

August 7, 2007

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

UNIT BOUNDARY DESCRIPTION

Boundary begins at Hanksville at the junction of SR-24 and SR-95: south on SR-95 to Lake Powell; south along the west shore of Lake Powell to SR-276 at Bullfrog; north along SR-276 to the Bullfrog to Notom Road; north along this road 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, stretching from Blue Bench on the north to Egnog on the south and from Coyote and Eagle Benches on the east to the Notom Road on the west. Elevations range from 4,800 feet to 11,500 feet above sea level. Annual precipitation averages 18 inches in the higher elevations and 8 inches on the lower foothills. Topography includes steep mountain slopes, benches and foothills, flat mesas, and deeply eroded canyons. The major vegetative communities found in the area are salt desert shrub, pinyon-juniper, mountain brush, aspen-conifer, and sub-alpine. Bison use is 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. This area is included within the larger Wildlife Management Unit #15, which encompasses approximately 856,812 acres.

RANGE AREA & APPROXIMATE OWNERSHIP

Ownership	Area in Acres	%
BLM Total	258,022	86
State Total	33,793	11
Tribal Total	0	
Private Total	4,203	1.5
National Parks Total	4,097	1.4
State Wildlife Reserves	0.5	.0002
Grand Total	300,205	100

HENRY MOUNTAIN BISON HISTORY AND STATUS

This herd had its roots in Yellowstone National Park. In 1941, the Carbon Emery Wildlife Federation and the Utah State Department of Fish and Game obtained 18 bison, including 3 bulls and 15 cows, in a cooperative effort from the National Park Service. The animals were released near Robber=s Roost Ranch north of the Dirty Devil River on the San Rafael Desert (Nelson 1965). The majority of the animals established themselves near the release site, but a few dispersed to areas north and west, as far away as Ferron and the Strawberry Valley. Most of the dispersing animals were bulls, and it was deemed necessary to supplement the original reintroduction with an additional five bulls the next year. There have been no other introductions into this herd. These bulls joined the majority of the others and crossed the Dirty Devil River in 1942 onto the Burr Desert. These bison used the Burr Desert as winter range and the Henry Mountains as summer range from that time until 1962.

The population had grown to about 71 animals by 1962, when brucellosis was detected in the herd. 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 taken by sport hunters. A significant result of the harassment of the capture operation was a change in range used by the bison. Since 1963, the herd has utilized the Henry Mountains as its home range.

Current management practices include an annual helicopter survey, summer ground classification, sport harvest, and extensive habitat management. A population estimate is derived annually based on the number of animals counted during the survey, count conditions, ground classification, the number of animals harvested, and a 5% natural mortality rate.

Pre-season population estimates of the herd, including calves, have ranged from 59 in 1964, to 559 in 1990. The bull:cow ratio has ranged from a low of 37 bulls per 100 cows in 1986, to a high of 72 in 1983 (Table 1). The average from 1949 to 2006 was 53. The number of calves per 100 adults has averaged almost 25 over the same period, ranging from 8 in 2003, to 40 in 1950. The average number of calves per 100 cows has averaged 37, ranging from 17 in 2003, to 56 in 1962.

The average number of estimated adults, post-season, since 1984 has been 266, ranging from a high of 320 in 1990, to a low of 162 in 2005 (Table 2). Currently, the Henry Mountains herd numbers about 340 adults and calves, with a population objective of 275 adults, post-season. Due to drought and poor calf production, the population was in a downward trend, but has responded in recent years to increased precipitation and forage production.

Habitat

Habitat management practices include purchases of grazing allotments from willing sellers, operator conversion of domestic sheep grazing allotments to cattle to reduce the chance of disease transmission, vegetative treatments, and water developments. The Division and BLM have partnered in a program to create suitable bison habitat on the Henry Mountains. Efforts include rangeland prescribed burns, mechanical treatments and reseeding. The Division has funded such projects covering over 6,700 acres. Also, two wild fires occurred in 2003, encompassing over 34,000 acres, most of which were reseeded. The work dramatically increased the quality of habitat on the Henry Mountains for livestock, bison and mule deer. Conservation organizations are active in negotiating, funding, and participating in habitat enhancement projects.

