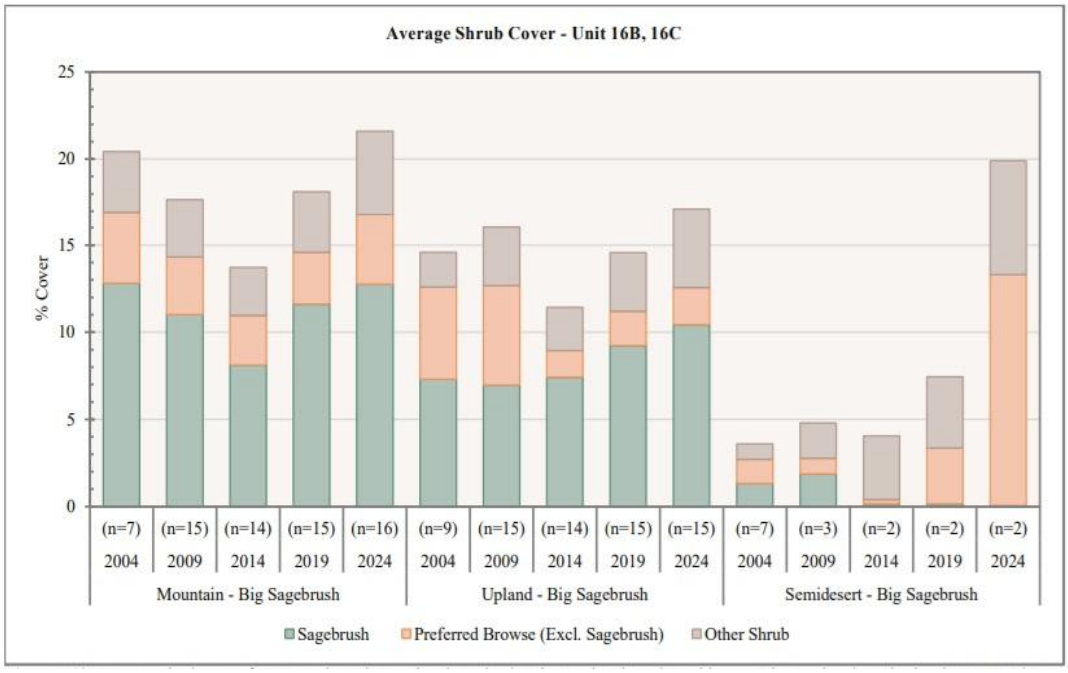


Figure 2. Trends in Browse Cover on Low and Mid Elevation Winter Ranges on the Manti Unit, 2004-2024.

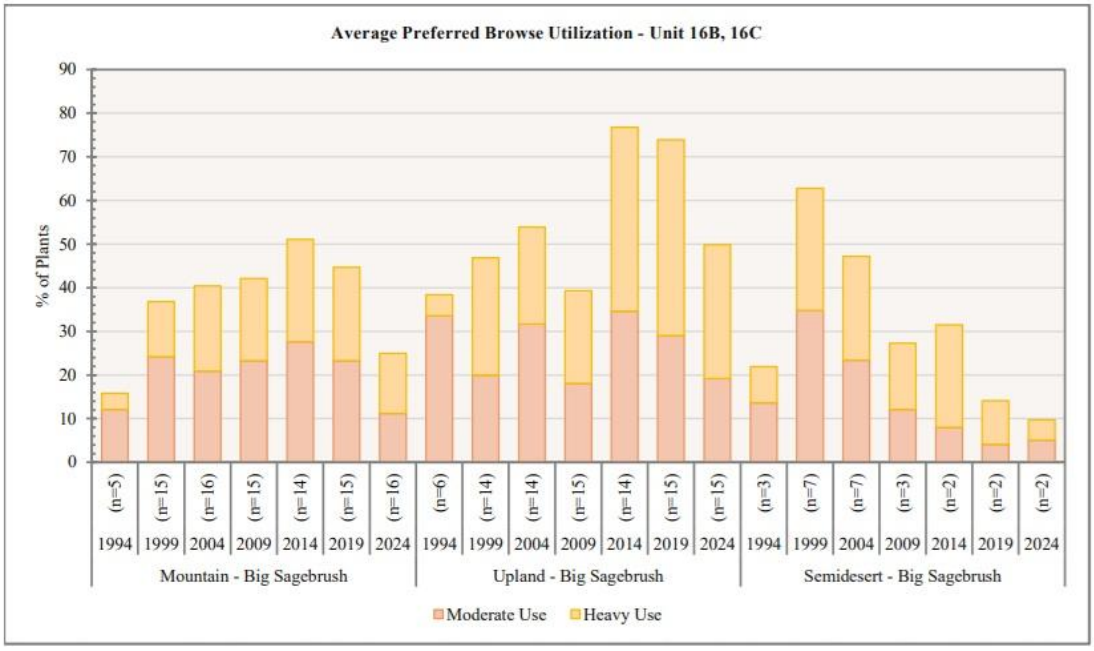


Figure 3. Trends in Browse Utilization across Low and Mid Elevation Winter Ranges on the Manti Unit, 2004-2024.

Table 2. Body Fat Comparisons of Captured Deer, 2014-2024 (Manti deer highlighted in red)

Percent (%) Ingesta Free Body Fat (IFBF)											
Unit	Dec 2014	Dec 2015	Dec 2016	Dec 2017	Dec 2018	Dec 2019	Dec 2020	Dec 2021	Dec 2022	Dec 2023	Dec 2024
Box Elder						8.79	9.3	12.42			
Cache		11.02	9.59	13.65	10.32	13.71	12.13	12.88	10.44	14.4	12.4
Morgan							8.84	10.84		14.97	
Antelope Island						9.99					
North Slope					8.59						10.06
South Slope	11.31	9.46	9	9.56	7.24	9.9	8.52	12.18	8.65	11.02	9.11
Oquirrh-Stansbury	10.52	8.43	9.56	8.79	7.39	8.46	8.26	10.91	9.91	10.02	10.43
Chalk Creek/Kamas					7.19	11.02	10.75				
Wasatch-Manti		8.76	9.22	10.23	9.32	11.11	8.97	10.28	9.4	12.02	9.53
Wasatch East						11.51	12.26	10.78			
Wasatch-West											12.3
Southeast Manti			8.87			9.42	9.25	10.89	8.03		
Southwest Manti							7.3				
Nebo-Tintic								12.67	8.88	12.61	9.33
Book Cliffs				7.56	6.35	8.8	7.13	8.88		6.65	8.84
Range Creek									8.48	11.25	8.58
West Desert					6.33	8.04					
Monroe	8.1	8.98	8.23	9.53	6.5	10.37	8.56	11.28	8.4	12.23	8.59
Beaver						7.75	8.44	9.67			
Boulder						8.54	5.96			10.05	10.9
Kaiparowits							5.88				
Panguitch					8.76	8.64					
Pine Valley		7.42	6.68	6.54	6.91	6.86	6.77	7.71	7.25	8.92	6.89
Southwest Desert											7.28
Zion					8.48	9.04				7.21	8.36
LaSal						8.63		7.61	8.91	11.46	6.64
San Juan		9.35	9.25	7.6	7.77	9.5	8.11	8.79	7.97	9.22	7.36
Statewide	9.98	9.06	8.8	9.18	7.78	9.48	8.61	10.52	8.76	10.86	9.16
Statewide_7_Units	9.98	9.01	8.71	9.72	7.95	10.07	8.87	10.87	9.01	11.12	9.19

