5/31/22

# BISON UNIT MANAGEMENT PLAN
# HENRY MOUNTAINS
# UNIT # 15

## PURPOSE OF THE PLAN

This document provides overall guidance and direction for managing the Henry Mountains (HM) bison herd. This plan offers general information on natural history, management, population status, habitat, and issues of concern for bison on this unit. This plan also outlines the goals, objectives, and strategies for managing the bison population and their habitat.

This unit bison management plan was revised by a 16 person advisory committee. The committee was diverse and had representation from the Utah Wildlife Board, Utah State University Eastern, Utah Department of Agriculture and Food, Sportsmen for Fish and Wildlife, Bureau of Land Management (BLM), Capitol Reef National Park (CRNP), Utah Farm Bureau, Bull Mountain Outfitters, Wayne County Commission, private landowners, livestock permittees, Utah School & Institutional Trust Lands (SITLA), and Utah Division of Wildlife Resources (DWR). This group met 9 times from August 19, 2019, to April 19, 2022.

## UNIT BOUNDARY DESCRIPTION

Garfield and Wayne counties—Boundary begins in Hanksville at the junction of SR-24 and SR-95; south on SR-95 to the west shoreline of Lake Powell; south along this shoreline to SR-276 at Bullfrog; north on SR-276 to the Burr Trail-Notom road; north on this road to the Glen Canyon National Recreation Area boundary west of the Bullfrog Creek drainage; northwest on this boundary to the Capitol Reef National Park boundary; north on this boundary to SR-24; east on SR-24 to SR-95 at Hanksville.

## BISON USE AREA DESCRIPTION

The area currently used by bison covers approximately 300,000 acres - from Blue Bench on the north to Eggnog on the south, to Coyote and Eagle Benches on the east, to the Notom-Burr Trail Road and CRNP boundary on the west, see Appendix, Map 1.

The elevation ranges from 4,800 feet to 11,500 feet above sea level. Annual precipitation averages 18 inches on the higher elevations and 8 inches on the lower foothills. The topography includes steep mountain slopes, benches and foothills, flat mesas, and deeply eroded canyons. The primary vegetative communities found in the area are salt desert shrub, pinyon-juniper, mountain brush, aspen-conifer, and subalpine. Bison can be found throughout the area, in all elevations, topographies, vegetative communities, and seasons.

## LAND OWNERSHIP

The following table shows land ownership of the area currently used by bison (Table 1). This area is included within the larger Wildlife Management Unit #15, which encompasses approximately 856,812 acres.

Table 1. Bison range area and approximate ownership

| Ownership | Area in Acres | % |
|---|---|---|
| BLM Total | 258,022 | 87 |
| SITLA Total | 33,793 | 11.4 |
| Private Total | 4,203 | 1.4 |
| Tribal Total | 0 | 0 |
| Grand Total | 296,108 | 100 |

## HENRY MOUNTAIN BISON HISTORY AND STATUS

Bison are culturally symbolic of the American frontier. In 1941, along with other conservation efforts through the turn of the century, local hunters and conservationists joined together to establish a bison herd in southeast Utah to restore and preserve bison for their intrinsic value and the benefit of future generations. The Carbon Emery Wildlife Federation (the local chapter of the National Wildlife Federation), the Federal Grazing Service, local stockmen, and the Utah Department of Fish and Game obtained 18 bison, including three bulls and 15 cows, from Yellowstone National Park. It has been heralded as one of the greatest joint efforts in wildlife conservation (Bingham, 1971).

The 18 bison were released near Robbers Roost Ranch north of the Dirty Devil River on the San Rafael Desert. Most of the animals established themselves near the release site, despite a few that dispersed north and west. Bulls accounted for most of the dispersing animals, and it was deemed necessary to supplement the original reintroduction with an additional five bulls the following year (Bates & Hersey, 2016).

Those additional five bulls joined the majority of the bison and crossed the Dirty Devil River in 1942 onto the Burr Desert. The bison used the Burr Desert as winter range and the HM as the summer range until 1962. There have been no other introductions into this herd.

Bison moved from the area of introduction on the San Rafael Desert to ranges across the Dirty Devil River and expanded into new ranges utilizing forage that had been available to cattle. This caused concerns about forage competition on some grazing allotments between affected grazers and the DWR and continues to this day. Numerous habitat projects have been completed to try to improve forage availability for both cattle and bison. The committee, in the development of this bison management plan, has worked to improve relations and help minimize these issues as much as possible.

The HM bison population grew to approximately 71 animals by 1962, when brucellosis was detected in the herd. Blood samples were taken during a special hunt that year, and several animals tested positive for *Brucella* titers, indicating possible infection in the herd (Bates, 1965). In 1963, 69 bison were captured in a corral and tested and inoculated for brucellosis. Animals suspected of brucellosis infection were marked, then released, and killed by sport hunters. A significant behavioral consequence of the harassment and the capture operation was that the bison changed their home range. Since 1963, the herd has utilized the HM area as its home range.

Total summer population estimates have ranged from 59 in 1964 to a high of 602 in 2008 and averaged 319. In 2010, the post-season adult population objective was increased from 275 to 305. It was increased again in 2012 to 325 in alignment with the 2007 HM bison plan. The modeled number of adult bison post-season since 2012 has averaged 314. In 2021 the modeled summer herd numbers were 411, and the adult post-season estimate was 295 (Table 2). More historical long-term population data and trends are included in Appendix A, Tables 1 and 2.

Table 2. The table references the yearly observed and modeled population with the number of permits and harvest from 2007 to 2020.

| | Modeled Summer Total Population | Aerial Observed Total Count* | Afield | Harvest | Modeled Post-Season Total Population Estimate | Modeled Post-Season Adult (1+) Pop. Estimate** |
|---|---|---|---|---|---|---|
| 2007 | 593 | 563 | 141 | 117 | 515 | 396 |
| 2008 | 577 | 540 | 165 | 133 | 416 | 334 |
| 2009 | 522 | 470 | 146 | 109 | 352 | 292 |
| 2010 | 427 | 345 | 48 | 38 | 346 | 296 |
| 2011 | 403 | 372 | 25 | 21 | 383 | 310 |
| 2012 | 504 | 471 | 117 | 91 | 391 | 329 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2013 | 464 | 425 | 98 | 62 | 382 | 321 |
| 2014 | 453 | 414 | 78 | 64 | 374 | 304 |
| 2015 | 447 | 413 | 55 | 43 | 386 | 317 |
| 2016 | 469 | 431 | 62 | 49 | 402 | 324 |
| 2017 | 569 | 461 | 86 | 63 | 413 | 325 |
| 2018 | 598 | 540 | 203 | 145 | 425 | 310 |
| 2019 | 464 | 393 | 127 | 83 | 353 | 316 |
| 2020 | 414 | No Flight*** | 46 | 38 | 361 | 303 |
| 2021 | 411 | 342 | 80 | 53 | 343 | 295 |

*Actual count, no sightability factor.
** Post-season estimate used for setting harvest permit numbers to meet management objectives.
***The 2020 flight survey was canceled due to COVID19- Utah Dept. of Public Safety flight restrictions.

Over the last ten years, the number of bulls per 100 cows has averaged 60 (Figure 1). The number of calves per 100 cows has averaged 31 over the same period. The extreme drought during the years of 2017-2018 appears to have affected calf production as the number of calves counted per 100 cows during the 2019 summer classification was only 14.

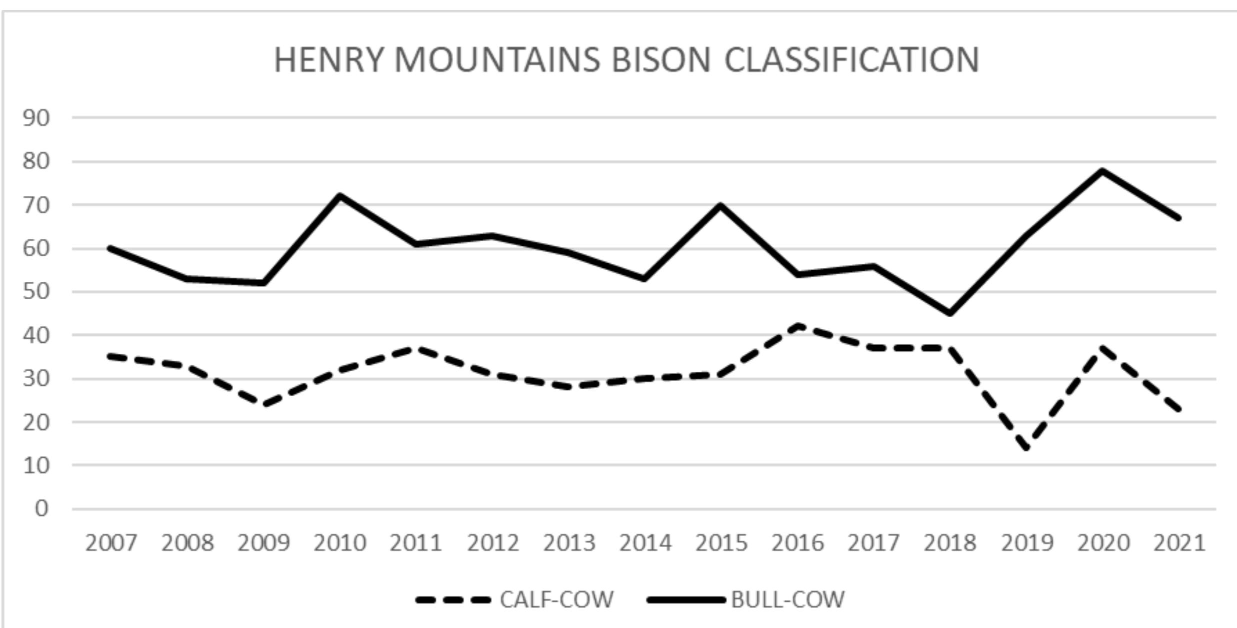



Figure 1. Bison classification 2007-2021.

**POPULATION MANAGEMENT**

Ongoing management continues to focus on conservation strategies to maintain a healthy and disease-free source of Yellowstone bison genetics and provide hunting and viewing opportunities. Management practices include extensive habitat management, summer herd composition surveys, annual helicopter surveys, sport harvest, and modeling population abundance. Pre-season (prior to the beginning of the bison hunts) population estimates of the herd, including calves, were done in the earlier years from the ground. However, since 1990, a helicopter has been used to survey the population to estimate the total numbers of adults and calves.

The model simulates a closed population where births and deaths are the only factors affecting population size. Since there is no migration into or out of the HM bison population, the model is a reliable fit to estimate abundance. A post-season (after the bison hunts end) adult (age 1+) population estimate is modeled annually using summer classification data, the number of animals harvested, and natural mortality.

Bison sex ratio data is gathered by counting at least one-half of the population and classifying the number of bulls, cows, and calves. Utah State University (USU) researchers estimated annual survival probability for adult HM bison at 0.982 (C.I. 0.966-0.998) from the historical cow-calf ratios and collar mortality data (Koons and duToit 2015), and from observed bull-cow ratios. This data is similar to Van Vuren and Bray (1986) survival estimates of calves averaging 94%, adult bulls 95%, and adult cows 96%.