On the Henry Mountains, bison have been very adaptable and utilized a wide variety of habitat types. The Henry Mountains herd has used grassland flats at just over 5000 feet in elevation on Blue Bench, pinyon-juniper woodlands and chainings from 5000 feet at Swap Mesa to over 8000 feet at McMillian Springs. Bison also use 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 may also be found on the stark indian ricegrass/globemallow flats on Stevens Mesa during the hottest days of the year.

Disease

There are three diseases of major concern to bison in Utah, brucellosis, tuberculosis and malignant catarrhal fever.

Blood from hunter-harvested bison is tested annually for brucellosis. There have been no reactors since 1963 and the Henry Mountains bison herd is considered brucellosis free.

Tuberculosis, when found in conjunction with brucellosis, can affect the survival and reproductive capabilities of cow bison. No reactors were found among 12 yearlings tested before being transplanted to Arizona from the Henry Mountains in 2001. Bison are also susceptible to a related disease, paratuberculosis, or Johne's disease. Johne's is a viral infection that can have devastating effects on bison.

Malignant catarrhal fever (MCF) is the most serious viral disease affecting ranched bison. It is also known to affect other bovine species, domestic sheep and deer. Related to the herpes virus, it is transmitted through lacrimal, nasal, oral and vaginal secretions, but has occurred in other situations and direct contact is not necessary. Bison have contracted MCF from sheep grazed over 2 miles away (Haigh *et. al.* 2002). Wind-borne infections have been reported and deer contracted the disease after traveling in a truck that carried sheep with MCF.

Malignant catarrhal fever is invariably fatal. In the most extreme cases, the animal dies showing no clinical symptoms. Treatment of chronic cases is considered hopeless.

There is no vaccine. Prevention requires that sheep or wildebeest do not have contact with susceptible species (Haigh *et. al.* 2002).

It is recommended that domestic sheep herds not be grazed within two miles of bison to protect the population from MCF and Johne's disease.

Genetics

The Henry Mountains herd is one of only four free roaming, 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). Additionally, the Henry Mountains herd is tested annually, and has been designated as >brucellosis free= since 1962.

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 a 500-year period. They recommend that each population have at least 430 individuals, including both adults and young, to maintain a minimum viable population. This will ensure survival of the plains bison genome.

Competition with Domestic Livestock

There is considerable overlap in the diet of bison and domestic cattle. 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. Van Vuren (1979) reported that both bison and cattle on the Henry Mountains were primarily grazers, but that bison diet consisted of 5% browse, compared to no use by cattle. Cattle, on the other hand, were more likely to use forbs than bison. This is consistent with observations from Wood Bison in British Columbia. Harper *et. al.* (2000) reported that bison are very efficient at digesting low protein, high fiber diets. Willow leaves comprised a significant portion of the diet during the winter. While dietary overlap with cattle is significant, bison may be more likely to use shrubby vegetation during winter periods.

Bison behavior may also provide a small 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 3 consecutive days during the summer growing season. 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. Bison on traditional winter ranges 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. Conversely, bison grazing behavior may be detrimental to perennial grasses in desert ecosystems, such as galleta grass or Indian rice grass, that are not capable of withstanding excessive grazing pressure.

Van Vuren (1979) observed similar habits on Mount Ellen on the Henry Mountains. When comparing habitat use by bison and cattle, he found that over 56 percent 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 the proximity of water than did bison.

Regardless, bison and cattle use similar habitat and have a similar diet and this is a concern for resource managers. Forage on dry desert mountain ranges is limited, particularly during droughts, and must be allocated to different resource users. On the Henry Mountains, the Bureau of Land Management, in cooperation with the Utah Division of Wildlife Resources and conservation groups have addressed this through the allocation of animal unit months (AUM) through the Resource Management Plan (RMP), Grazing Allotment Plans, and the purchase of grazing privileges from willing sellers.

The Utah Division of Wildlife Resources has also partnered with the Bureau of Land Management and State and Institutional Trust Lands Administration to complete numerous habitat improvement projects that increase forage quantity and quality for both bison and livestock. Over 40,000 acres, have been treated on the Henry Mountains since 1965, greatly enhancing habitat. Efforts are currently underway to improve water sources, maintain old chainings by removing new saplings, and remove old growth pinyon-juniper stands to create additional productive habitat. Methods for these enhancements include: hand cutting individual trees; prescribed fire; chaining; and other mechanical treatments.