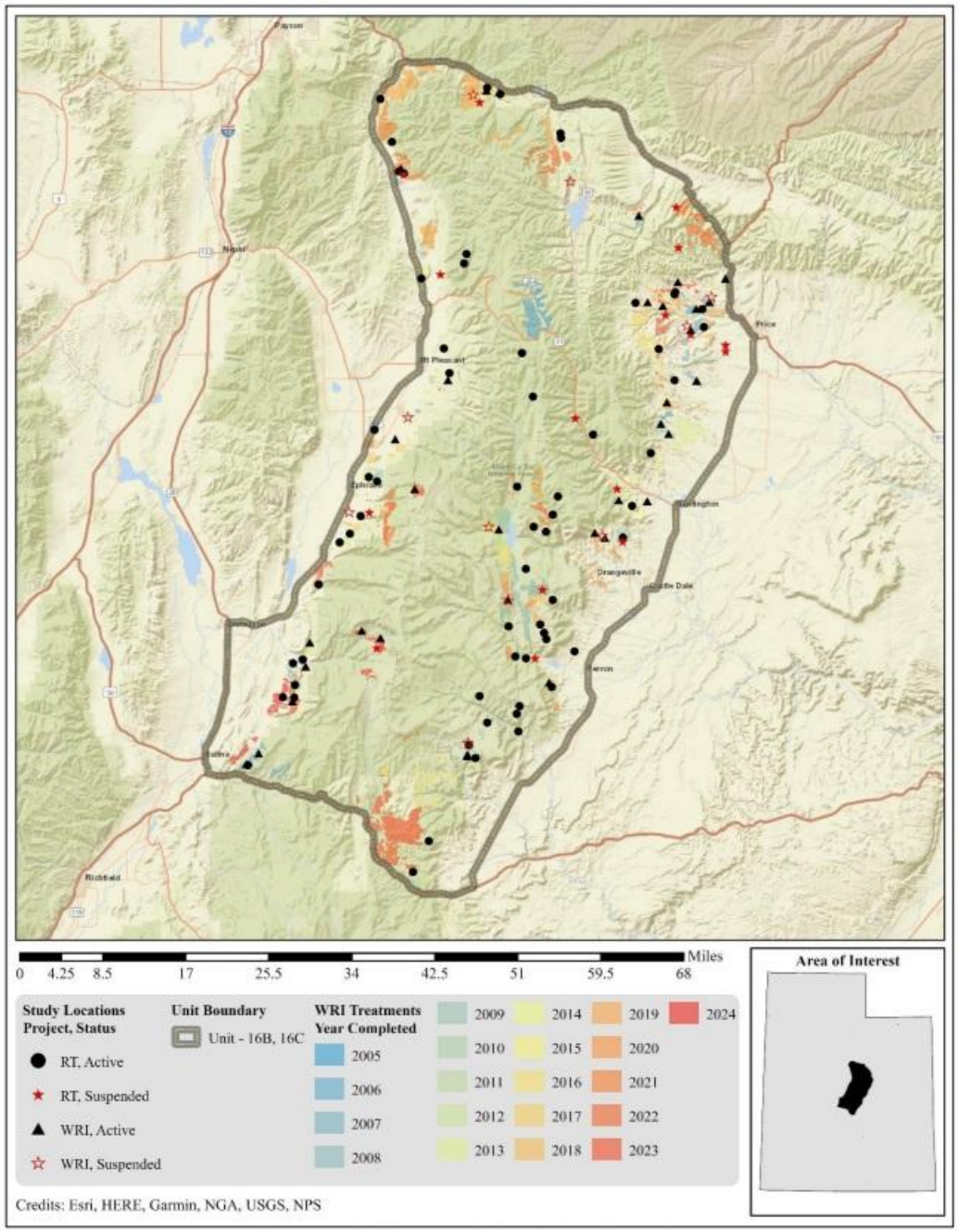


Figure 4. Mule Deer habitat treatment projects, Manti 2005-24.

DURATION AND AUTHORITY OF PLAN

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DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit # 14
San Juan
September 2025

BOUNDARY DESCRIPTIONS

Grand and San Juan Counties - Boundary begins at the confluence of the San Juan and Colorado rivers; north along the Colorado river to Kane Springs Creek; southeast along this creek to Hatch Wash; southeast along this wash to US-191; south on this road to the Big Indian road; east on this road to the Lisbon Valley road; southeast on this road to the Island Mesa road; east on this road to the Colorado state line; south on this line to the Navajo Indian Reservation boundary; southwest along this boundary to the San Juan River; west on this river to the Colorado River. EXCLUDES ALL NATIVE AMERICAN TRUST LANDS WITHIN THIS BOUNDARY.

This boundary includes the following two subunits:

Unit 14A - San Juan, Abajo Mountains - **Grand and San Juan Counties** - Boundary begins at US-163 and South Cottonwood Creek (near Bluff); north along this creek to Allen Canyon; north along this canyon bottom to Chippean Canyon; north along this canyon bottom to Deep Canyon; north along this canyon bottom to Mule Canyon; north along this canyon bottom to the Big Causeway; north from the Big Causeway to Trough Canyon; north along this canyon bottom to North Cottonwood Creek; north along this creek to Indian Creek; north along this creek to the Colorado River; north along this river to Kane Springs Creek; southeast along this creek to Hatch Wash; southeast along this wash to US-191; south on US-191 to Big Indian road; east on this road to Lisbon Valley road; southeast on this road to Island Mesa road; east on this road to the Utah-Colorado state line; south on this line to the Navajo Indian Reservation boundary; west and south along this boundary to the San Juan River; west along this river to US-163 at Mexican Hat; east on US-163 to South Cottonwood Creek. EXCLUDES ALL NATIVE AMERICAN TRUST LANDS WITHIN THIS BOUNDARY.

Unit 14B - San Juan, Elk Ridge - San Juan County - Boundary begins at the junction of US-163 and South Cottonwood Creek (near Bluff); north along this creek to Allen Canyon; north along this canyon bottom to Chippean Canyon; north along this canyon bottom to Deep Canyon; north along this canyon bottom to Mule Canyon; north along this canyon bottom to the Causeway; north from the Causeway to Trough Canyon; north along this canyon bottom to North Cottonwood Creek; north along this creek to Indian Creek; north along this creek to the Colorado River; south on this river to the San Juan River; east on this river to US-163; east on US-163 to South Cottonwood Creek. EXCLUDES ALL NATIVE AMERICAN TRUST LANDS WITHIN THIS BOUNDARY.