USU also estimated the average sightability during the helicopter survey and found that the probability of detection was 95% due to the DWR observer's high collar detection. In comparison, DWR had previously estimated sightability between 90-93%. Hess (2002) developed aerial survey methods for Yellowstone National Park, where detection probability estimates were 92% during winter and 97% during summer (Terletzky and Koons 2016).

After the population is modeled, the estimate is compared to the number of animals counted during the summer helicopter survey. Under most circumstances, when the modeled adult population estimate is greater than the adult population estimate derived from the survey, the modeled estimate is used. Conversely, the survey numbers are used if the survey reveals a larger adult population than what is modeled. In the past 14 years, there have been three times when the survey showed the model underestimated the adult population. When this happened, survival was adjusted in the model to fit the observed numbers. Any underestimation or overestimation of modeled bison numbers may result in adjusting model inputs to fit observed numbers.

It is important to note that both the aerial survey and the model are used to estimate population abundance independently. In addition, the ratio of adults and calves from classification and the aerial survey are compared to establish a higher probability of calf production data to input into the model. This adaptive framework of utilizing different methods of collecting, analyzing, and modeling HM bison population data strengthens current bison management.

### Genetics

In 2014, researchers at USU, in collaboration with a team at Texas A&M, analyzed 129 individual HM bison genetic samples to assess overall genetic health. Researchers did not detect the introgression of domestic cattle DNA in either mitochondrial or nuclear genomes. Additionally, they found that the herd has a small number of genetic contributions from bison found on the National Bison Range, where 18 females are known to have been introduced into Yellowstone National Park before the HM translocation took place in 1941 (Ranglack *et al.*, 2015)(Figure 3).

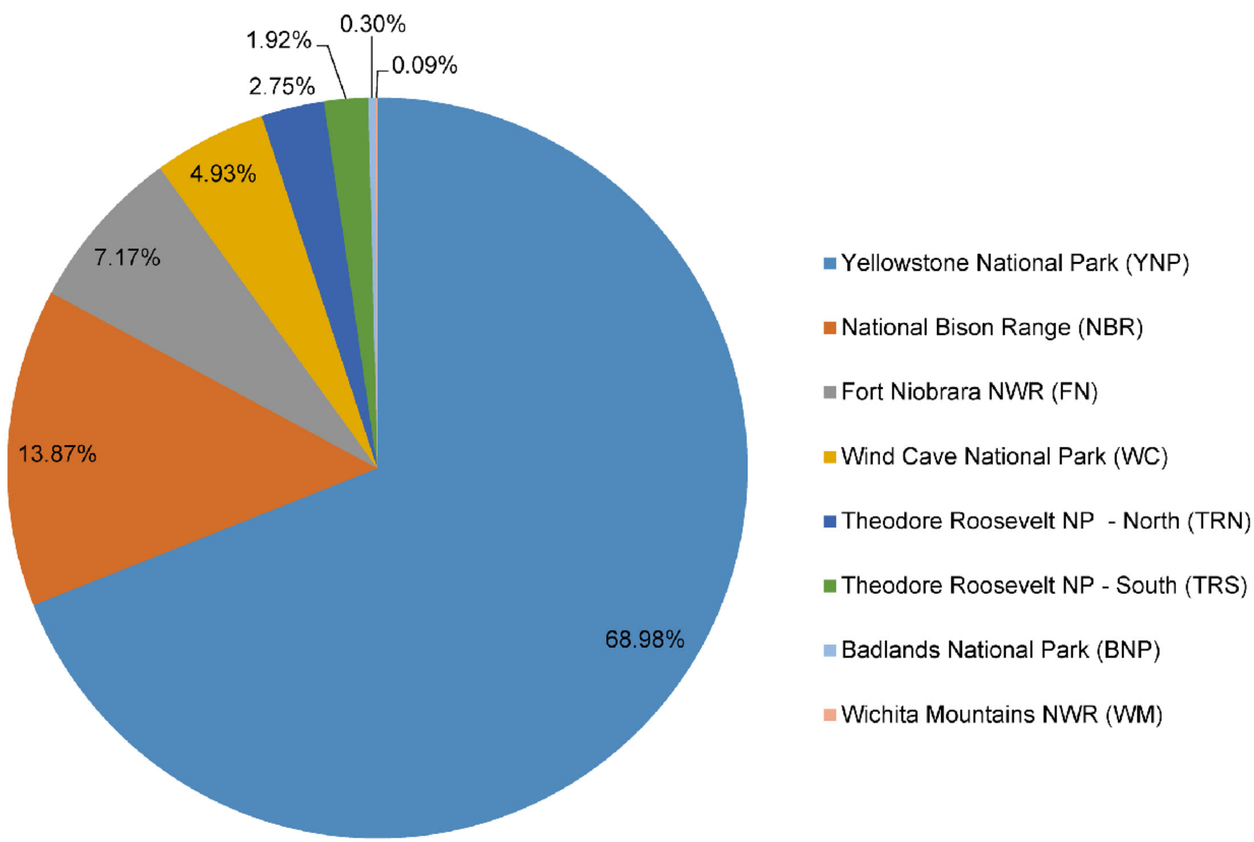



Figure 3. Genomic Contributions. Genomic contributions of 8 US federal bison herds to the Henry Mountains herd, in which 129 animals were sampled for 40 microsatellite loci. Herds were identified a priori for analysis. Contributions of <10% were considered insignificant (Ranglack *et.al.* 2015).

Since the early 1940s, a period >80 years, the HM bison herd has shared rangelands with cattle. This research reasonably confirms that it is highly unlikely for free-ranging bison to crossbreed with cattle naturally (Ranglack *et al.*, 2015).

The HM herd is the only demonstrated introgression-free, disease-free, and free-ranging bison population in North America (Ranglack *et al.*, 2015) and one of only four free-ranging, genetically pure herds remaining on public lands in North America. It is recognized as a key population in maintaining the bison genome. The others include Yellowstone National Park, Wind Cave National Park, and Elk Island in Alberta, Canada (Kunkel *et al.*, 2005).

To ensure the survival of the plains bison genome Kunkel *et al.* (2005) assessed management strategies for minimizing the potential negative effects of inbreeding, the goal being to maintain 90% of the genetic diversity of the gene pool over 500 years. They recommend that each population have at least 430 individuals, including adults and young, to maintain a minimum viable population.

Previous research has advised that individual herds should have an effective population size of 1000 (census number of 2000–3000) to avoid inbreeding depression and maintain genetic variation. If it is not possible to have this primary herd in one location, it could be in two or three locations with significant genetic exchange between them (Hedrick, 2009).

Herds should be maintained at an appropriate population size to minimize the loss of genetic variation and heterozygosity in the HM bison herd and maximize the probability of population survival (Gates *et al.*, 2010). For small herds, fluctuations in population size can have a substantial negative impact on retention of genetic variation (Nei *et al.*, 1975). Maintenance of population size is more important to population survival than the founder population size and should, therefore, be prioritized for small herds (Senner, 1980).

Recently, the U.S. Dept. of Interior (DOI) completed a collaborative genetic viability study of 16 bison herds residing on DOI administered lands and two others from Parks Canada. Two state-managed bison herds — the Utah Book Cliff and Henry Mountains herds — were included because most of their range is on lands administered by the Bureau of Land Management (BLM), and the BLM shares conservation stewardship of these herds. The metapopulation herds studied are geographically isolated and are managed at specific population numbers on range-limited landscapes.

Researchers analyzed the current genetic fitness of each population using Population Viability Analysis models then analyzed what each population would look like in 200 years under current management with and without translocations of new animals. They also analyzed different types of removals to manage population size and the removals' associated effects on long-term genetic viability. These studies indicate that smaller, non-migrating populations lose genetic diversity more quickly than larger populations. Additionally, species with shorter generation spans lose diversity faster than those with longer generation spans. Therefore, in managing population size, the removal of younger animals retains more genetic diversity long-term than removing adults (Hartway et al., 2020). This is important to managing and conserving the HM bison because harvest removals reduce genetic viability faster than without harvest. Removing prime breeding age females will slow population growth and reduce the required number of removals, but it will also reduce adequate population size and increase genetic loss by shortening generation time. It can also limit the herd's ability to recover from a severe decline or catastrophic event (Traylor-Holzer, 2017).

Showing that the HM bison herd has declining genetic viability, Traylor-Holzer modeled HM bison removals (Figure 4) to maintain the current population objective averaging about 90 animals annually which declined over time to about 55 annually by year 200 as a result of inbreeding consequences. Whereas if there were no inbreeding effects, removals would average 120/year with only a slightly higher birth rate suggesting significant effects of inbreeding in the model. Animal removals also continue to decline over time as inbreeding accumulates (Taylor-Holzer, 2017). This also translates into fewer annual harvest permits to be made available to future generations of hunters.

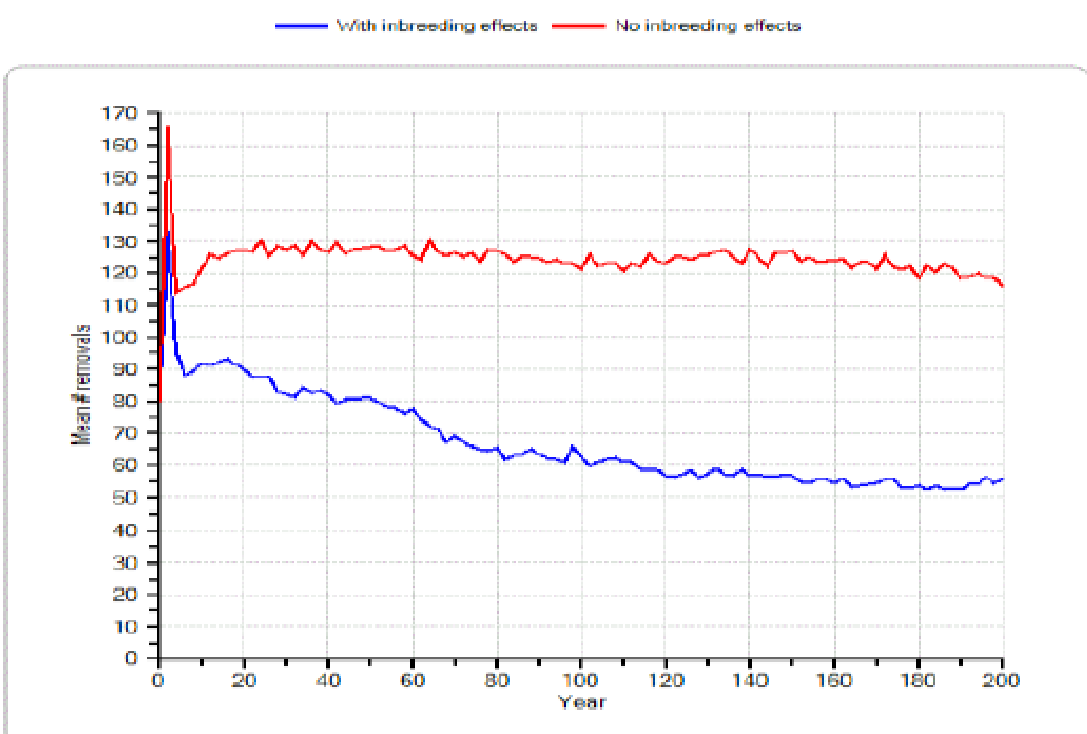



Figure 4. The projected mean number of removals over 200 years for Henry Mtns herd, with inbreeding (blue) and no inbreeding (red) impacts in the model.