Forage Allocation

The Henry Mountains bison are free roaming. The herd is not contained by fences and shows nomadic and seasonal movements common to wild bison. Habitat use has been seen to increase in areas following wildfire. Both livestock and human use patterns influence distribution.

In 1983, an initial population objective was set at 200 adults, post-season, or after the hunt. The 2127 AUMs allocated by the BLM in their 1983 Management Framework Plan (MFP) was not deemed sufficient to support the population year-round, and identified a shortfall of 118 AUMs. However, on page 97 of the Environmental Impact Statement completed on Henry Mountain Grazing, it states: "because of the additional AUMs provided from land treatments, sufficient forage would be made available to prevent overgrazing by bison on these ranges in the long term . . . it is important to note that the bison herd would be managed at a post hunt herd size of 200 yearling and adult

animals agreed between UDWR and BLM.” From this statement, it is assumed that the BLM intended to provide forage for 200 adult bison, post-season, in 1983.

The agreed upon objective of 200 adults was raised in the mid-1990's due to two transfers of AUMs to bison: 166 by Tercero Corporation in 1986, and 800 by Jack King in 1995. These AUMs provided additional forage for bison, and the objective was informally raised to 275 adult and yearling bison, post-season. The population has been managed at this level ever since. An additional 505 AUMs were purchased in 2001 on Mount Ellen, but no adjustment was made to the population objective. While the seller agreed to request to have the forage reallocated to bison, it was felt by all parties that these AUMs could provide a buffer of additional forage in years of extreme drought.

In addition to the BLM AUMs discussed above, UDWR holds grazing privileges on Utah School and Institutional Trust Lands, accounting for an additional 947 AUMs, which have not been considered when setting the objective. About 320 of these AUMs are associated with state sections outside of the area currently used by bison. That leaves about 625 additional AUMs for bison. Adding these to other forage currently allocated is sufficient to provide forage for about 325 adult and yearling bison, post-season.

A severe drought in the late 1990's and early 2000's had an affect on bison habitat use. Large numbers moved into areas not previously used, causing conflicts with livestock. One area was the Blue Bench allotment, north of Mount Ellen, where 201 bison were counted during the survey in 2002. The BLM was concerned that although there was sufficient forage for bison on summer ranges, conflicts were arising over bison use of cattle winter ranges where no AUMs had been allocated to bison. Because of this concern, Bureau of Land Management (BLM) officials asked the Division to help resolve this problem and suggested purchasing additional AUMs particularly in winter allotments where unresolved conflicts were occurring. A willing seller was found, and in 2003, Sportsmen for Habitat, using conservation permit funds, purchased an additional 2530 AUMs in bison range, including 586 on Blue Bench.

Currently, there are 3649 AUMs, which have been allocated to bison by the BLM and SITLA, and 3035 AUMs that have been purchased for bison and are awaiting allocation through the Richfield Resource Management Plan, currently under revision. Due to the agreement with the seller of the 505 AUMs that they be used as a conservation buffer, they will not be considered in changing the population objective. Given this, the total number of available AUMs is 6179, which is sufficient forage for more than the recommended increase in bison numbers.

Recreational Opportunities

Outdoor recreational activities have increased dramatically over the past two decades. Types of human related recreation in bison habitat include: back country travel; mountain biking; ATV use; horseback riding; antler gathering, camping; backpacking; hiking; trail races, such as triathalons, or long distance races; hunting of big game, cougar and bear; and others. Another popular activity has been outdoor educational

schools that take large groups of youth into the back country to learn survival and leadership skills.

Part of the mission of the Division of Wildlife Resources 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 permits. Each year, the Division issues conservation permits to conservation groups who sell the permits to the highest bidder. These funds are used to enhance habitat or fund special projects, such as transplants or research. Bison population size is controlled through hunting and 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 taken by hunters that year were taken on Mount Ellen. Interestingly, the next year, in order to protect newly planted forage in the burn areas, cattle were allowed back on Mount Ellen and the roads were again open to public travel. Bison use declined on Mount Ellen that year, and in 2005, almost all the bison had moved south to Mount Pennell. That trend reversed itself somewhat in 2006. Bison continued to use burned areas extensively. But, almost half of the herd (169 of 381 observed) was found on Mount Ellen.