LAND OWNERSHIP

Subunit 14A - San Juan, Abajo Mountains

RANGE AREA AND APPROXIMATE OWNERSHIP

Ownership	Area (acres)	Percentage %
Forest Service	132,280	12.93%
Bureau of Land Management	485,478	47.46%
Utah State Institutional Trust Lands	66,756	6.53%
Native American Trust Lands	7,337	0.72%
Private	330,412	32.30%
National Parks	387	0.04%
Utah Department of Transportation	69	0.01%
Utah Department of Natural Resources	67	0.01%
TOTAL	1,022,828	100%

Subunit 14B - San Juan, Elk Ridge

RANGE AREA AND APPROXIMATE OWNERSHIP

Ownership	Area (acres)	Percentage %
Forest Service	233549	23.69%
Bureau of Land Management	619934	62.89%
Utah State Institutional Trust Lands	58997	5.98%
Private (Includes Native American Trust Lands)	8531	0.87%
National Parks	64693	6.56%
Utah Department of Transportation	95	0.01%
TOTAL	69050	100%

UNIT MANAGEMENT GOALS

Manage the deer population at a level capable of providing a broad range of recreational opportunities, including hunting and viewing.

Use current research (body condition scores (BCS), survival rates, cause-specific mortality, range trend data, etc.), historic population estimates, and production data to set realistic and attainable population objectives and use those data to evaluate population estimates using the most reliable models.

Balance deer herd goals and objectives with impacts on human needs, such as private property rights, agricultural crops and local economies.

POPULATION MANAGEMENT OBJECTIVES

Target Winter Herd Size – Manage for a target population of 19,000 wintering deer (modeled number) during the five-year planning period.

Subunit	2015-2019 Objective	2020-2024 Objective	2025-2029 Objective
Abajo Mountains	13,500	13,500	17,000
Elk Ridge	5,600	2,000	2,000
UNIT TOTAL	20,500	15,500	19,000

The 2025-2029 population objectives are not necessarily the carrying capacity nor the long-term objectives. Deer populations will be assessed annually using the monitoring strategies outlined below to determine the current population status and their relationship to carrying capacity. Deer populations can be very dynamic depending on a number of factors that can change carrying capacity. Deer objectives may be adjusted based on range condition and trend assessments, as well as deer body condition, productivity and survival trends. Improvements in computer population modeling has provided better estimates of current deer numbers which will aid in setting population objectives that are more realistic and attainable.

Abajo Mountains – An increase in population objective to 17,000 deer will be implemented in 2025. This largely comes from improvements in modeling estimate, where previous models did not take fluctuating survival rates into account. Range Trend data will be used to assess habitat conditions. Should over-utilization and range damage by deer occur, recommendations will be made to reduce deer populations to sustainable levels in localized areas. The Desirable Components Index (DCI) scores from the 2024 range trend survey show that the unit has generally remained the same over time, if not slightly improved (Figure 1). This suggests that the herd has not reached or exceeded carrying capacity on the summer range and upper elevation winter ranges on years with favorable environmental conditions. Population trend, habitat, and body condition data suggest that the current objective is realistic, attainable and allows for herd growth of 2100 deer over the next 5 years.

Elk Ridge – There will be no change in population objective in 2025. This subunit has experienced a large population decline over the past 20-25 years and the population objective has been lowered multiple times in response to this. While there was a slight increase in the population estimate with the updated model, it is still far below the current objective. Elk Ridge is a narrow plateau of summer range with limited perennial water sources. Fawn production has remained at low levels for an extended period of time primarily due to prolonged drought periods and poor summer range conditions (Table 1 and Figure 2). Beef Basin and Black Mesa, which are both major wintering grounds for the Elk Ridge deer herd, continue to experience reductions in sagebrush abundance.

However, according to the 2024 Range Trend Report, overall winter range conditions on Elk Ridge have improved since 1994. The Elk Ridge deer population is susceptible to fluctuations in abundance depending on environmental conditions, but the current population objective is adequate given historic trends on this unit.

Herd Composition

Abajo Mountains – This is a general season unit and will be managed for a buck to doe ratio of 15-17 bucks per 100 does in accordance with the statewide plan. This is a change from the previous objective of 18-20 bucks per 100 does. Biologists will take into account current year buck/doe ratio, 3-year average buck/doe ratio and trend as well as fawn and adult survival when making permit recommendations.

Elk Ridge – This is a limited entry unit and will be managed for a buck to doe ratio of 25-30 bucks per 100 does, in accordance with the statewide plan. Biologists will take into account current year buck/doe ratio, 3 year average buck/doe ratio and trend as well as fawn and adult survival when making permit recommendations.

Harvest

Abajo Mountains - Continue general season unit buck deer hunt regulations, using archery, any weapon, and muzzleloader hunts. Antlerless removal may be implemented if needed to maintain the population below carrying capacity and to address specific localized crop depredation, range degradation, or urban conflict concerns, using a variety of harvest methods and seasons.

Elk Ridge - Continue limited entry buck deer hunting strategy to maintain herd composition objectives and quality hunting opportunities. Antlerless removal may be implemented if needed to address specific localized range degradation issues. Antlerless removal will likely not occur for population management during the duration of this plan given that the population is considerably below carrying capacity.

POPULATION MANAGEMENT STRATEGIES

Monitoring

Population Size - The **Abajo Mountains** and **Elk Ridge** population estimates will be made based on fall (post-season) composition counts conducted by biologists, survival and body condition data from GPS collared deer, and hunter harvest data. These data will be used to model the winter deer herd population size. The modeled population estimate for the winter of 2024 was 14,900 deer on the Abajo Mountains subunit and 1,100 deer on the Elk Ridge subunit.

Buck/doe ratios and Age Structure – Collect buck/doe and fawn/doe ratio data during fall composition counts. Monitor age class structure of the buck population through check stations, postseason classification, mandatory harvest surveys, and field bag checks.

Harvest - The primary means of monitoring harvest will be through statewide mandatory hunter harvest reporting.

Research - Continue to support research and collar efforts on this unit. These projects aim to collect annual adult and fawn survival rates, body condition scores, cause specific mortality, potential CWD transmission, mapping migration corridors, and identifying limiting factors for deer herd growth.

Table 1. Population and Harvest Trend data for the Abajos (top) and Elk Ridge (bottom).

Population Trends and Harvest for the San Juan, Abajo Mountains (14a) Deer Subunit

Year	Buck harvest	Permits	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2020	749	2050	55	20	11000	13500	81%
2021	806	2050	45	23	12400	13500	92%
2022	842	2250	41	20	12400	13500	92%
2023	856	2250	47	17	11900	13500	88%
2024	845	2250	53	23	14900	13500	110%
5 Year Avg	820	2170	48	21	-	-	-

Population Trends and Harvest for the San Juan, Elk Ridge (14b) Deer Subunit

Year	Buck harvest	Permits	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2020	50	60	50	46	750	2000	38%
2021	58	65	40	44	950	2000	48%
2022	57	65	47	34	950	2000	48%
2023	60	70	45	34	950	2000	48%
2024	57	74	47	41	1100	2000	55%
5 Year Avg	56	69	46	40	-	-	-

Antlerless Harvest

Use antlerless harvest to locally reduce deer populations when range conditions, deer adult and fawn survival, fawn production, and deer body condition suggest it is approaching carrying capacity.

Use antlerless harvest in combination with the Urban Deer Rule to reduce nuisance and depredation by deer.