Supplementing the HM population with younger bison from genetically best-matched conservation herds could potentially offset the impacts of low genetic diversity levels and the adult hunting management strategy used to control the size of the herd. Additional translocations would most likely be essential for the HM population because it is among the studied herds with the lowest levels of genetic diversity (Hartway et al. 2020).

The HM herd has significance because it was founded by bison from Yellowstone National Park. Therefore, it provides a source of disease-free genetics for future translocations to other conservation herds, sustaining and increasing genetic viability. Consequently, improving and maintaining genetic diversity in this population is a necessity for the future of bison conservation.

## Disease

Diseases of significant concern to bison in Utah are bovine brucellosis, bovine tuberculosis, and malignant catarrhal fever.

Brucellosis, caused by the bacterium *Brucella abortus*, causes abortions during the third trimester of pregnancy, and occasionally retained placenta, infertility, reduced milk production, lameness, swollen joints, and swollen testicles (Olsen et al., 2010, Schumaker *et al.*, 2012). Bacteria are shed with birth fluids, and other animals are infected through direct contact with the fluids (Olsen *et al.*, 2010). Some bison can become chronic carriers of the bacteria and shed it intermittently (Olsen *et al.*, 2010). In Utah, blood from hunter-harvested bison is tested annually for brucellosis (Table 3). There have been no reactors since 1963, and the HM bison herd is considered brucellosis free.

Table 3. HENRY MOUNTAINS BISON, BRUCELLOSIS TESTING

| **HUNTER HARVESTED BISON** | | | | | | **LIVE CAPTURED BISON** | |
|---|---|---|---|---|---|---|---|
| Year | # of kits sent out | # bison harvested | Harvest samples returned | Kit return (%)* | Hunter harvested bison, Brucella testing results | # live bison tested | Live bison, Brucella test results |
| 2014-15 | 70 | 62 | 48 | 77 | 39 Negative, 9 hemolyzed | 0 | NA |
| 2015-16 | 60 | 43 | 31 | 72 | 31 Negative | 0 | NA |
| 2016-17 | 58 | 49 | 37 | 76 | 33 negative, 4 hemolyzed | 0 | NA |
| 2017-18 | 57 | 60 | 46 | 77 | 46 Negative | 0 | NA |
| 2018-19 | 112 | 78 | 66 | 85 | 66 Negative | 32 | 32 Negative |
| 2019-20 | 129 | 84 | 50 | 60 | 50 Negative | 0 | NA |
| 2020-21 | 46 | 38 | 19 | 50 | 19 Negative | 7 | 7 Negative |

*Calculated as (# of kits submitted to lab/ # of bison harvested)*100

Bovine tuberculosis, caused by *Mycobacterium bovis*, is a chronic debilitating disease of cattle that can affect bison and many other species (Wobeser, 2009; Miller *et. al.*, 2013). No reactors were found among 12 yearlings tested before being translocated to Arizona from the HM in 2001.

Malignant catarrhal fever (MCF), caused by bovine herpesvirus type 2, is a severe viral disease affecting ranched bison (Berezowski *et al.*, 2005; Li *et al.*, 2006). It is most commonly transmitted from domestic sheep through body secretions, but wind-borne infections have been reported where bison contracted MCF from sheep grazed several kilometers away (Li *et al.*, 2008). Malignant catarrhal fever is highly fatal, with mortality rates reaching 100% on affected farms (Schultheiss *et al.*, 1998). Past operator conversion of BLM domestic sheep grazing permits to cattle on the HM has reduced the risk of MCF disease transmission to bison. There is one domestic sheep allotment on the HM unit, and domestic sheep have not been known to have grazed with bison. However, cattle are currently grazed on the allotment. No outbreaks of MCF have been documented in the HM bison to date.

A statewide brucellosis action plan is being developed to address a potential breakout of the disease in Utah. The action plan will be added to the appendix of this management plan upon completion.

**Limiting Factors**

Van Vuren (1983) investigated bison mortality factors on the HM and found survival to be high, with calves averaging 94%, adult bulls 95%, and adult cows 96%. The study did not determine specific causes of natural mortality, but the authors speculated the primary causes of natural mortality were predation of young, accidents, and old age. Wounding loss by hunters and poaching were identified as non-natural causes.

Bison will also share some dietary overlap with elk (*Cervus elaphus*). However, elk are managed at a population objective of zero elk on the HM to provide more forage for cattle and bison. The current number of elk is estimated to be between 20-30 elk. The effort to eliminate the elk population is managed through hunting. Dietary overlap of bison and mule deer (*Odocoileus hemionus*) is less but could conceivably occur on shared winter ranges, especially if heavy and severe winters rendered grass forage unavailable to bison. The balance between various wild ungulates populations will be determined through individual species management plans for the herd unit. These are reviewed and approved through the public Regional Advisory Council and Wildlife Board process and involve public input and discussion. Vegetation, watershed, and habitat monitoring will help form the basis for the future population objective recommendations.

Large mammalian predators in HM bison habitat include cougars (*Puma concolor*), coyotes, (*Canis latrans*), and bobcats (*Lynx rufus*). Although cougars and coyotes have been documented to kill bison in the literature, they are not considered a significant threat to HM bison herds, other than the potential of predation on the very young. Mexican gray wolf (*Canis lupus spp. baileyi*) immigration into southern Utah from New Mexico and Arizona is possible. However, it is not anticipated that wolves will ever become established on the HM.

Drought also plays a part in regulating population growth. Three of the driest years in recent memory resulted in the lowest calf production on the HM in 2001, 2003, and especially 2019. In 2001, there were 18 calves produced per 100 cows; 17 in 2003 and the lowest in 2019, at 14 compared to the long-term average of 36 calves per 100 cows (cows one-year old and above). (The most recent drought of 2020-21 resulted in 23 calves per 100 cows in 2021). Reduced forage quality and yield may result in absorption of the fetus, low calf birth weight, and poor milk production, ultimately leading to lower calf survival. These conditions result in fewer calves being born or surviving, slowing population growth until habitat conditions improve.

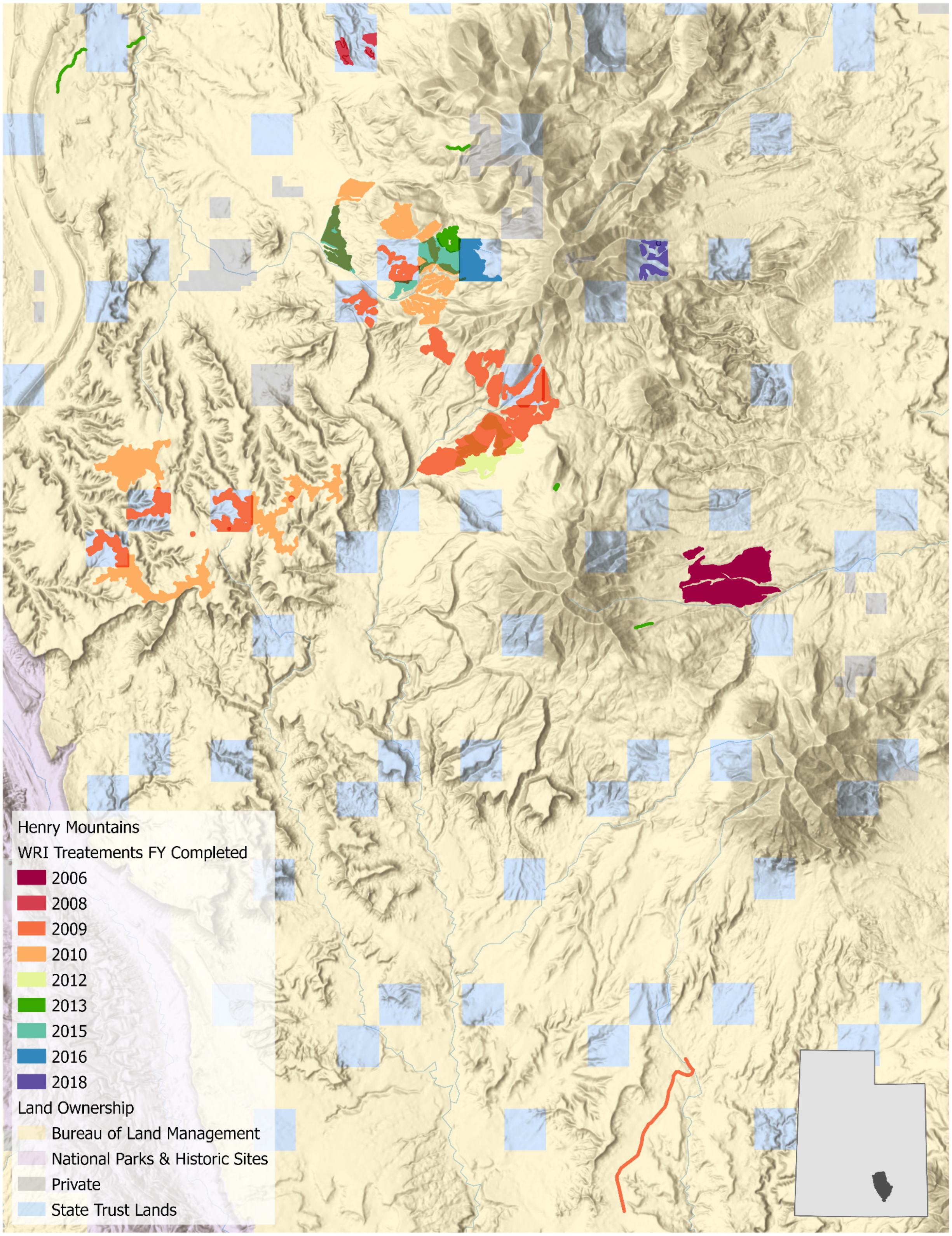
## HABITAT

The HM bison are very adaptable, wide-ranging, and utilize a wide variety of habitat types. The herd uses grassland flats at just over 5000 feet in elevation, pinyon-juniper woodlands, and chainings from about 6000 feet to over 8000 feet. They also graze on grasses where woodlands once dominated from previous burns, as well as sub-alpine meadows at over 11,000 feet on Mount Ellen and Pennell. At times they prefer the shade of Douglas fir stands on the east side of Pennell during the summer, but they can also be found at the lower elevations on the stark Indian-ricegrass/globemallow flats during the hottest days of the year.