Of particular concern may be constant use of springs by campers. 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 Division in meeting its mission.

Agricultural Depredation

There have been only limited impacts by bison to agriculture on the Henry Mountains. Agricultural fields that are irrigated and harvested are currently limited. Harvested crops are alfalfa or grass hay, which are either cut and baled or left standing as livestock pasture forage. Elk and deer depredations occur to these areas and any complaints are addressed through stack yard fencing, payments for damages or mitigation type hunting opportunities. Bison have used agricultural fields on at least two of the past 20 years in the Henry Mountains. These were both periods of drought. A technician was hired to herd bison from the fields and the landowner was compensated for damages. However, visits by bison to agricultural fields have generally not been of such impact or duration to

elicit heavy complaints. If agricultural depredations develop, they will continue to be addressed under the Utah State Code, DWR policy and established guidelines.

Limiting Factors

Van Vuren (1983) investigated bison mortality factors on the Henry Mountains. He found that natural survival was very high, with calves averaging 94% survival, adult bulls 95%, and adult cows 96%. He found 33 carcasses during 1977 and 1978, but specific causes of natural mortality were not determined. However, it was speculated that predation of young, accidents, and old age were the primary causes. Wounding loss by hunters and poaching were identified as non-natural causes.

Currently, large mammalian predators in bison habitat include: cougars, coyotes and bobcats. While bison kills from at least the first two of these species have been documented in the literature, none are considered to be a significant threat to bison herds, other than the potential of predation on the very young. However, wolf immigration into northern Utah from neighboring states is expected. However, it is not anticipated that wolves will ever become established on the Henry Mountains.

Drought also plays a part in regulating population growth. Two of the driest years in recent memory, 2001 and 2003, had the lowest calf production recorded on the Henry Mountains. In 2001, there were 18 calves produced per 100 cows and 17 in 2003, compared to the long-term average of 37 calves per 100 cows. 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.

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 sportsmen 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 Henry Mountains was held in 1950, when 10 permits were issued, and 6 bulls and 4 cows were harvested. Hunting resumed in 1960, and permits have issued every year since, with the exception of 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 properly distinguish cows from bulls. Non-resident permits, based on 10% of total permits, were first offered in 1978. Conservation permits, which are sold at an auction to the highest bidder, or by conservation groups at annual banquets, were first offered in 1982.

There have been over 1800 bison hunters afield from the first hunt in 1950 through 2005. Hunter choice permits have ranged from 9 in 1975, to 68 in 1991. The average number of hunter choice permits has been 26. There have been 564 cow-only hunters afield. Permit numbers have ranged from 0 in 1992, 1993 and 1996, to 129 in 1990. The average number of cow-only hunters has been 38. A total of 55 conservation permits

have been issued. Hunters have harvested 1611 bison, comprised of 890 bulls and 721 cows. The average annual harvest has been 21 bulls and 34 cows. Overall, hunter success has been 87%, while it has been 93% for hunter choice permits, and 77% for cow-only permits.

There continues to be a high demand for these unique permits. In 2005, 4336 residents applied for 19 permits, and 601 non-residents put in for 3 permits (Crump 2005). Overall odds of obtaining a permits was greater than 200 to 1. Of course, these odds are affected by the number of bonus points the applicant has, making odds less for some, and greater for others. The number of total applicants for bison permits on the Henry Mountains has increased by 461 since 2001.

Issues and Concerns

The Henry Mountains Bison Working Group identified the following issues and concerns and ranked them in order of significance:

1. Designing and implementing habitat projects to resolve conflicts between bison and livestock
2. Maintain viable bison numbers to prevent ESA listing
3. Sharing Bison allotments with livestock
4. Bison use on winter ranges and moving them to keep off winter range/ seedings
5. Maintenance of existing fences and water developments in allotments purchased by conservation groups
6. Resolving issues at the current population objective before increasing the objective
7. Bison summer use of winter allotments
8. Grazing buyout/ Taylor Grazing Act issues
9. Wildlife species management other than bison (eg. deer)
10. Wilderness Study Area issues
11. Bison Permits for permittees to offset drought related expenses
12. Will the recommendations by this committee be consistent with decisions in the BLM RMP currently under revision?
13. Private land issues
14. Access issues
15. Bison survey accuracy

MANAGEMENT GOALS AND OBJECTIVES

A. Population Management Goal: Maintain the Henry Mountain bison herd as a genetically viable free roaming bison population in balance with available habitat and other land uses.