Predator Management

Manage predators according to the predator management policy (W1AG-04) where habitat is not limiting and predators are demonstrated to have negative impacts on the population. Indices such as doe and fawn survival, body condition scores, fawn production, and cause specific mortality will be used to determine if predator management is deemed necessary.

Private Lands Management

Support programs that increase tolerance for deer on private lands including CWMU, landowner permits, and Walk-In Access programs.

Address all depredation problems in a timely and efficient manner.

Disease Management

Investigate and manage diseases that threaten mule deer populations and continue monitoring Chronic Wasting Disease (CWD) as stated in the Statewide plan. The Abajo subunit is CWD positive (<0.05% prevalence). CWD has not been detected on the Elk Ridge subunit.

CWD Strategies

- Utilize rotational hunter harvest surveillance, targeting this unit once every several years.
- Consider compulsory testing of hunter harvested deer to increase sample size.
- Consider managing the unit toward the lower end of the buck/doe objective to minimize increase of the disease.
- Consider late season buck hunts in focal hotspots on the unit to minimize disease transmission.
- Consider increasing harvest on private lands and in urban areas working with landowners, WMAs, cities, and counties
- Educate public and enforce rules regarding carcass importation and disposal from CWD positive areas.

Urban Deer Management

Continue working with municipalities on localized urban deer control management actions. Work cooperatively with municipalities in developing urban deer management plans, within the guidelines set by state law and agency policies.

Poaching

While the effect of poaching on wildlife populations can be difficult to assess, the illegal take of wildlife is unacceptable. Law enforcement will continue to make mule deer protection a high priority by concentrating efforts on prioritized winter ranges. Success will only be achieved with vigilance and assistance from our conservation partners and the general public.

RECREATION OBJECTIVES

Provide mule deer hunting that encourages a variety of hunting opportunities while maintaining population objectives.

RECREATION STRATEGIES

Consider early rifle hunt opportunities as hunter crowding and other concerns dictate.

Work with land managers to maintain access during hunting seasons where appropriate.

HABITAT MANAGEMENT OBJECTIVES

Maintain or improve mule deer habitat on the unit by protecting, maintaining, and enhancing existing crucial habitats and mitigating losses due to natural and human impacts.

Use the most current range trend data and the best available science when prioritizing, designing, and implementing habitat improvement projects

Maintain and protect critical winter range from future losses. Acquire critical winter range when the opportunity arises.

Minimize deer vehicle collisions along highways on the unit by continuing to cooperate with UDOT in construction and maintenance of highway fences, passage structures and warning signs, etc.

HABITAT MANAGEMENT STRATEGIES

Monitoring

Range trend studies will be conducted by DWR to evaluate deer habitat health, trend, and carrying capacity using the deer winter range Desirable Component Index (DCI) and other vegetation data. The DCI was created as an indicator of the general health of deer winter ranges. The index incorporates shrub cover, density and age composition as well as other key vegetation variables. Changes in DCI suggest changes in winter range capacity. The relationship between DCI and the changes in deer carrying capacity is difficult to quantify.

Continue to work with and support Universities and land management agencies on habitat research projects.

Conduct cooperative range assessments to evaluate forage condition and utilization of important deer ranges. Determining opportunities for habitat improvements will be an integral part of these surveys. This will also be pivotal in determining if antlerless harvest is necessary.

Habitat Protection

Work toward long-term habitat protection and preservation through the use of agreements with federal agencies and local governments and the use of conservation easements on private lands.

Support, cooperate with, and provide input to land management planning efforts dealing with actions affecting habitat security, quality and quantity.

Work with land management agencies and energy companies to minimize and mitigate impacts of energy development activities.

Work with land management agencies in managing riparian areas in critical fawning habitat to furnish water, cover and succulent forage from mid- to late summer.

Work with private landowners, federal, state, and local governments to maintain and protect critical ranges from future losses and degradation through grazing management and trail, OHV and Travel Plan modifications.

Habitat Improvements

Continue to improve, protect, and restore summer and winter ranges critical to deer, such as aspen and sagebrush steppe communities. Cooperate with federal land management agencies and private landowners in carrying out habitat improvements such as pinion-juniper removal, reseedings, controlled burns, mechanical treatments, grazing management, water developments etc. on public and private lands. Habitat improvement projects will occur through the WRI process. Projects completed to date are summarized in Table 3 and 4 as well as Map 1 and 2.

Reduce expansion of pinion-juniper woodlands into sagebrush habitats and improve habitats dominated by pinion-juniper woodlands by completing habitat restoration projects like lop-and-scatter, bullhog and chaining.

Protect deer winter ranges from wildfire by reseeding burned areas, creating fuel breaks and vegetated green strips and reseed areas dominated by annual grasses with desirable perennial vegetation. Seek opportunities to increase browse in burned areas of critical winter range.

Seek out opportunities to improve fawning habitat across the unit. Consider summer range habitat improvement projects that remove encroaching trees, improve succulent vegetation and wet meadow

habitat, increases aspen recruitment, enhances and/or protects riparian areas, use prescribed fire to promote early succession habitats where appropriate.

Utilize antlerless deer harvest to improve or protect forage conditions when vegetative declines are attributed to deer over utilization.

Highway mortality will continue to be monitored and the need for additional highway fences, passage structures, warning signs and other mitigation options will be evaluated.

RANGE TREND SUMMARIES AND BODY CONDITION DATA

Deer Winter Range Condition Assessment San Juan, Abajos (Unit 14A)

The overall condition of deer winter and transitional range within the Abajo Mountains Management Unit has improved since 1994 (Figure 1). More specifically, average unit conditions improved from poor in 1994 to fair in 2024. Alkali Point (14A-01) is the only Range Trend site that has been consistently considered to be in very poor condition, which can be attributed to a lack of preferred browse and perennial forbs and the consistent presence of annual grass. One factor beneficial to the overall winter range health on all Range Trend sites in this unit is a general lack of annual grass. However, most sites could benefit by increasing preferred browse and perennial forb cover while diversifying these components in their respective communities. It is probable that these sites represent their surrounding areas. As such, Range Trend sites likely point to areas of needed habitat rehabilitation topics of concern, namely the need for increased preferred browse on Alkali Point, Harts Draw (14A-09), and Shay Mesa (14A-11) and increases in perennial forbs as a whole. Brushy Basin (14A-02), Peters Point (14A-08), and Shingle Mill (14A-12) have averaged conditions ranked between fair and good, and these sites are the drivers for unit-wide conditions. Brushy Basin and Shay Mesa tend to have higher variability in deer winter habitat and may have the highest degree of potential winter range improvement: the immediate area may benefit and respond the most to improvement projects. Areas of improvement may include a reduction in pinyon (Pinus spp.) and juniper (Juniperus spp.) tree cover, and/or cheatgrass (Bromus tectorum). Increases in preferred browse cover and native perennial grass and forbs would also improve habitat health.

The overall deer winter range assessment in 2024 was that WMU 14A is in fair condition. Factors negatively contributing to fair conditions are the lack of preferred shrub cover and recruitment on Alkali Point, Peters Point, Harts Draw, and Shay Mesa. Most sites would benefit from increases in native perennial grass and forb cover, while Alkali Point, Harts Point, and Shay Mesa have notable cheatgrass grass populations and a reduction of cover and abundance would benefit the respective habitat areas.