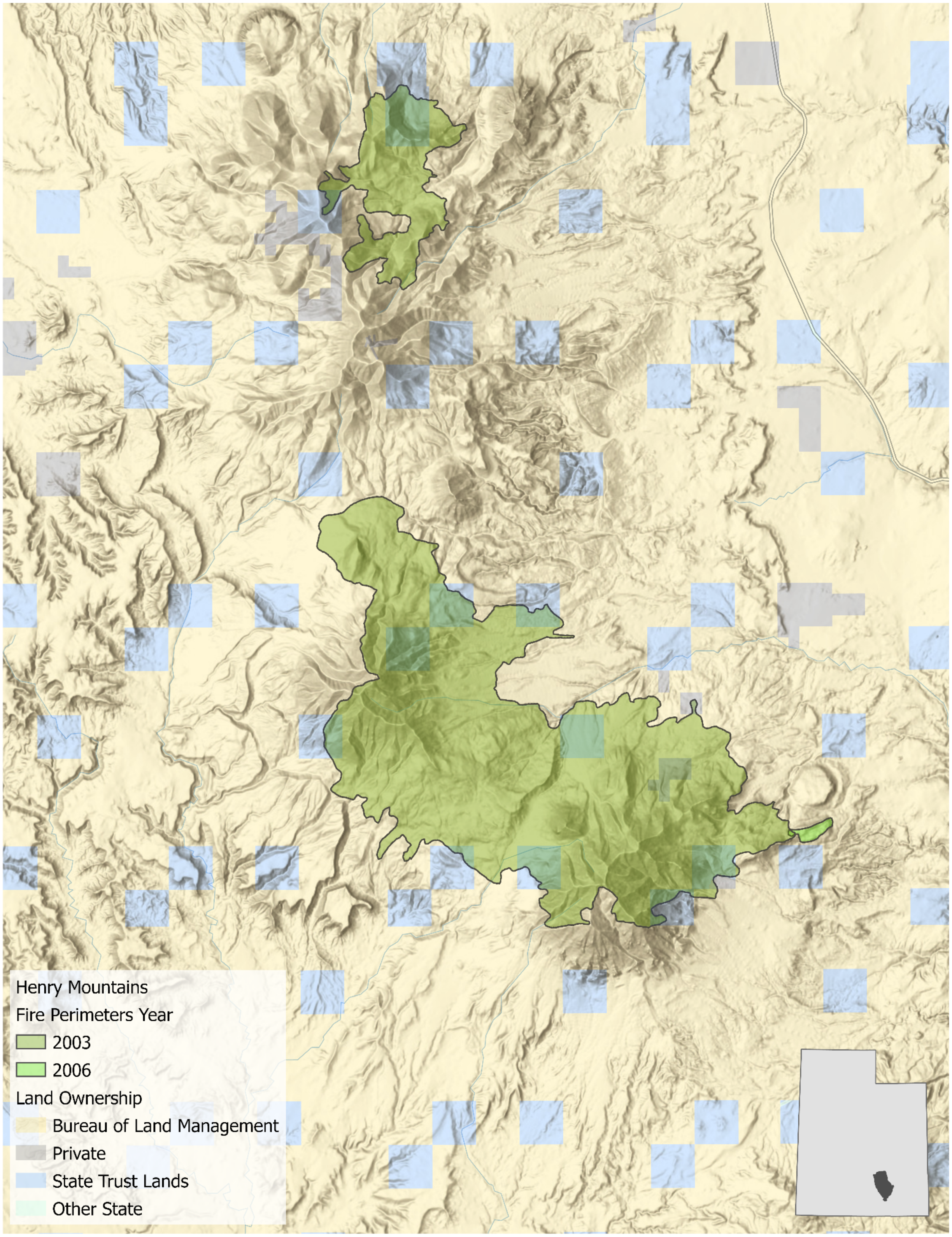
In 2015, USU researchers described bison using a diversity of habitats throughout the year, and grazing effects were widely distributed. Patches of grassland were favored over other habitats, whether naturally occurring or from mechanical treatments, regardless of patch distance from water (Ranglack and duToit, 2015). Burned areas were found to contain higher-quality forage than mechanically treated areas from testing fecal nitrogen concentrations. As a result, bison preferred chained or burned habitat types that produce grasslands, suggesting that continued habitat manipulations, especially burning stands of pinyon-juniper, increased grasslands forage, further distributing grazing effects from bison and cattle (Ranglack and du Toit, 2015a).

Utah State researchers also proposed that fire be used to manipulate HM habitat to attract bison to certain foraging areas and away from others where possible. This offers the potential to minimize conflict in some areas between bison and other interests such as cattle grazing, which is spatially more constrained by proximity to water. (Ranglack and du Toit, 2015a).

Habitat management practices on the HM have included vegetative treatments and water developments. The DWR, BLM, and SITLA have partnered to create suitable bison habitat on the HM. Numerous habitat improvement projects have been completed that increase forage quantity and quality for both bison and cattle. Efforts include rangeland prescribed burns, mechanical treatments, and reseedings (Map 1). Over 40,000 acres have been treated on the HM since 1965, greatly enhancing habitat. The Watershed Restoration Initiative (WRI) has funded projects covering over 8,200 acres. Also, two wildfires occurred in 2003, encompassing over 34,000 acres, most of which were reseeded (Map 2). The work dramatically increased the quality of habitat on the HM for livestock, bison, and mule deer. Conservation organizations, such as Sportsmen for Fish and Wildlife, and the Mule Deer Foundation, are active in negotiating, funding, and participating in habitat enhancement projects. The DWR is committed to promoting these types of efforts and working with other interested parties to increase the value of HM rangelands for the betterment of the wildlife that lives there and, in extension, the agricultural producers that share these public rangelands.




Map 1. WRI treatments by fiscal year completed for WMU 15, Henry Mountains.




Map 2: Land coverage of fires by year from 2000-2019 for WMU 15, Henry Mountains (Geosciences and Environmental Change Science Center (GECSC) Outgoing Datasets, 2020).

Vegetation trends are dependent upon annual and seasonal precipitation patterns. The Palmer Drought Severity Index South Central and Southeast division display periods of drought and wet conditions (Figure 2). Range Trend studies have been sampled within the WMU 15 regularly since 1987, with studies being added or suspended as deemed necessary (Range Trend, 2019). These studies are sampled on a five-year rotation with data last being collected on the WMU 15 in 2019.

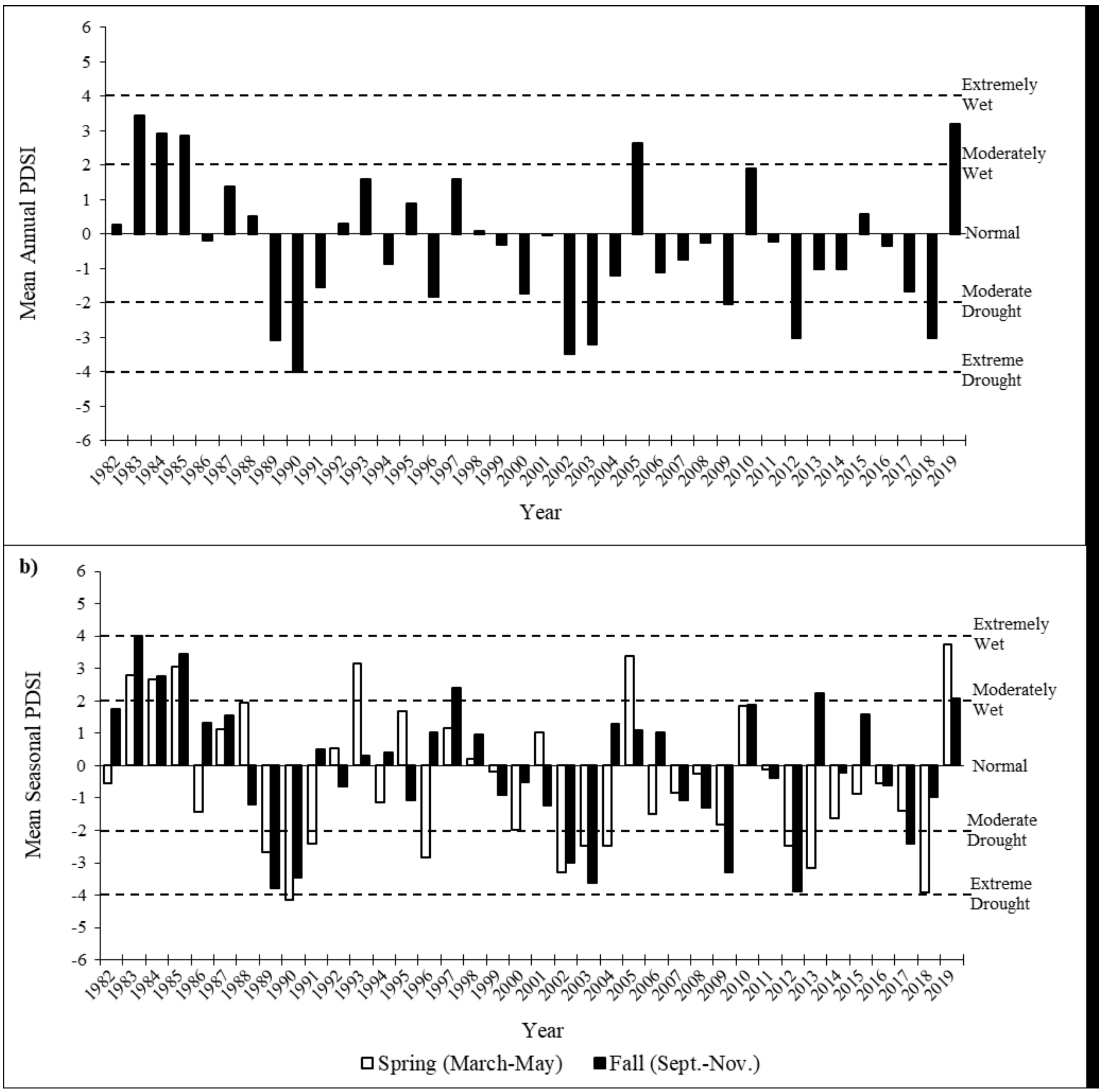



Figure 2: The 1982-2019 Palmer Drought Severity Index (PDSI) for the Southeast Division (Division 7). The PDSI is based on climate data gathered from 1895 to 2019. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is >4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly

Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and <-4.0 = Extreme Drought. a) Mean annual PDSI. b) Mean spring (March-May) and fall (Sept.-Nov.) (Time Series Data, 2020).

Since 2004, the condition of the sites across the unit has varied. But overall, the condition has been stable or has improved when considering all cover types. However, there are low potential sites where production is low on the lower elevations. These sites have the potential of being impacted through reduced diversity of desirable grass and forb species. The herbaceous understory on these sites is mostly comprised of annual forbs and grasses. Efforts to restore native plants should be made whenever possible. Native and introduced perennial grasses have decreased over some sites. The shrub component remains high. However, invasive cheatgrass puts these sites at risk for altering fire regimes. If ecological integrity becomes threatened, invasive plant species should be reduced at these sites.

The aspen community is considered crucial habitat for bison. The herbaceous understory on these sites is rich and abundant and primarily composed of native species, with perennial grasses and forbs dominating. Overall cover has increased since 1999, but frequency shows a decreasing trend. Most summer range and upper winter/transition ranges on the unit remain stable or are improving.

Habitat treatment projects on the Henry Mountains will be done to the extent possible on watershed scales across all land ownership types. Projects will be planned using the best management practices, available research, and techniques for site-specific treatments to restore habitats to more productive landscapes. All projects will follow appropriate NEPA requirements and will be proposed through the Utah Partners for Conservation Development and Utah Watershed Restoration Initiative. Other funding partners will be approached as projects develop.

**Forage Competition**

There is considerable overlap in the diet of bison and domestic cattle. Van Vuren and Bray (1983) calculated approximately a 91% dietary overlap between bison and cattle on the HM, and Nelson (1965) found that grasses and sedges comprised the majority of the bison diet from rumen samples. However, shrubs and forbs were also found, with snowberry being the most common shrub detected in the diet from higher elevations. Van Vuren (1979) reported that both bison and cattle on the HM were primarily grazers, but the bison diet consisted of 5% browse. Comparatively, cattle were more likely to use forbs than bison. Harper *et al.* (2000) reported that bison are very efficient at digesting low protein, high fiber diets.