Objective 1: Achieve a post-season population size of 325 adult and yearling bison by 2012 within the Wildlife Management Unit.

Strategies:

1. Conduct research to determine sightability of bison during helicopter census, habitat use, and movements. Partners, to include the Division, the BLM, the Henry Mountain Grazing Association and Sportsmen for Habitat, will seek funding from a variety of sources.
2. Conduct annual helicopter census to determine population size. Until data from the study mentioned above is analyzed, use 95% sightability to estimate total pre-season population on good counts. Use 85% sightability when conditions are less than ideal. These conditions occur in years with above normal precipitation when bison are scattered in small groups and are more prone to use areas with tree cover. Participants of the survey will decide at the end of the survey which sightability estimate to use.
3. On an experimental basis, use a helicopter to survey bison during the winter to evaluate the efficacy and sightability of bison during a post-season count.
4. Conduct annual ground classification counts during the rut to determine calf production.
5. Utilize population modeling with an annual mortality rate of 5% or 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 post-season population.
6. Use a combination of transplanted animals, hunter's choice permits and cow only permits to allow for a slow increase to 325 adults, post-season on the Henry Mountains by 2013. Increases will be delayed for two years to allow habitat projects to become established. Target population levels are 305 in 2010, 315 in 2011, and 325 in 2012. Population increases will be delayed if vegetation on the unit shows a downward trend, based on data from the BLM and the Interagency Range Trend.
7. 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.

8. Cooperate with the BLM to convert existing domestic sheep grazing permits to cattle permits to avoid the introduction of malignant catarrhal fever, Johne's, or other diseases.
9. Conduct law enforcement efforts to minimize illegal take of bison.
10. Address all agricultural depredation problems in a timely manner.
11. Improve genetic variability by supplementing bison population with a few bulls every ten years from other genetically-pure, 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 ground classification counts during the rut to determine bull: cow ratio.
2. Use a combination of hunters choice and cow only permits, and removal of animals for transplant to maintain desired bull:cow ratio.
3. Educate hunters on aging bison and have them report on the Mandatory Reporting Survey the age of bison harvested based on tooth replacement and wear.
4. Require cow only permit holders to attend an orientation course each year to teach them how to properly identify the sex of the animal.
5. Monitor disease outbreaks in the herd and address as needed.

B. Habitat Management Goal: Provide good quality habitat for healthy populations of bison in the Henry Mountains.

Objective 1: Maintain or improve sufficient bison habitat to allow herds to reach 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. Conduct an annual range ride with permittees and agency personnel to assess range conditions and review habitat projects.
3. Design and implement habitat projects to resolve conflicts between bison and livestock. Use conservation permit, grazing improvement board, Utah Partners for Conservation Development, and other public and private funds to pay for these projects (see Appendix A). All partners will work together to obtain funding. Increased forage will be allocated to bison and livestock. Habitat work will focus on winter

ranges, particularly in the pinyon-juniper/sagebrush zone where projects have been successful in the past.

4. 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.
5. Support exchange of use agreements between grazing permittees in order to minimize the impacts of bison and to better manage range resources. Such use would have to be approved by the BLM, which would require subleasing agreements.
6. Use sportsmen and other volunteers to maintain range improvements on allotments used by bison. The Division may assist by providing materials or manpower when available.

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

Strategies:

1. Work with land managers to minimize and mitigate 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.
3. Support land management agency travel plans.

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. Initiate research projects to help better understand bison use patterns.
6. In cooperation with the BLM and SITLA, work with livestock operators to consider realignment of grazing allotments to improve distribution of both cattle and bison.
7. On an experimental basis, move bison that are using winter ranges during the summer months by horseback in an attempt to relocate them to areas where ample forage is allocated for bison. The affected parties, including UDWR, BLM, Capitol Reef NP, private landowners and permittees, should mutually agree upon these areas. The Division will be contacted by permittees when range damage due to bison occurs to winter ranges in

the summer months. The Division will coordinate all efforts to move bison in a timely manner.

8. In drought years when livestock permittees are required to stock at less than full numbers (not to include suspended AUMs), the Utah Wildlife Board will be approached to issue bison additional permits.
9. Move bison by horseback from recently seeded areas if they are causing damage.