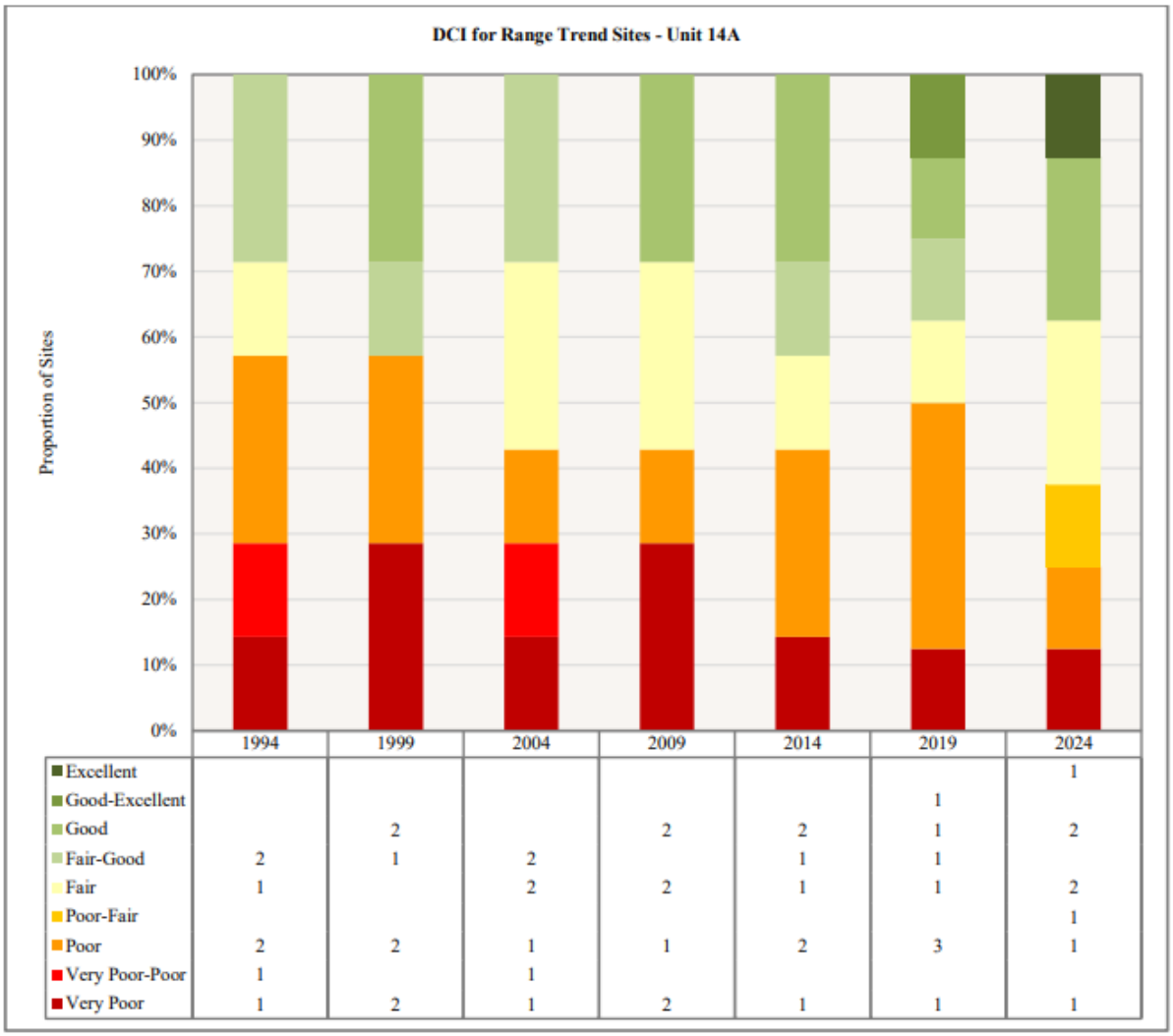


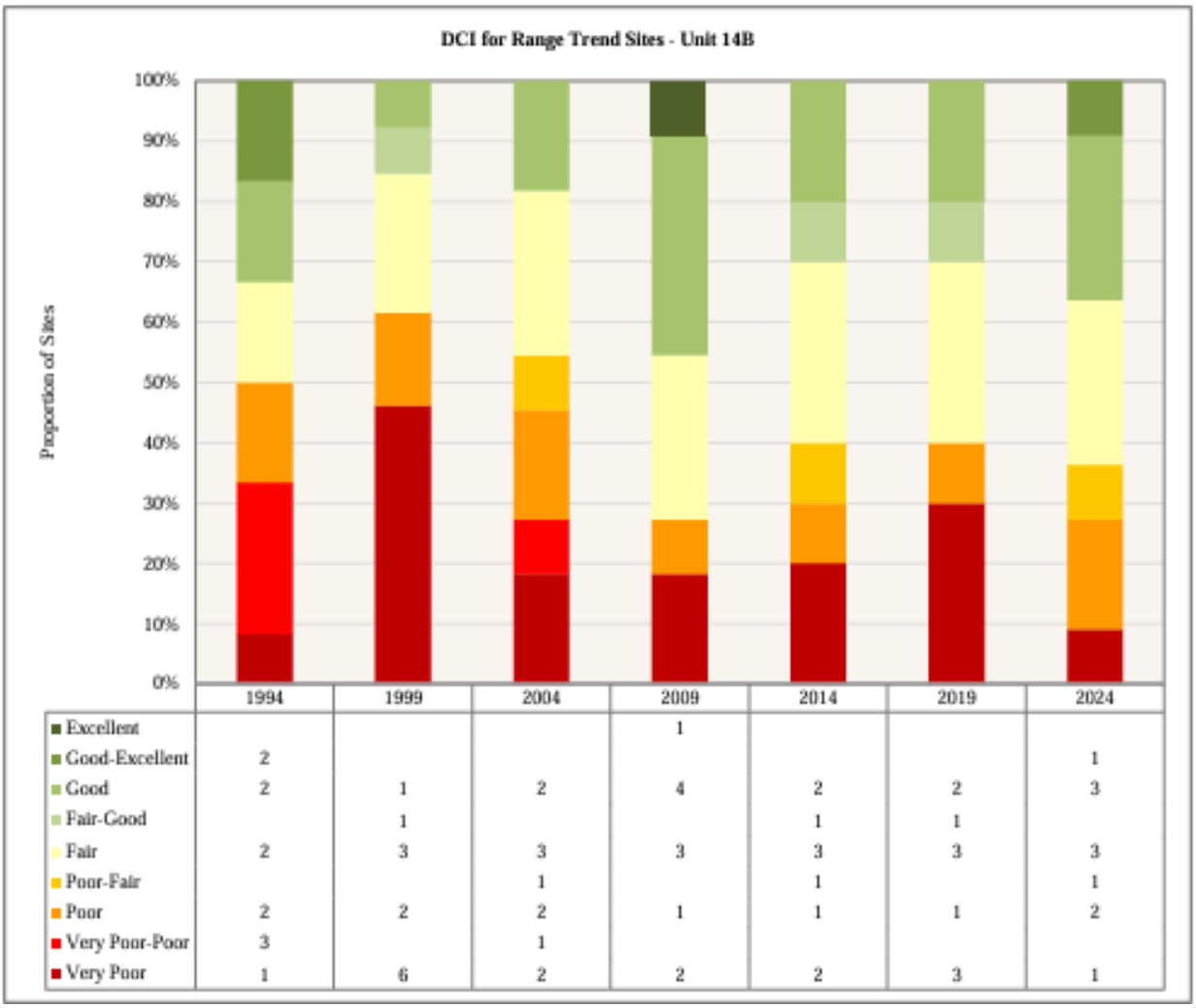
Figure 1. Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 14A, San Juan, Abajos