Like other wildlife, bison range free, and unlike livestock, bison are not tied to allotment boundaries or seasons of use. Therefore, bison forage across the landscape through all seasons and utilize forage in areas where cattle graze and where they do not graze. From past BLM decisions, agreements, AUM purchases, relinquishments, and allocations, there are enough paper AUMs for bison on the HM unit. Although HM bison have enough paper AUMs in total, the AUMs are not in all places they forage or for every season of use. Methods for determining the number of livestock or wildlife on a given landscape are determined by the appropriate management authority and their respective processes and governing rules and regulations.

Bison behavior may also provide a degree of spatial separation in ranges used in conjunction with cattle. Nelson (1965) found bison behavior helps limit their direct impact on domestic livestock. First, Nelson found that bison seldom remained in an area longer than three consecutive days during the summer growing season resulting in greater distribution and more uniform utilization of foraging areas. While they did exhibit preferred areas during various seasons, bison were “almost constantly on the move and do not remain in an area until the plants are completely utilized,” as domestic cattle are known to do. On traditional winter ranges, bison were noted to be more sedentary. Second, he reported that free-ranging bison did not remain at water sources for extended periods and appeared to have lower water needs than domestic cattle. He noted that bison would water then move off — “…and little time was spent at watering holes.” Finally, Nelson also noted that while bison spent most of their time foraging in less steep areas, they did utilize rougher and more broken country than cattle. Regardless, any excessive grazing behavior from either bison or cattle may be detrimental to perennial grasses in desert ecosystems, such as galleta grass or Indian ricegrass, that are not capable of withstanding such pressure.

Van Vuren (1979, 2001) observed similar habits on Mount Ellen and a relatively low spatial overlap of 29%. When comparing habitat use by bison and cattle, he found that over 56% of all summer observations of feeding bison were over 10,000 feet, compared to 10 percent of feeding cattle. Both cattle and bison used relatively level areas to graze, but cattle did more so than bison. For example, 65% of bison observations exceeded 21 degrees slope, compared to only 32% of cattle observations. Bison also fed a greater horizontal distance from water than cattle, and cattle grazed in greater numbers in water proximity than bison. This natural distribution lessens forage competition between bison and cattle.

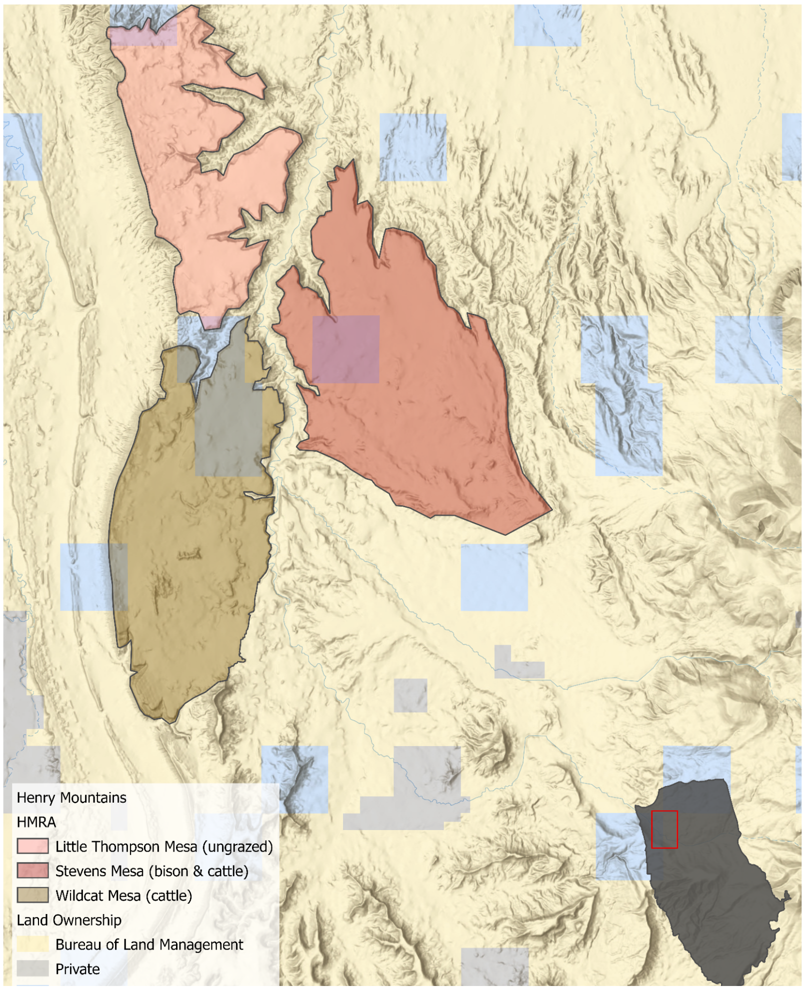
Van Vuren (1979) noted that “bison in the Henry Mountains frequently moved from area to area, a characteristic documented by Nelson 1965. Such movement generally resulted in better distribution of grazing pressure, but not always. For example, a particular site was used sequentially by a number of bison groups on several occasions. No group remained longer than a day or two, but the overall effect on the site was a week or more of continual bison use. Bison rarely remained at one site for extended periods, but the impact may have been significant when this happened. One group of as many as 135 bison spent two weeks on Granite Saddle before dispersing."

Ranglack and du Toit noted that bison on the HM are free to explore and utilize the best resource patches fully across the HM range. Considering that bison can forage more widely and range farther from water on shared rangelands, researchers pointed out that bison can serve as a reliable ecological indicator of rangeland conditions. (Ranglack, 2015b)

Through the fall of 2011 and 2012 (USU), researchers collected forage utilization data from exclosures set up for the study on Stevens Mesa, Apple Brush Flat, and Pete Steele Bench portions of the Steele Butte allotment. They set out to quantify the relative impacts of shared forage resources utilized by bison, cattle, and lagomorphs. The Steele Butte allotment was chosen due to concerns of bison foraging on cattle winter range during the summer and fall seasons. Data show that at the present population density, bison cause only modest reductions in forage availability for cattle and that cattle faced more significant forage challenges from lagomorphs than from bison in the study area (Ranglack et al., 2015). These results align with a concurrent study done by other USU researchers (Ware et al. 2014), as discussed below in the following paragraph. The grazing effects of small herbivores are often underestimated but must be accounted for as a potential driver of grassland structure and diversity (Rebollo et al., 2013). Bison and cattle segregate spatially on shared rangelands because bison range widely across the landscape, whereas cattle are central foragers, usually focusing their grazing around water sources (Van Vuren 2001; Allred et al. 2011). Therefore, researchers stated that the purported negative impacts of bison on cattle might be overstated (Ranglack et al., 2015).

In 2010-2012, Ware, Terletzky & Adler (2014) studied the effects of bison and cattle grazing on the Henry Mountains, specifically looking at suspected range degradation caused by bison. The research focused on comparing similar ecological sites on three adjacent mesas: on the Steele Butte cattle allotment; Stevens Mesa grazed by both cattle and bison; Wildcat Mesa, grazed almost solely by cattle; and Thompson Mesa, where only limited grazing by cattle occurred historically (Map 3). The study results suggested that bison grazing had not caused a significant change in plant productivity or plant community composition on the cattle winter range (Ware et al., 2014).

Ware (2014) stated that "bison and cattle movements and aggregations across the landscape can also influence changes in community composition. Although bison and cattle diets are similar, their spatial-temporal use of the landscape varies greatly. Cattle tend to concentrate in areas where water and shade are available, whereas bison are restricted less by these factors (Plumb & Dodd, 1993; VanVuren 2001; Ware et al., 2014). The behavior that bison exhibit naturally extends grazing beyond that of cattle, and maintaining spatial-temporal variation within native rangelands is believed to increase heterogeneity fundamental to grazing landscapes (Fuhlendorf & Engle, 2001; Ware et al., 2014)."




Map 3. Henry Mountain Resource Area with detail of the three adjacent mesas studied in the Ware, Terletzky & Adler research looking at plant community composition.

After the completion of the range ecology research by Ranglack and duToit (2015), we have a better understanding of bison habitat use on the HM to combine with the results of an experimental grazing exclosure study (Ranglack et al., 2015) and a concurrent study of plant community composition on the HM rangeland (Ware et al. 2014), which both discounted bison–cattle competition at the patch scale. Ranglack and du Toit (2015) stated, "Our findings at the habitat scale add to those of van Vuren (2001), who found during 1977–1978 that bison and cattle spatial distributions showed relatively little overlap (29%) because bison used steeper slopes and higher elevations than cattle, which remained close to water sources. With the comparatively small bison population on the HM rangeland (<10% of cattle numbers), concerns of their overusing habitats needed for cattle could be resolved by creating more grazing habitats—by chaining or preferably burning pinyon–juniper woodland—remote from watering points (Ranglack & du Toit, 2015a). Our findings should provide guidance for future bison management and hopefully ease tensions between the local ranching community and the state and federal government agencies regarding the commingling of bison with cattle (Ranglack & du Toit, 2015c)."

An example of spatial overlap that causes conflict between bison and cattle is on the Bullfrog BLM winter allotment. The allotment is within the southwest portion of the bison range, where bison migrate for winter. Bison overlap habitat with cattle on the northern half of the allotment during late fall, winter, and early spring. This area seems to be affected more by drought and lower precipitation than other areas in bison habitat. However, bison return each year and can find forage to survive through the winter, primarily in areas where there is spatial separation. This occurs because of the distances they can travel through rugged terrain and their ability to find grasses beyond where cattle will go to find feed. Many of these areas are outside the Bullfrog allotment boundary on the adjoining mesas. The forage conflict mainly arises in the spring during greenup when bison and cattle feed on Bullfrog and Mud Benches. The DWR is working with the BLM on their Indian Springs Benches habitat project on the South side of Mount Hillers. These two large benches are 1000 feet higher in elevation than Bullfrog Benches and are dominated by pinyon-juniper habitat. The trees will be mechanically removed and the benches will be seeded with grasses and forbes. This project will open enough area to graze about the same number of cattle that overlap with bison on the northern half of the Bullfrog allotment discussed above.

Spatial separation on the bison winter range occurs on Cave Flat and Swap Mesa and is in part a result of a BLM winter range road closure of the Cave Flat Road on Cave Flat. These areas become a place of refuge for most of the bison moving from hunting pressure and vehicular traffic on the mountain. Cattle are seldom if ever grazed on these mesas because of access issues and complex terrain. The road closure reduces hunting pressure so that bison are not pushed off Cave Flat and also Swap Mesa and onto adjoining allotments in greater numbers and time utilizing forage needed for cattle. Management access to Cave Flat and Swap Mesa by foot and horse protects habitat so that the wintering bison herd will have enough forage to help hold the herd on the mesas. Any attempt to establish a road onto Swap Mesa accessible to vehicles through CRNP would be imprudent. This management is crucial as it helps to protect surrounding allotments from increased numbers of bison leaving the mesas and utilizing forage that would otherwise be available to cattle.