C. Recreation Goal: Provide for a ‘Once In a Lifetime’ bison hunting opportunity and high quality opportunities to view bison.

Objective 1: Maintain high quality hunting experiences 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. Investigate whether the length of the hunting season has an impact on other species.

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

Strategies:

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

LITERATURE CITED

- Boyd, D. 2003 *Conservation of North American Bison: Status and Recommendations*. Unpubl. Thesis, Univ. Calgary, Alberta. 222 pp.
- Crump, J. 2006. *The odds book*. JDC Pub. 169 pp.
- Haigh, J.C., C. Mackintosh and F. Griffin. 2002. Viral, parasitic and prion diseases of farmed deer and bison. *Rev. Sci. Tech. Off. Int. Epiz.* 2002, 21 (2) 219-248.

- Halbert, N.D. 2003. *The utilization of genetic markers to resolve modern management issues in historic bison populations: implications for species conservation*. Ph.D. Dissertation, Texas A&M Univ., College Station, TX.
- Harper, W.L., J.P Elliot, I. Hatter, and H. Schwantje. 2000. Management plan for Wood Bison in British Columbia. Ministry of Env. Lands and Parks. Wildl. Bull. No. B-102. 43 pp.
- Joly, D.O. 2001. Brucellosis and Tuberculosis as Factors Limiting Population Growth of Northern Bison. PhD Diss. Univ. of Saskatchewan. 204 pp.
- Kunkel, K., S. Forrest, and C. Freese. 2005. Reintroducing Plains Bison (*Bos bison*) to American Prairie Foundation lands in Northcentral Montana: 5-Year Conservation and Management Plan. Rep. to the World Wildlife Fund, 62 pp.
- Nelson, Kendall L. 1965. Status and habits of the American Buffalo (*Bison bison*) in the Henry Mountain area of Utah. Pub. 65-2, Utah Dept. of Fish and Game. 142 pp.
- Soule, M. E., J. A. Estes, J. Berger, and C. Matinez Del Rio. 2003. Ecological effectiveness: conservation goals for interactive species. *Conservation Biology* 17:1238-1250.
- Van Vuren, D.H. 1979. Status, ecology and behavior of bison in the Henry Mountains, Utah. Report Submitted to the Bureau of Land Management, Salt Lake City, Utah. 37 pp.
- Van Vuren, D. 1983. Group dynamics and summer home range of bison in southern Utah. *J. Mamm.* 64:329-332
- Ward, T. J., J. P. Bielawski, S K. Davis, J. W. Templeton and J. N. Derr. 1999. Identification of domestic cattle hybrids in wild cattle and bison species: a general approach using mtDNA markers and the parametric bootstrap. *Animal Conservation* 2:51–57.

Appendix A.

Potential Habitat Projects to
Resolve Conflicts between Bison and Livestock

		<u>Earliest completion date</u>
1.	Airplane Springs Chaining Maintenance	2007
2.	Dugout Chaining Maintenance	2007
3.	Tarantula Mesa waterlines	2007
4.	Cedar Creek Bench Chaining	2008
5.	Indian Springs Fuels Reduction	2008
6.	Five, Seven Canyon and other water projects	2007
7.	Cave Flat Reseeding	2008
8.	Bullfrog/Muley Canyon Gap Fences	2007