San Juan, Elk Ridge (14B)

The overall condition of deer winter and transitional range on the Elk Ridge Management Unit has slightly improved from poor-fair conditions in 1994 to fair conditions in 2024 (Figure 2). Mormon Pasture Point (14B27), Dry Mesa (14B-36), and Beef Basin Wash (14B-39) are the main drivers for the unit's wintering habitat suitability and quality, and average between poor-fair and fair-good condition for deer winter range. Lower Lost Park (14B-16) (suspended), Deer Flat (14B-17) (suspended), South Plain (14B-23), North Cottonwood (14B-28) (suspended), Salt Creek Mesa (14B-29) (suspended), Arch Canyon (14B-38), and Lower Ballies (14B-42) are/have been considered to have very poor and poor (respective) wintering habitat condition consistently from year to year: these poor conditions suppress the unit's overall quality of winter habitat. Range Trend sites in WMU 14B that tend to have higher winter habitat variability include Black Mesa (14B13), Texas Flat (14B-14) (suspended), Harmony Flat (14B-15) (suspended),

Wild Cow Point (14B-22), and Arch Canyon (14B-38). This variability may suggest a higher potential for winter range improvement, but it may also suggest some instability in each community's resistance and resilience to state transitions. All of these sites appear to exhibit declining winter habitat condition overall but may experience the most improvement if treatments were applied in these areas.

The overall deer winter range assessment in 2024 for WMU 14B was that the unit is in fair condition with most sites ranging between fair and good-excellent condition. However, Black Mesa, Wild Cow Point, Arch Canyon, and Lower Ballies remain between very poor and poor-fair condition due to low amounts of preferred browse and lack of perennial grass and forbs. Black Mesa and Lower Ballies have particularly high amounts of cheatgrass (Bromus tectorum). Furthermore, caution should be used when implementing landscape-scale treatments for habitat improvement in the Black Mesa and Lower Ballies areas due to their respective communities' low productivity or resilience to change in the long term.



	1994	1999	2004	2009	2014	2019	2024
Excellent				1			
Good-Excellent	2						1
Good	2	1	2	4	2	2	3
Fair-Good		1			1	1	
Fair	2	3	3	3	3	3	3
Poor-Fair			1		1		1
Poor	2	2	2	1	1	1	2
Very Poor-Poor	3		1				
Very Poor	1	6	2	2	2	3	1

Figure 2. Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 14B, San Juan, Elk Ridge

Treatments/Restoration Work

San Juan, Abajos (14A)

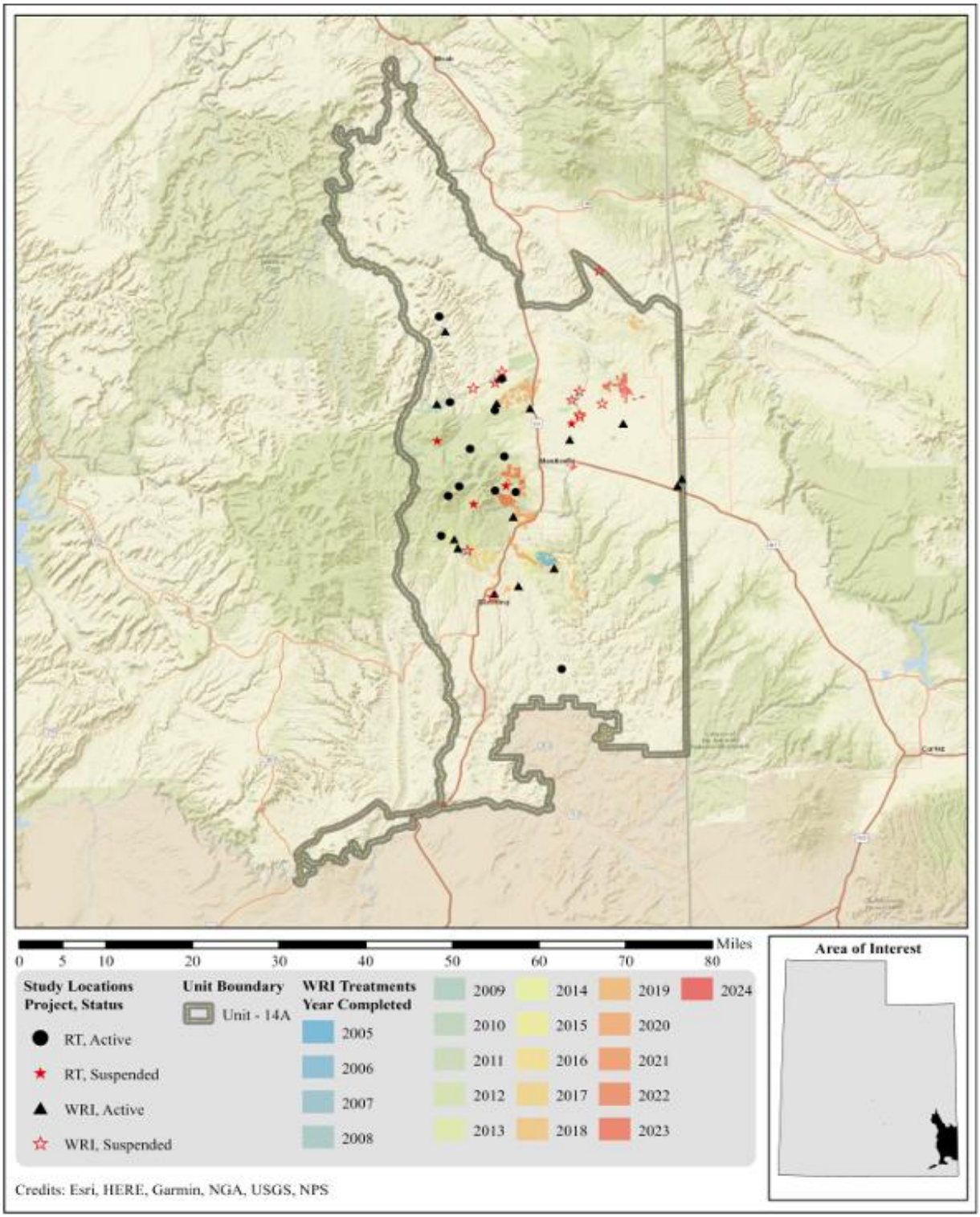
There has been an active effort to address many of the limitations on this unit through the Watershed Restoration Initiative (WRI). A total of 29,917 acres of land have been treated within the Abajo

Mountains unit since the WRI was implemented in 2004 (Map 1). Treatments frequently overlap one another bringing the net total of completed treatment acres to 27,190 for this unit (Table 2). Other treatments have occurred outside of the WRI through independent agencies and landowners, but the WRI comprises most of the work done on deer winter ranges throughout the state of Utah.