Should future grazing and forage competition issues arise, the DWR will cooperate to resolve conflicts. Continued rangeland work will help address many of the issues that arise. The DWR has been a significant participant on cooperative range and habitat improvement projects. The DWR will participate within the framework and intent of applicable laws to pursue resolution of any chronic conflicts through all available means.

## Agricultural Depredation

There has been only limited impacts by bison to agriculture on the HM. Agricultural fields that are irrigated and harvested are limited. Harvested crops are alfalfa or grass hay, which are both cut and baled or left standing as livestock pasture forage. Elk and deer depredation occur in these areas, and complaints are addressed through stack-yard fencing, payments for damages, or mitigation-type hunting opportunities. HM bison have been known to have used cultivated agricultural lands only three times in the past 34 years. Two of the events were during periods of drought. A technician was hired to herd bison from the fields, and the landowner was compensated for damages.

The current HM Limited Entry Landowner Association (LOA) addresses wildlife use of cultivated fields by providing funds from selling limited entry mule deer permits. Monetary damages by wildlife above and beyond the amount received through the LOA proceeds will be addressed by the DWR. Visits by bison to cultivated fields have generally not been of such impact or duration to elicit heavy complaints. If agricultural depredations develop, they will be addressed promptly under the Utah State Code, DWR policy, and established guidelines.

## RECREATION

Outdoor recreational activities have increased dramatically over the past two decades. Types of human-related recreation in bison habitat include backcountry travel, mountain biking, ATV and motorcycle use, horseback riding, antler gathering, camping, backpacking, hiking, trail or long-distance races, hunting of big game, cougar and bear, and others. Another popular activity has been outdoor educational schools that take large youth groups into the backcountry to learn survival and leadership skills.

Part of the mission of the DWR is to manage protected wildlife for its intrinsic, scientific, educational, and recreational values. Bison management certainly benefits from many recreational activities. Broad-based public support is realized when individuals or groups have the opportunity to observe or photograph bison in a wild setting. Funding for management is derived from the sale of hunting equipment, licenses, and Once-In-A-Lifetime permits and through the conservation permit program. DWR issues conservation permits to conservation groups who sell the permits to the highest bidder in the conservation permit program. These funds are used to enhance habitat or fund special projects, such as transplants or research. Bison population size is controlled through hunting which is an integral part of protecting fragile range resources.

However, outdoor recreational activities can have an impact on bison. Free-roaming bison are susceptible to disturbance from human activities. Nelson (1965) reported that bison would flee from an area after coming in contact with humans. During the summer of 2003, public access to Mount Ellen and Pennell was closed due to the Lonesome Beaver and Bulldog fires. Also, no livestock were on Mount Ellen and heavier than normal summer precipitation resulted in higher than normal forage production. That year, bison use was limited almost entirely to Mount Ellen. The majority of the herd was observed feeding in open meadows, but still, bison would move to timbered areas when fire trucks or other official vehicles would traverse the area. Almost all the bison killed by hunters that year were taken on Mount Ellen. Interestingly, cattle were allowed back on Mount Ellen the following year to protect newly planted forage in the burn areas, and the roads were again open to public travel. Bison use declined on Mount Ellen that same year, and in 2005, almost all the bison had moved south to Mount Pennell. That trend reversed somewhat in 2006. Bison continued to use burned areas extensively, but almost half of the herd (169 of 381 observed) were found on Mount Ellen.

Another example of disturbance resulted from an early fall season archery hunt (2017-2020). The archery hunt allowed hunters to harvest bison before the herds moved to less accessible wintering areas, which they normally do during the November/December hunts. This management strategy failed because there was an increase in vehicles traversing roads to find bison to hunt, which pushed herds from accessible fall season habitat into the safer wintering areas.

Of particular concern may be the constant use of water springs by campers or hunters. This activity may preclude use by bison, other wildlife, and livestock. Recreational use of bison habitat can be compatible, but precautions should be taken to direct human use to areas where the public can have the possibility of viewing bison without negative impacts. Properly planned recreational use has the potential to benefit local economies and assist the DWR in meeting its mission.

**Use and Demand**

Bison population numbers on this unit are managed by sport harvest. This once-in-a-lifetime permit provides a unique opportunity for hunters to take a bison in a truly wild situation. Hunting permits are set to maintain the population at or below the current population objective and sex ratio in a combination of hunter choice or cow-only permits. The first bison hunt on the HM was held in 1950 when ten permits were issued, and hunters harvested six bulls and four cows. Hunting resumed in 1960, and permits have been issued every year since, except for 1965, 1972, and 1973. Due to difficulties in sex determination, the permit was officially designated as Hunters Choice in 1974. The first cow-only permits were issued in 1988, and an orientation course is offered each year to teach permit holders how to distinguish cows from bulls properly. Non-resident permits, based on 10% of total permits, were first presented in 1978. Conservation permits, sold at an auction to the highest bidder or by conservation groups at annual banquets, were first offered in 1982.

Since the first hunt in 1950 through 2020, there have been over 3200 bison hunters afield. Hunter choice permits had ranged from 9 in 1975 to 110 in 2018. There have been 1252 cow-only hunters afield. Permit numbers have ranged from 0 in 1992, 1993, and 1996 to 206 in 2018. Hunters have harvested over 2600 bison since 1950, comprising approximately 1400 bulls and 1200 cows. Since 2000, annual harvest has varied from 21 in 2011 to 145 in 2018 and has averaged 67 bison. Overall, hunter success has been about 83%. Figures 5 and 6 show total harvest and specific bull and cow harvest respectively from 2007 through 2021.

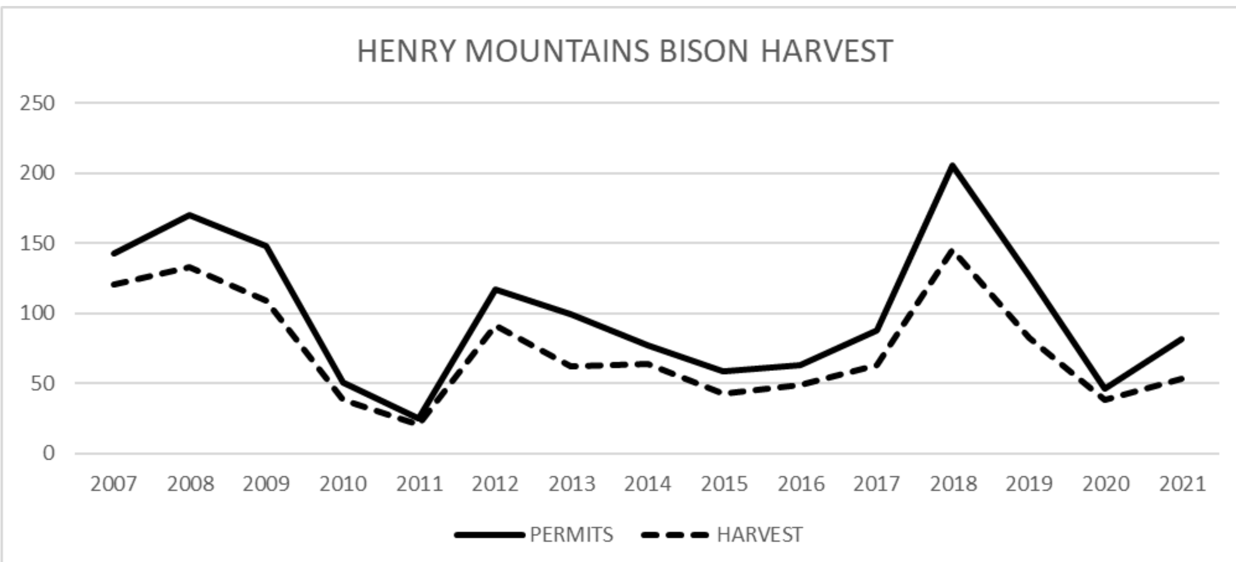



Figure 5. Henry Mountain total bison harvest 2007-2021.

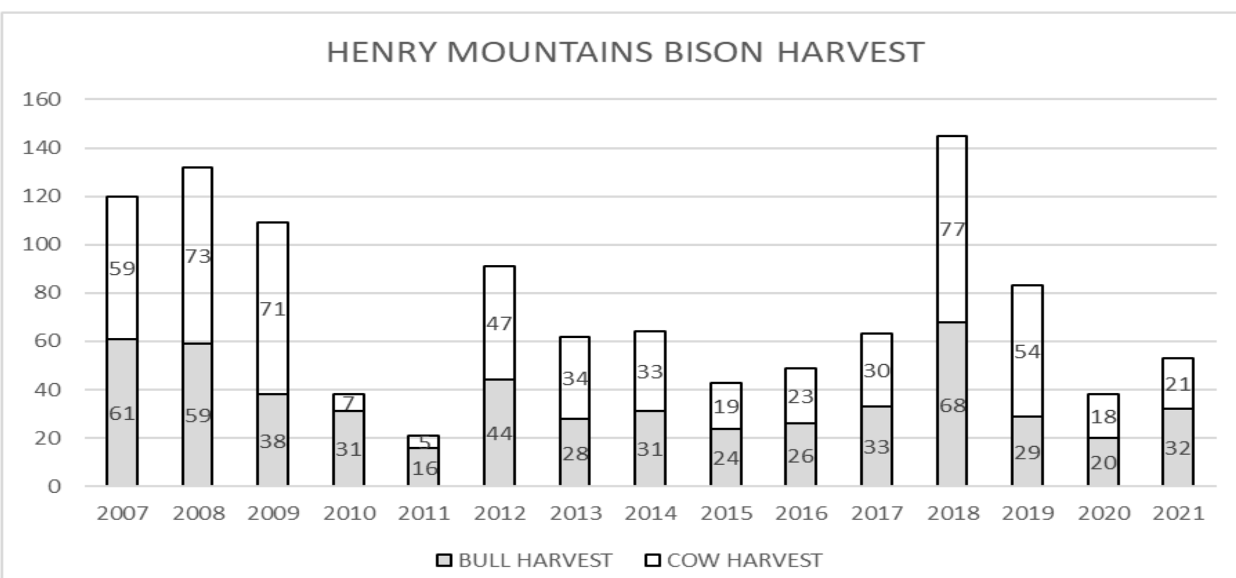



Figure 6. Henry Mountains bull and cow harvest 2007-2021.

Demand for these unique permits has steadily increased over the past 15 years (Figure 7). Resident applicants increased from 4336 in 2005 to 7876 in 2021. Nonresident applicants had increased even greater from 601 in 2005 to 4242 in 2021. In the last 10 years, odds of obtaining a permit has averaged about 100 to 1 for residents and 400 to 1 for nonresidents.