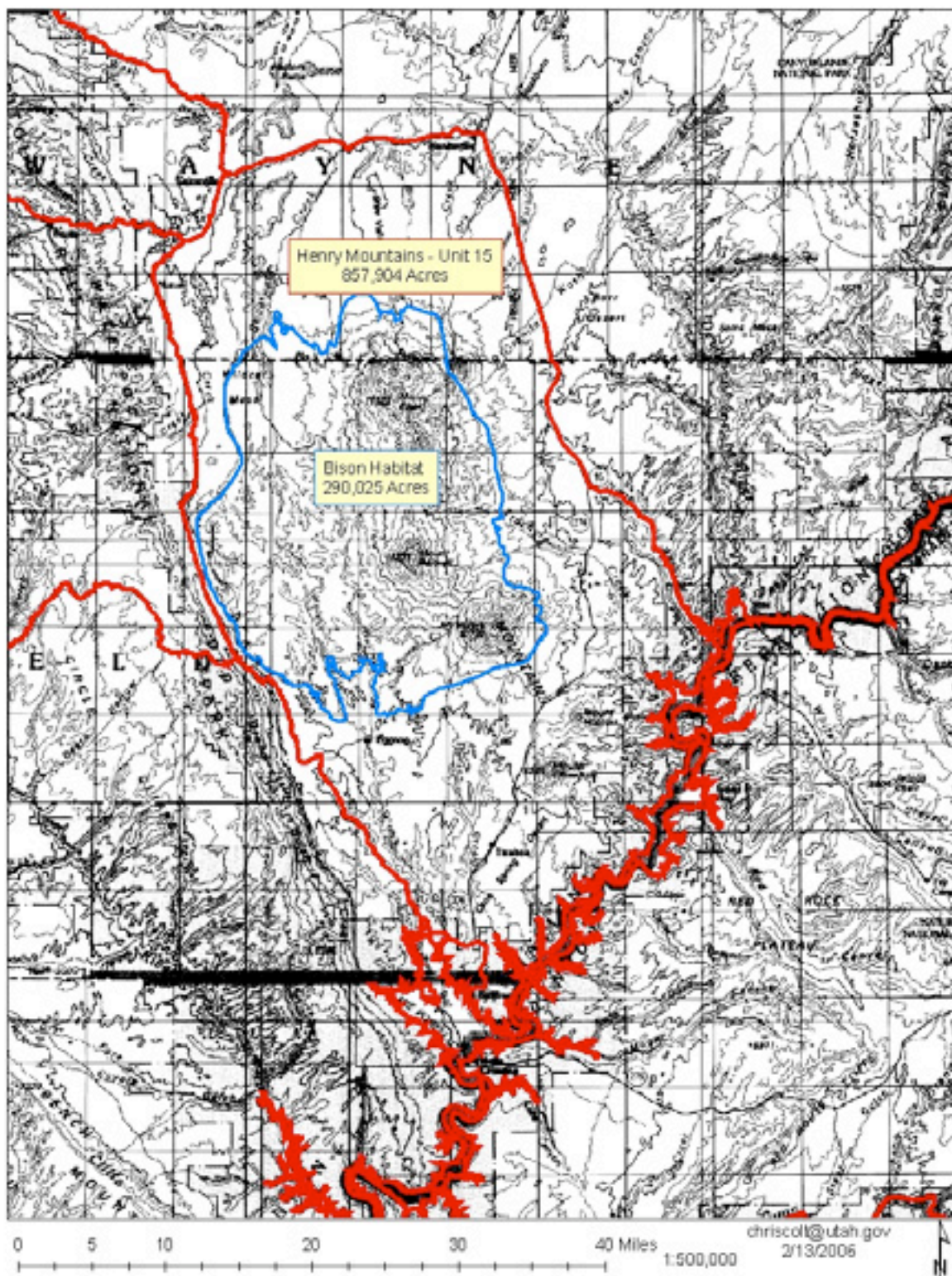
Table 1. Herd composition surveys of bison on the Henry Mountains, Utah, 1960 to 2005.

Year	Preseason Pop Est	Preseason Adults	Other Mortality	Age: Sex Ratios			Post Season Adult Estimate
				Bull: Cow	Calf: Cow	Calf: Adult	
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	6	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	6			24	
73	121	99	1			22	
74	139	92	0			35	
75	126	95	0			33	
76	84	67	26			25	
77	151		5				
78	243	196	3	61	39	24	
79	296	232	0	46	40	28	
1980	300	232	1	69	49	29	
81	274	211	1	40	42	30	
82	252	191	0	41	47	32	
83	308	246	5	72	41	25	
84	314	245	6	50	42	28	235
85	365	328	8	55	42	27	280
86	352	224	1	37	37	33	267
87	368	222	0	48	43	34	280
88	395	322		46	33	23	311
89	345	272		44	46	27	282
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	2	57	18	11	246
2002	392	318		56	36	23	261
2003	352	318		56	17	8	254
2004	335	268	2	42	42	25	227
2005	265	196	5	38	49	26	169
2006	401	311		36	36	29	275
Average	266	221	4	57	37	24	267

Table 2. Bison harvest on the Henry Mountains, Utah, 1950 to 2005.