The most common management practice in this unit is vegetation removal by hand crew (lop and scatter, loppile-burn, etc.) targeting pinyon (Pinus spp.) and juniper (Juniperus spp.) trees. Additional techniques to remove pinyon and juniper often include bullhog treatments. Other management practices including (but not limited to) aerating, prescribed fire, and seeding species to augment the herbaceous understory have all been used across the unit (Table 2).

Table 2: WRI treatment action size (acres) for completed projects for WMU 14A, Abajo Mountains. Data accessed on 02/25/2025.

Type	Total Completed Acreage
Vegetation Removal/Hand Crew	**9,496**
Lop & Scatter	5,563
Lop-Pile-Burn	3,904
Cut Stump	24
Lop & Chip	4
Bullhog	**8,697**
Full Size	6,898
Skid Steer	1,799
Aerator	**3,248**
Double Drum (Two-Way)	2,619
Single Drum (One-Way)	629
Prescribed Fire	**2,330**
Prescribed Fire	2,330
Harrow	**2,205**
≤ 15 ft. (One-Way)	2,205
Disc	**2,083**
Off-Set (One-Way)	1,863
Plow (One-Way)	220
Seeding (Primary)	**1,431**
Drill (Rangeland)	826
Ground (Mechanical Application)	438
Hand Seeding	87
Drill (Truax)	56
Broadcast (Aerial-Helicopter)	24
Forestry Practices	**252**
Thinning (Commercial)	252
Herbicide Application	**115**
Spot Treatment	115
Planting/Transplanting	**60**
Other	59
Bareroot Stock	<1
Grand Total	**29,917**
***Net Total Land Area Treated**	**27,190**



Map 1: Terrestrial WRI treatments by fiscal year completed for WMU 14A, San Juan, Abajos.

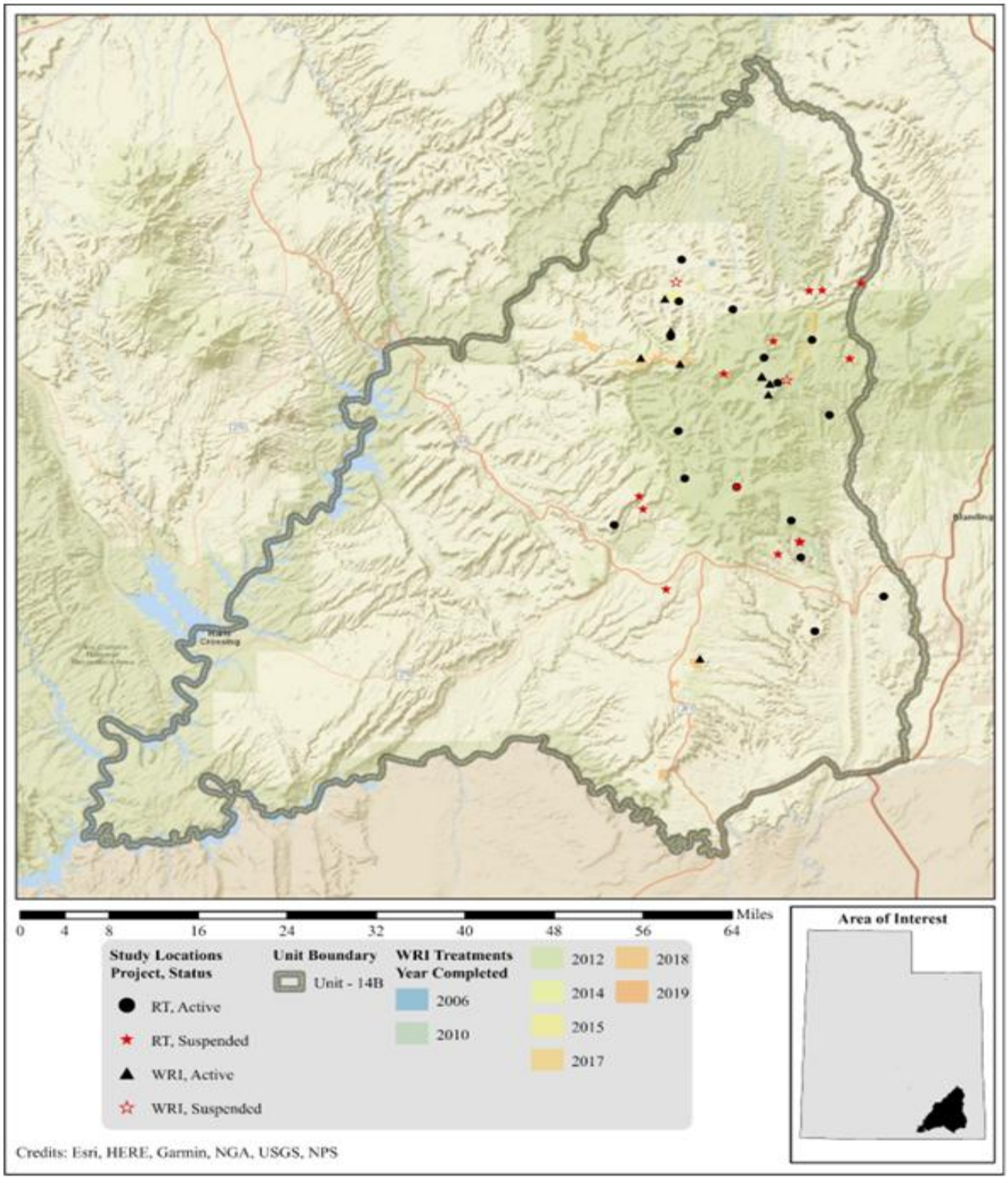
San Juan, Elk Ridge (14B)

There has been an active effort to address many of the limitations on this unit through the Watershed Restoration Initiative (WRI). A total of 9,612 acres of land have been treated within the Elk Ridge Management Unit since the WRI was implemented in 2004 (Map 2) Treatments frequently overlap one another bringing the net total of completed treatment acres to 9,153 for this unit (Table 3). Other treatments have occurred outside of the WRI through independent agencies and landowners, but the WRI comprises most of the work done on deer winter ranges throughout the state of Utah.

The most common management practice in this unit is vegetation removal by mastication (bullhog) to remove pinyon and juniper trees. Additional techniques to remove pinyon (Pinus spp.) and juniper (Juniperus spp.) often include lop and scatter treatments. Other management practices including (but not limited to) seeding species to augment the herbaceous understory and prescribed fire are all used across the unit (Table 3).

Table 3: WRI treatment action size (acres) for completed projects for WMU 14B, Elk Ridge. Data accessed on 02/25/2025.