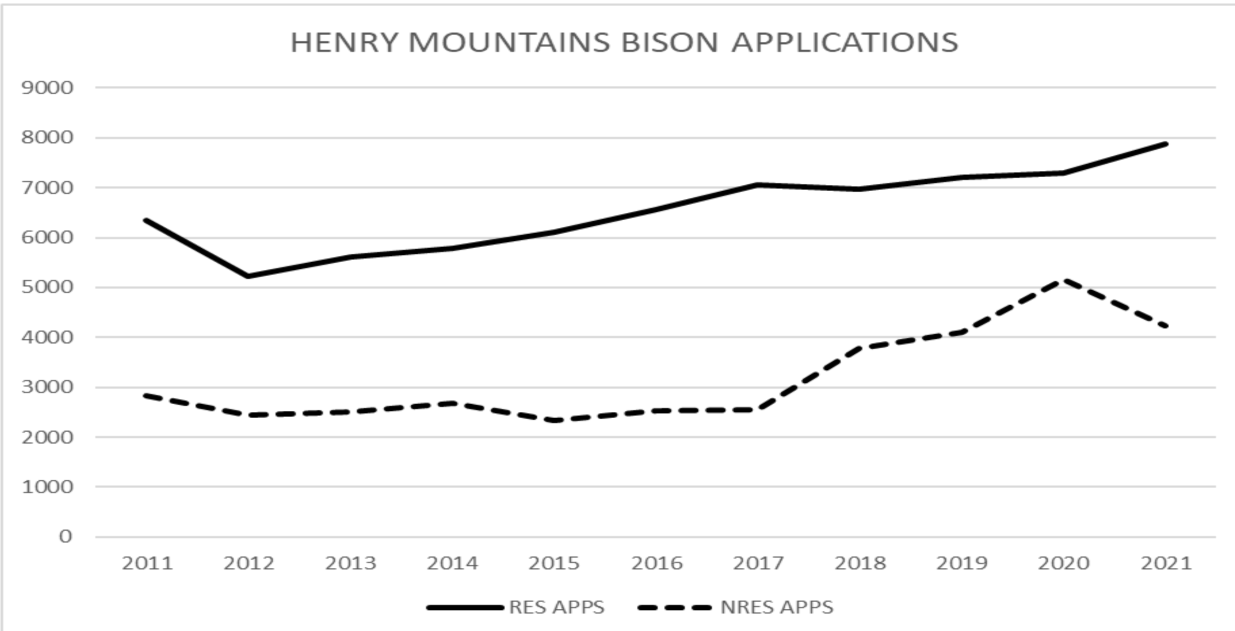



Figure 7. Henry Mountains bison permit applications 2011-2021.

## UNIT MANAGEMENT GOALS

Maintain the Henry Mountains bison herd as a genetically viable free-roaming conservation population balanced with available forage resources and long-term habitat capacity.

Manage the bison population by providing diverse recreational opportunities, including hunting and viewing.

Balance bison herd goals and objectives with impacts on human needs such as livestock grazing, private property rights, and local economies.

## POPULATION MANAGEMENT OBJECTIVES AND STRATEGIES

*Objective 1: Maintain a post-hunt population size of 325 adult (age 1+) bison within the Henry Mountains Wildlife Management Unit. With an average annual production of approximately 80 calves, the total postseason population would be 405 bison.*

Strategies:

1. Conduct helicopter surveys to determine population size. Use a sightability range between 85% and 95% determined by survey and range conditions and bison distribution to estimate the total pre-season population. The count can be compared with the modeled expectations to help determine sightability. Prepare a pre-survey description of modeled numbers, expectations, costs, contributors, range conditions, etc., followed by a post-flight summary via email.
2. Evaluate new technology as it evolves for application in aerial surveys to improve survey accuracy and efficiency.
3. Conduct annual summer classification counts during the rut to determine calf production and bull-cow ratios.
4. Utilize population modeling with annual mortality estimates derived from research to estimate post-season herd size. In years when the herd is obviously under-counted, use the previous years' model to estimate the post-season population.
5. Adjust model inputs to fit observed numbers when the model is underestimating or overestimating the bison population.
6. Habitat conditions, including effects of drought, will be discussed with the bison committee when harvest recommendations are reviewed.
7. Utilize the United States Drought Monitor at https://droughtmonitor.unl.edu/ to make temporary adjustments in the bison population size depending on drought severity and range conditions. If drought-related conditions and bison densities negatively impact habitat, recommend additional bison permits at the August Wildlife Board meeting.
8. Continue monitoring of radio-collared bison to determine seasonal movements and habitat use areas during critical periods.
9. Collect blood samples from hunter-harvested bison to monitor for brucellosis and take necessary actions to maintain brucellosis-free status in compliance with Department of Agriculture guidelines.
10. Cooperate with the BLM to avoid the introduction of malignant catarrhal fever, Johne's, or other diseases.
11. Conduct law enforcement efforts to minimize illegal take of bison.
12. Address all agricultural depredation problems in a timely manner.

13. Preserve genetic integrity of the bison herd by maintaining herd size at management objective to prevent loss of unique allele composition.
14. Pursue opportunities to improve genetic heterozygosity by supplementing the bison population from other genetically pure and disease-free herds.

*Objective 2: Maintain a ratio of 50 bulls per 100 cows to ensure older age class bulls remain in the population.*

Strategies:

1. Conduct annual summer classification counts during the rut to determine the bull-cow ratio.
2. Use a combination of hunters' choice, cow-only permits, and removal of animals through transplant to maintain the desired bull-cow ratio.
3. Educate hunters to use the Mandatory Reporting Survey to report bison age based on tooth replacement and wear.
4. Require cow-only permit holders to complete the online orientation course each year to teach them how to identify the sex of the animal properly.

## HABITAT MANAGEMENT OBJECTIVES AND STRATEGIES

*Objective 1: Maintain or improve sufficient bison habitat to support population objectives.*

Strategies:

1. Identify critical bison use areas and work with land managers and private landowners to improve or maintain habitat quality in these areas.
2. Pursue research studies to address concerns about bison-livestock forage competition and range overlap.
3. Design and implement habitat projects to reduce conflicts between bison and livestock. Use funds from conservation permits, Grazing Improvement Board, Utah Partners for Conservation Development, and other public and private money to pay for these projects (see Appendix A). All partners will work together to obtain funding. Increased forage may be allocated to bison and livestock. Habitat work will focus on winter ranges prioritizing areas of bison-cattle conflicts. Vegetation monitoring will be established on habitat projects prior to

implementation and read two years after implementation to evaluate success or failure of the project.

4. Support lease agreements between grazing permittees to minimize bison-cattle conflicts and better manage range resources. Such use would have to be approved by the BLM, which would require subleasing agreements or grazing permit transfers.
5. Use hunters and other volunteers to maintain range improvements on allotments used by bison. The DWR may assist by providing materials or workforce when available.

*Objective 2: Increase habitat security to encourage bison use in select areas.*

Strategies:

1. Work with land managers to minimize and mitigate the loss of bison habitat due to human disturbance and development.
2. Support efforts by the land managers to manage off-highway vehicle use in bison use areas, including law enforcement efforts. Especially the Cave Flat and Swap Mesa areas that provide a refuge from vehicular disturbance.
3. Support land management agency travel plans that include bison and wildlife considerations.
4. Design harvest strategies to minimize early movements of bison to winter ranges when possible.
5. Work with land management agencies to maintain hunter access to areas that discourage bison movements into Capitol Reef National Park.

*Objective 3: Achieve a distribution of bison that better utilizes available habitat and minimizes conflict.*

Strategies:

1. Provide adequate forage on summer and transitional ranges to discourage bison use on winter ranges during summer months. Consider other alternatives such as gap fences, herding, and fencing of water sources on winter ranges.
2. Address all depredation problems in a timely and efficient manner.
3. Develop water sources in areas that will improve herd distribution.
4. Discourage bison from areas with potential conflicts by improving range conditions in areas where conflicts do not exist.
5. Utilize research projects and radio telemetry data to help better

understand bison use patterns.

6. In cooperation with the BLM, SITLA, and livestock operators, investigate realignment of grazing allotments to improve the distribution of both cattle and bison.
7. Develop hunt strategies to disperse bison, or create refuge areas to encourage bison use on wintering areas where more forage is available and potential conflicts with livestock are reduced.
8. Consider the use of hazing bison when needed to address range concerns in specific areas such as private land depredation, severe drought on winter ranges, and new seeding projects.

## RECREATION MANAGEMENT OBJECTIVES AND STRATEGIES

*Objective 1: Maintain high quality-hunting opportunities for bison.*

Strategies:

1. Utilize multiple hunting seasons to minimize hunter crowding.
2. Maintain high hunter success rates.
3. Provide older age class bulls in the harvest by achieving desired bull-cow ratios.
4. Maintain hunting strategies that minimize early-season movements into wintering areas.
5. Investigate whether the length of the hunting season has an impact on other species.
6. Capitol Reef National Park supports efforts to provide hunter access to the western portion of the bison range through the Park.

*Objective 2: Increase public awareness and expand viewing opportunities of bison without creating additional disturbance to the herd.*

Strategies:

1. Work with the BLM and counties to install interpretive signs and provide viewing areas at selected spots in bison habitat to educate visitors about bison.
2. Utilize print and media (including social media) to educate the public about bison and bison issues.

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Appendix A.

## Potential Habitat Projects to Resolve Conflicts between Bison and Livestock

1. Indian Springs fuels reduction: To increase forage for cattle and wildlife.
2. Henry Mountains fuels treatments landscape wide by BLM- Canyon Country Fuels: Convert habitat into earlier seral stages for higher forage productivity for cattle and wildlife.
3. Various water development and spring upgrades where possible: Maintain and improve water availability for cattle and wildlife.
4. Trough replacement at McMillan for bison, Tarantula Mesa for cattle and wildlife, and Hancock Spring for cattle and wildlife.

Appendix B.

Table 1. Herd composition surveys of bison on the Henry Mountains, Utah, 1960-2020.

| | Preseason* | Preseason | Age: | Sex Ratios | | Post Season |
|---|---|---|---|---|---|---|
| Year | Pop Est | Adults | Bull:Cow | Calf:Cow | Calf:Adult | Adult Estimate |
| 1960 | 74 | 60 | 91 | 52 | 23 | |
| 61 | 76 | 63 | 86 | 43 | 21 | |
| 62 | 86 | 68 | 83 | 56 | 28 | |
| 63 | 73 | 58 | 83 | 55 | 26 | |
| 64 | 59 | 45 | 55 | 47 | 31 | |
| 65 | 77 | 64 | | | 20 | |
| 66 | 92 | 75 | | | 23 | |
| 67 | 84 | 74 | | | 14 | |
| 68 | | | | | | |
| 69 | 94 | 82 | | | 15 | |
| 1970 | 75 | | | | | |
| 71 | 73 | 56 | | | 30 | |
| 72 | 61 | 49 | | | 24 | |
| 73 | 121 | 99 | | | 22 | |
| 74 | 139 | 92 | | | 35 | |
| 75 | 126 | 95 | | | 33 | |
| 76 | 84 | 67 | | | 25 | |
| 77 | 151 | | | | | |
| 78 | 243 | 196 | 61 | 39 | 24 | |
| 79 | 296 | 232 | 46 | 40 | 28 | |
| 1980 | 300 | 232 | 69 | 49 | 29 | |
| 81 | 274 | 211 | 40 | 42 | 30 | |
| 82 | 252 | 191 | 41 | 47 | 32 | |
| 83 | 308 | 246 | 72 | 41 | 25 | |
| 84 | 314 | 245 | 50 | 42 | 28 | 235 |
| 85 | 365 | 328 | 55 | 42 | 27 | 280 |
| 86 | 352 | 224 | 37 | 37 | 33 | 267 |
| 87 | 368 | 222 | 48 | 43 | 34 | 280 |
| 88 | 395 | 322 | 46 | 33 | 23 | 311 |
| 89 | 345 | 272 | 44 | 46 | 27 | 282 |