Year	Hunters Choice					Cow Only					Conse rvation				
	Afield	Bull	Cow	Total	Success	Afield	Bull	Cow	Total	Success	Afield	Bull	Cow	Total	Success
1950	10	6	4	10	100%										
1960	10	7	3	10	100%										
61	12	8	4	12	100%										
62	20	9	11	20	100%										
63	14	1	6	7	50%										
64	10	2	8	10	100%										
65	0														
66	10	7	3	10	100%										
67	10	4	6	10	100%										
68	15	15	0	15	100%										
69	10	8	0	8	80%										
1970	10	6	0	6	60%										
71	15	8	2	10	67%										
72	0	0	0	0											
73	0	0	0	0											
74	9	4	3	7	78%										
75	9	7	2	9	100%										
76	10	8	2	10	100%										
77	10	9	1	10	100%										
78	22	11	10	21	95%										
79	27	14	13	27	100%										
1980	27	16	7	23	85%										
81	27	20	5	25	93%										
82	27	15	12	27	100%						1	1		1	100%
83	27	19	8	27	100%						1	1		1	100%
1984	35	27	7	34	97%						1	1		1	100%
85	44	28	12	40	91%						1	1		1	100%
86	56	38	17	55	98%						1	1		1	100%
87	56	39	15	54	96%						1	1		1	100%
88	44	31	13	44	100%	22	0	19	19	86%	1	1		1	100%
89	44	30	12	42	95%	22	0	17	17	77%	1	1		1	100%
1990	54	40	10	50	93%	129	6	93	99	77%	1	1		1	100%
91	68	42	18	60	88%	21		15	15	71%	2	2		2	100%
92	16	15	1	16	100%					0	2	2		2	100%
93	49	39	7	46	94%					0	2	2		2	100%
94	22	15	6	21	95%	66	3	53	56	85%	2	2		2	100%
95	33	26	5	31	94%	66	3	39	42	64%	3	3		3	100%
96	45	35	7	42	93%					0	3	3		3	100%
97	27	21	4	25	93%	27	1	24	25	93%	2	2		2	100%
98	42	32	7	39	93%	33	2	27	29	88%	6	5	1	6	100%
99	32	23	4	27	84%	65	3	47	50	77%	5	4	1	5	100%
2000	23	16	6	22	96%	24	0	18	18	75%	5	5		5	100%
2001	58	34	17	51	88%	29	1	20	21	72%	5	4	1	5	100%
2002	28	22	3	25	89%	14	0	13	13	93%	5	4	1	5	100%
2003	38	31	5	36	95%	19	0	9	9	74%	3	3	0	3	100%
2004	18	9	3	12	67%	19	0	12	12	63%	4	3	1	4	100%
2005	14	12	2	14	100%	8	0	8	8	100%	3	2	1	3	100%
2006	10	10	0	10	100%	10	1	9	10	100%	3	2	1	3	100%
	1197	819	291	1110	93%	574	20	423	443	77%	58	51	7	58	100%

Figure 1. Bison habitat on the Henry Mountains, Utah.



Committee Members

Tom Jeffrey, Wayne County Commissioner
Dell LeFever, Garfield County Commissioner
Suzanne Grayson, Bureau of Land Management
Leroy Smalley, Bureau of Land Management
Gary Hall, Bureau of Land Management
Cornell Christensen, Bureau of Land Management
John Keeler, Utah Farm Bureau
Ron Torgerson, SITLA
Gary Hallows, Utah Cattlemen's Association
Steve Dalton, Ranch Manager, Sandy Ranch
Bliss Brinkerhoff, Livestock Permittee
Paul Pace, Livestock Permittee
David Brinkerhoff, Livestock Permittee
Verland King, President, Henry Mountain Grazing Association
Mack Morrell, Livestock Permittee
Don Peay, Livestock Permittee, Sportsmen for Fish and Wildlife
Byron Bateman, Sportmen For Habitat
Ryan Foutz, Utah Foundation for North American Wild Sheep
Forrest Simms, USAALL
Bill Bates, Utah Division of Wildlife Resources
Wade Paskett, Utah Division of Wildlife Resources
Anis Aoude, Utah Division of Wildlife Resources

Approved this 8th day of August, 2007.

James F. Karpowitz, Director