Type	Total Completed Acreage
Bullhog	**5,991**
Full Size	5,400
Skid Steer	591
Seeding (Primary)	**1,336**
Drill (Rangeland)	699
Broadcast (Aerial-Fixed Wing)	636
Herbicide Application	**959**
Aerial (Fixed-Wing)	959
Vegetation Removal/Hand Crew	**537**
Lop & Scatter	533
Lop (No Scatter)	4
Prescribed Fire	**318**
Prescribed Fire	318
Forestry Practices	**270**
Thinning (Non-Commercial)	270
Seeding (Secondary/Shrub)	**184**
Broadcast (Aerial-Fixed Wing)	184
Planting/Transplanting	**17**
Other	17
Grand Total	**9,612**
***Net Total Land Area Treated**	**9,153**



Map 2: Terrestrial WRI treatments by fiscal year completed for WMU 14B, San Juan, Elk Ridge.

Table 4: Percent Ingesta Free Body Fat Comparisons of Captured Deer, 2014-2024.

Percent (%) Ingesta Free Body Fat (IFBF)											
Unit	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Dec-23	Dec-24
Box Elder						8.79	9.3	12.42			
Cache		11.02	9.59	13.65	10.32	13.71	12.13	12.88	10.44	14.4	12.4
Morgan							8.84	10.84		14.97	
Antelope Island						9.99					
North Slope					8.59						10.06
South Slope	11.31	9.46	9	9.56	7.24	9.9	8.52	12.18	8.65	11.02	9.11
Oquirrh-Stansbury	10.52	8.43	9.56	8.79	7.39	8.46	8.26	10.91	9.91	10.02	10.43
Chalk Creek/Kamas					7.19	11.02	10.75				
Wasatch-Manti		8.76	9.22	10.23	9.32	11.11	8.97	10.28	9.4	12.02	9.53
Wasatch East						11.51	12.26	10.78			
Wasatch-West											12.3
Southeast Manti			8.87			9.42	9.25	10.89	8.03		
Southwest Manti							7.3				
Nebo-Tintic								12.67	8.88	12.61	9.33
Book Cliffs				7.56	6.35	8.8	7.13	8.88		6.65	8.84
Range Creek									8.48	11.25	8.58
West Desert					6.33	8.04					
Monroe	8.1	8.98	8.23	9.53	6.5	10.37	8.56	11.28	8.4	12.23	8.59
Beaver						7.75	8.44	9.67			
Boulder						8.54	5.96			10.05	10.9
Kaiparowits							5.88				
Panguitch					8.76	8.64					
Pine Valley		7.42	6.68	6.54	6.91	6.86	6.77	7.71	7.25	8.92	6.89
Southwest Desert											7.28
Zion					8.48	9.04				7.21	8.36
La Sal						8.63		7.61	8.91	11.46	6.64
San Juan		9.35	9.25	7.6	7.77	9.5	8.11	8.79	7.97	9.22	7.36
Statewide	9.98	9.06	8.8	9.18	7.78	9.48	8.61	10.52	8.76	10.86	9.16
Statewide_7_Units	9.98	9.01	8.71	9.72	7.95	10.07	8.87	10.87	9.01	11.12	9.19

Unit Low

Unit High

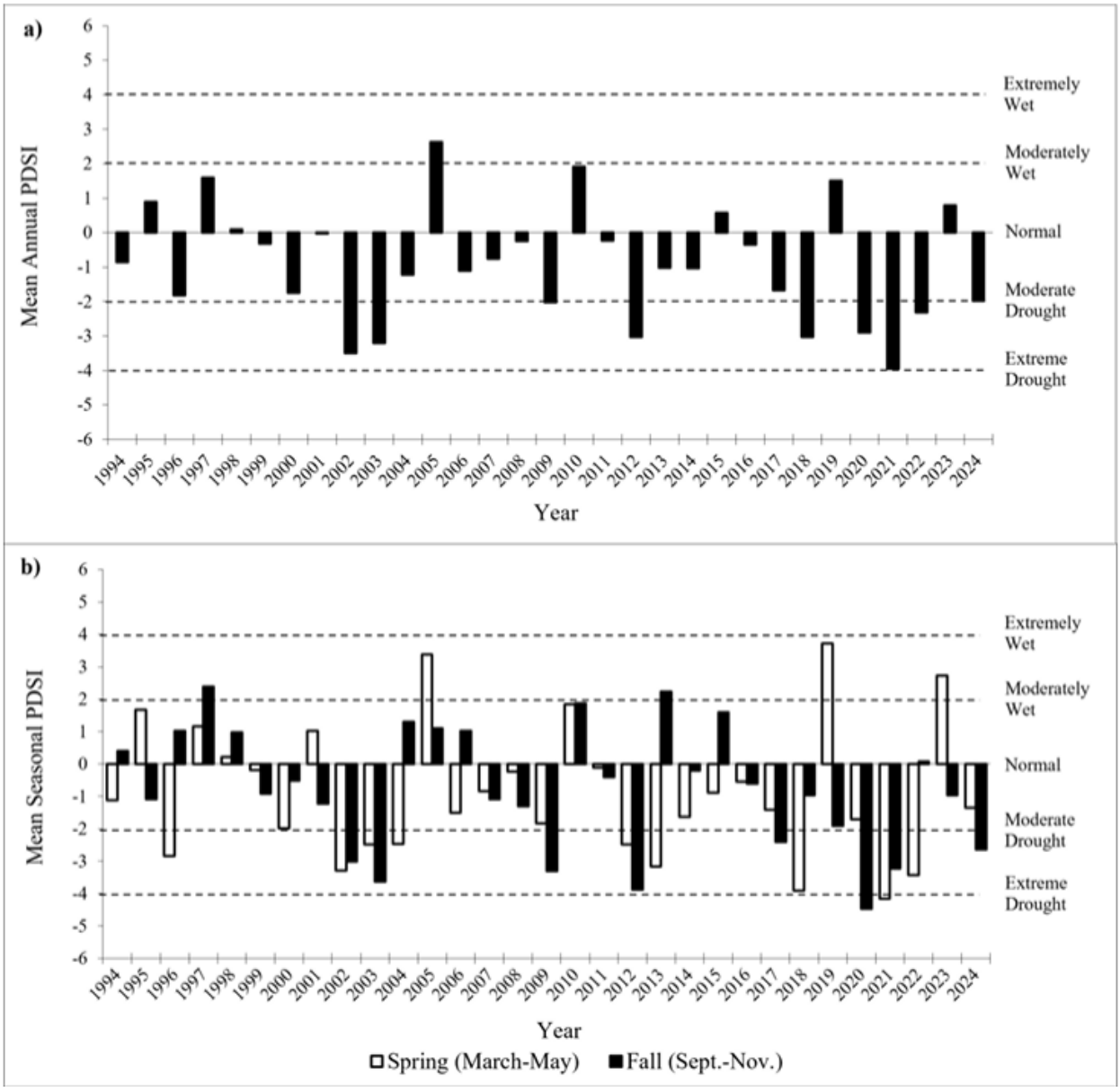


Figure 5. Drought Index, Southeast Utah. Top Graph Depicts the Entire Year, Bottom Graph Depicts Spring and Fall.

DURATION AND AUTHORITY OF PLAN

After approval by the Utah Wildlife Board this unit plan will be in effect for five years, or until amended. Unit deer plan goals, objectives and strategies are constrained within the sideboards set in the statewide deer plan, which supersedes unit plans. It is possible that changes to the statewide deer plan may affect unit plans. Additionally, changes to Utah State Code and/or Administrative Rules may also affect deer unit plans.