Table 1. Continued

| | Preseason* | Preseason | Age: | Sex Ratios | | Post Season |
|---|---|---|---|---|---|---|
| Year | Pop Est | Adults | Bull:Cow | Calf:Cow | Calf:Adult | Adult Estimate |
| 1990 | 559 | 479 | 56 | 26 | 17 | 320 |
| 91 | 426 | 368 | 58 | 25 | 16 | 285 |
| 92 | 324 | 270 | 61 | 32 | 20 | 240 |
| 93 | 474 | 381 | 71 | 42 | 24 | 293 |
| 94 | 470 | 393 | 42 | 28 | 20 | 297 |
| 95 | 360 | 314 | 58 | 23 | 15 | 226 |
| 96 | 416 | 350 | 63 | 31 | 19 | 290 |
| 97 | 397 | 342 | 55 | 25 | 16 | 275 |
| 98 | 460 | 374 | 54 | 35 | 23 | 285 |
| 99 | 420 | 345 | 65 | 36 | 22 | 250 |
| 2000 | 433 | 368 | 57 | 28 | 18 | 293 |
| 2001 | 379 | 341 | 57 | 18 | 11 | 246 |
| 2002 | 392 | 318 | 56 | 36 | 23 | 261 |
| 2003 | 352 | 318 | 56 | 17 | 8 | 254 |
| 2004 | 335 | 268 | 42 | 42 | 25 | 227 |
| 2005 | 265 | 196 | 38 | 49 | 26 | 169 |
| 2006 | 401 | 311 | 36 | 39 | 29 | 275 |
| 2007 | 591 | 486 | 60 | 35 | 27 | 396 |
| 2008** | 602 | 494 | 53 | 33 | 65 | 334 |
| 2009*** | 522 | 452 | 52 | 24 | 16 | 292 |
| 2010 | 384 | 337 | 72 | 32 | 19 | 296 |
| 2011 | 422 | 346 | 61 | 37 | 23 | 310 |
| 2012 | 496 | 432 | 63 | 31 | 19 | 329 |
| 2013 | 457 | 399 | 56 | 28 | 18 | 321 |
| 2014 | 460 | 383 | 53 | 30 | 20 | 304 |
| 2015 | 444 | 374 | 70 | 31 | 19 | 317 |
| 2016 | 459 | 386 | 54 | 42 | 28 | 324 |
| 2017 | 490 | 402 | 56 | 37 | 24 | 325 |
| 2018 | 569 | 478 | 45 | 37 | 26 | 310 |
| 2019 | 462 | 425 | 63 | 14 | 9 | 316 |
| 2020 | No Flight | No Flight | 78 | 37 | 21 | 303 |
| 2021 | 407 | 361 | 61 | 23 | 14 | 295 |
| **Average** | 266 | 221 | 57 | 37 | 24 | 287 |

*Preseason population estimate is based on the observed count from the flight survey and incorporates sightability.

**2008- In January 2009 (Post-hunt 2008) 31 bison were captured and translocated to the Book Cliffs.

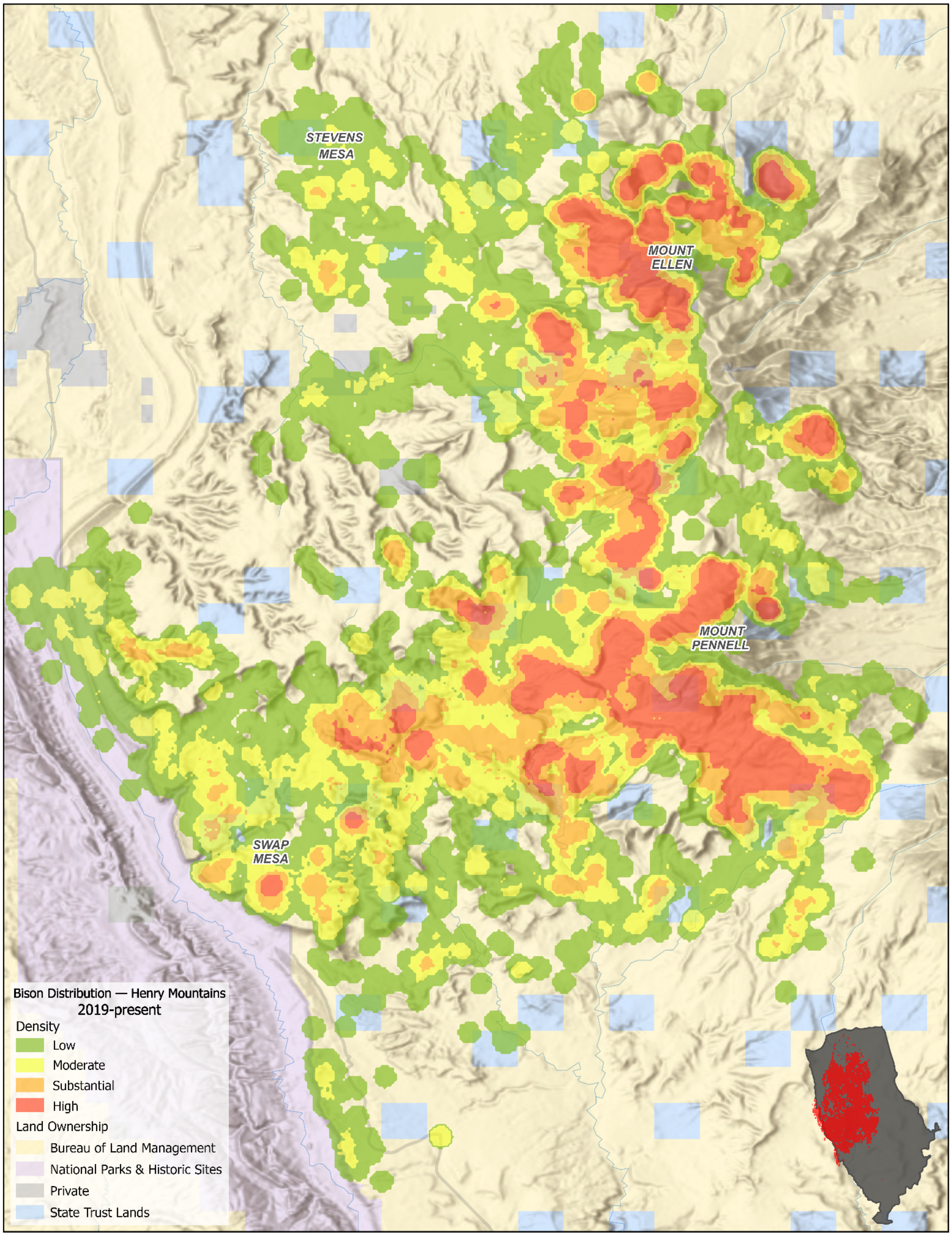
***2009- In January 2010 (Post hunt 2009) 40 more bison were captured and moved to the Book Cliffs.

Table 2. Bison harvest by hunt on the Henry Mountains, Utah, 2007 to 2020.

| | Any Weapon Hunters Choice | | | | | Any Weapon Cow Only | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Afield | Bull | Cow | Total | Success | Afield | Bull | Cow | Total | Success |
| 2007 | 67 | 56 | 10 | 66 | 99% | 74 | 5 | 49 | 51 | 69% |
| 2008 | 67 | 53 | 11 | 64 | 96% | 98 | 6 | 62 | 68 | 69% |
| 2009 | 56 | 37 | 10 | 47 | 84% | 90 | 1 | 61 | 62 | 69% |
| 2010 | 40 | 31 | 3 | 34 | 85% | 8 | 0 | 4 | 4 | 50% |
| 2011 | 19 | 16 | 1 | 17 | 89% | 6 | 0 | 4 | 4 | 66% |
| 2012 | 60 | 42 | 10 | 52 | 87% | 57 | 2 | 37 | 39 | 68% |
| 2013 | 50 | 27 | 5 | 32 | 64% | 48 | 1 | 29 | 30 | 63% |
| 2014 | 41 | 29 | 6 | 35 | 85% | 33 | 2 | 25 | 27 | 82% |
| 2015 | 35 | 24 | 4 | 28 | 80% | 20 | 0 | 15 | 15 | 75% |
| 2016 | 39 | 26 | 6 | 32 | 82% | 23 | 0 | 17 | 17 | 74% |
| 2017 | 36 | 27 | 6 | 33 | 92% | 40 | 3 | 24 | 27 | 68% |
| 2018 | 90 | 52 | 18 | 70 | 78% | 92 | 0 | 57 | 57 | 62% |
| 2019 | 55 | 24 | 9 | 33 | 60% | 51 | 1 | 35 | 36 | 71% |
| 2020 | 18 | 16 | 2 | 18 | 100% | 21 | 0 | 14 | 14 | 67% |
| 2021 | 49 | 29 | 5 | 36 | 64% | 23 | 0 | 14 | 14 | 61% |
| **Average** | 48 | 33 | 7 | 40 | 85% | 47 | 2 | 31 | 32 | 68% |

| | Archery Hunters Choice | | | | | Archery Cow Only | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Afield | Bull | Cow | Total | Success | Afield | Bull | Cow | Total | Success |
| 2017 | 10 | 7 | 0 | 7 | 70% | No hunt | | | | |
| 2018 | 20 | 16 | 2 | 18 | 90% | No hunt | | | | |
| 2019 | 9 | 5 | 2 | 7 | 78% | 12 | 0 | 8 | 8 | 67% |
| 2020 | 4 | 4 | 0 | 4 | 100% | 3 | 0 | 2 | 2 | 67% |
| 2021 | 7 | 0 | 2 | 2 | 25% | No hunt | | | | |
| **Average** | 11 | 8 | 1 | 9 | 85% | 8 | 0 | 5 | 5 | 67% |

Map 1. Occupied bison habitat in the Henry Mountains area from March 2019-January 2022. Densities are determined from 31 gps collared bison with approx. 20,500 locations and 2 points/bison/day. Low =1-1,420 points, Moderate = 1,421-2,899 points, Substantial = 2,900-4,409 points, and High = 4,410-14,717 points.



**Committee Members**

Cindy Ledbetter/Joe Chigbrow, Bureau of Land Management
Sue Fritzke, National Park Service
Bob McReady, National Wildlife Federation
Jayden Brian, Outfitter
Paul Pace, Permittee
Gordon VanDyke/Travis Van Orden, Sandy Ranch
Troy Justeson, Sportsman for Fish and Wildlife
Ron Torgerson, State Institutional Trust Lands Administration
Troy Forrest, Utah Department of Agriculture and and Food
Wade Paskett, Utah Division of Wildlife Resources
Brett Behling, Utah Farm Bureau
Mike King, Utah State University Eastern
Kevin Albrecht, Utah Wildlife Board
Newell Harward/Dennis Blackburn, Wayne County Commissioners

The Henry Mountains bison management plan will be presented to the Utah Wildlife Board on September 29, 2022 and, if approved, will be in effect for a period of 10 years from this date. At the 10 year period the committee will review the plan to make a recommendation to the DWR for purposes of either updating the plan with new information and/or adding amendments. If the plan is acceptable and working it may be recommended to the DWR that it be continued for a specified time by the HM bison committee.