



Lessons Learned from Bison Restoration Efforts in Utahⁱ on Western Rangelands

By Bill Bates and Kent Hersey

On the Ground

- Bison are considered the keystone species of the Great Plains but widespread slaughter led to their near extinction.
- Utah has two wild, free-ranging herds on public lands managed as wildlife though hunting. Both herds are descended from animals reintroduced to the Henry Mountains in the 1940s and more recently the Book Cliffs in 2008.
- Key elements for the successful ecological restoration of bison include:
 - Legal designation of bison as wildlife in the state
 - Genetically-pure, disease-free source
 - Large expanses of habitat—they take a lot of room
 - Potential conflicts must be identified and addressed in a transparent manner
 - Mutual purpose and trust with all affected stakeholders is essential; i.e., ask, How can we have both sustainable livestock grazing and a viable bison herd on the unit?
 - Active management to address changing situations and maintain herd size at a sustainable level

Keywords: bison, wildlife restoration, Utah, collaboration, public land, trust.

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When Lewis and Clark first crossed the continental divide, the plains bison (*Bison bison*) numbered around 30 million animals and was considered the dominant keystone species of the Great Plains grasslands.^{1,2} However, widespread slaughter led to the near extinction of the species. Over a century later, Cahalane³ stated that there were about 5000 bison remaining in the United States, and all of these animals were behind fences except those in Yellowstone National Park.

Currently, there are an estimated 500,000 bison in the United States. Unfortunately, the vast majority is maintained in private herds as domestic livestock.⁴ Less than 11,000 are found on public lands and held as public trust animals.⁵ This has spurred numerous efforts to reintroduce new bison herds. In spite of a nationwide effort led by the Department of Interior,⁵ the ecological restoration of bison in the United States has proven difficult. Several issues have been identified as impediments including cattle gene introgression, the potential spread of brucellosis, the nomadic behavior of wild herds, and legal jurisdiction.⁵ Restoration efforts initiated by private conservation groups and Native American tribes^{4,5} have been successful in restoring genetically-pure and disease-free herds in eastern Montana and on the Blackfeet Reservation, but these herds are not free-ranging and are not managed as public wildlife.

In 2016, there were six free-ranging bison herds in the United States comprising approximately 6500 animals (Table 1).⁴ Three herds are managed by the National Park Service in the Grand Canyon, Grand Tetons, and Yellowstone national parks, and three are managed by state wildlife agencies in Utah and Alaska. Of those, 5500 bison in the Yellowstone and Grand Teton herds are considered genetically pure (i.e., showing no signs of cattle gene introgression) and free ranging, but are not disease-free. About 500 bison occur in the Book Cliffs and Grand Canyon herds that are disease free and free ranging, but not genetically pure. The remaining 500 bison found in the Henry Mountains and Copper River herds are considered disease free, free ranging, and genetically pure. There are two additional public trust herds in Utah and South Dakota at Antelope Island and Custer state parks, respectively, but both herds may have some cattle gene introgression and are managed through an annual culling process.

ⁱ The 70th Annual Society of Range Management Annual Meeting will be held in St. George, Utah January 29 – February 2, 2017. This article highlights Utah range science and management. For more information on SRM Red Rock & Rangelands 2017 see <http://rangelands.org/srm17/>.

Table 1. Free-ranging bison herds found on public lands in the United States, 2016

Herd	Lead agency	Fenced or ranging	Disease	Genetic status	Herd size	Acres of habitat
Book Cliffs	UDWR	Ranging	Disease free	Some introgression	200	1,400,000
Chitina/Cooper River	Alaska Fish and Game	Ranging	Disease free	No introgression detected	110	100,000
Grand Canyon	NPS	Ranging	Disease free	Some introgression	300	23,000
Grand Teton	NPS	Ranging	Brucellosis positive	No introgression detected	900	360,000
Henry Mountains	UDWR	Ranging	Disease free	No introgression detected	325	325,000
Yellowstone	NPS	Ranging	Brucellosis positive	No introgression detected	4600	2,200,000

Abbreviations: NPS, National Park Service; UDWR, Utah Division of Wildlife Resources.

Two of the free-ranging herds are found in the state of Utah. Both are free ranging, occur on public land, and are managed as wildlife through hunter harvest. Both populations were initiated through transplants with the Henry Mountains bison herd started in the mid-20th century, and the Book Cliffs herd being started much more recently in the early 21st century. The purpose of this paper is to document the process that enabled these transplants to be successful and to suggest a model that may be used by other entities to restore free-ranging bison onto public lands in the future.

Early Restoration Efforts

Bison are native to Utah⁶ and are depicted on at least 19 Native American rock art panels scattered throughout the state. Additionally, early explorers reported observations of bison along the Green River and near Utah Lake, whereas early trappers reported bison throughout northern Utah. However, by 1841, mountain man Osborne Russell, noted that bison had left the Great Salt Lake Valley, only returning during times of winter. Mormon pioneers utilized bison on their westward trek as far west as the Sweetwater River in Wyoming and as late as 1857. William Clayton, who served as a scout for Brigham Young, reported signs of bison in the Salt Lake Valley in 1847. Jones reported finding two old bison skulls on the Manti National Forest in central Utah in the 1980s (D. Jones, personal communication, 2006).

Bison are believed to have been extirpated from Utah prior to statehood in 1896, as no further records were made of wild, free-ranging bison in the state. The species was mentioned in early wildlife laws passed by the Utah Territorial Legislature, but by 1919 bison were no longer classified as a game animal.⁷

In 1941, Dr. 'Buffalo Bill' William Goetzman, chairman of the Carbon-Emery Wildlife Federation, collaborated with the Utah State Department of Fish and Game (UFGD, currently Utah Division of Wildlife Resources [UDWR]), United States Division of Grazing, and local stockmen to move bison into the

state.^{8,9} The Henry Mountains herd was started when 18 bison (3 bulls and 15 cows) were transplanted from Yellowstone National Park to the Robber's Roost Ranch north of the Dirty Devil River on the San Rafael Desert (Fig. 1).¹⁰ Each animal was tested for brucellosis and inoculated with a vaccine for the disease. The majority of the animals established themselves near the release site, but a few bulls dispersed to areas north and west. One animal traveled as far away as the Strawberry Valley in northern Utah, a distance of about 135 miles. Another bison moved southwest toward the Arizona border. Because of the dispersal, the Henry Mountains herd was supplemented with 5 additional bulls the following year.¹¹ No other augmentations to this herd have been made since 1942. In 1942, the entire herd crossed the Dirty Devil River onto the Burr Desert. Bison used the Burr Desert as winter range and the Henry Mountains as summer range from that time until 1962.

By 1962, the population had grown to an estimated 71 animals. Blood samples were taken during a special hunt that year, and several animals tested positive for *Brucella* titers, indicating possible infection in the herd.⁸ In 1963, 69 bison were captured in a corral and tested and inoculated for brucellosis. Animals suspected of brucellosis infection were marked, released, and harvested by sport hunters. Since the test and culling actions initiated by the UDWR, no further suspect or reactors have been detected in the several thousand blood samples collected through hunter-harvested animals from 1966 to the present (UDWR, unpublished data), indicating that those actions were successful in eradicating the disease from the herd or that it was never truly present. No attempt was made to isolate and confirm the disease from tissue samples,⁹ leaving the possibility that the results may have been false positives.

An unanticipated result of the harassment from the capture operation was a change in the distribution of the bison. After the roundup, the bison moved south to the Henry Mountains, which they have been using year round since 1963.

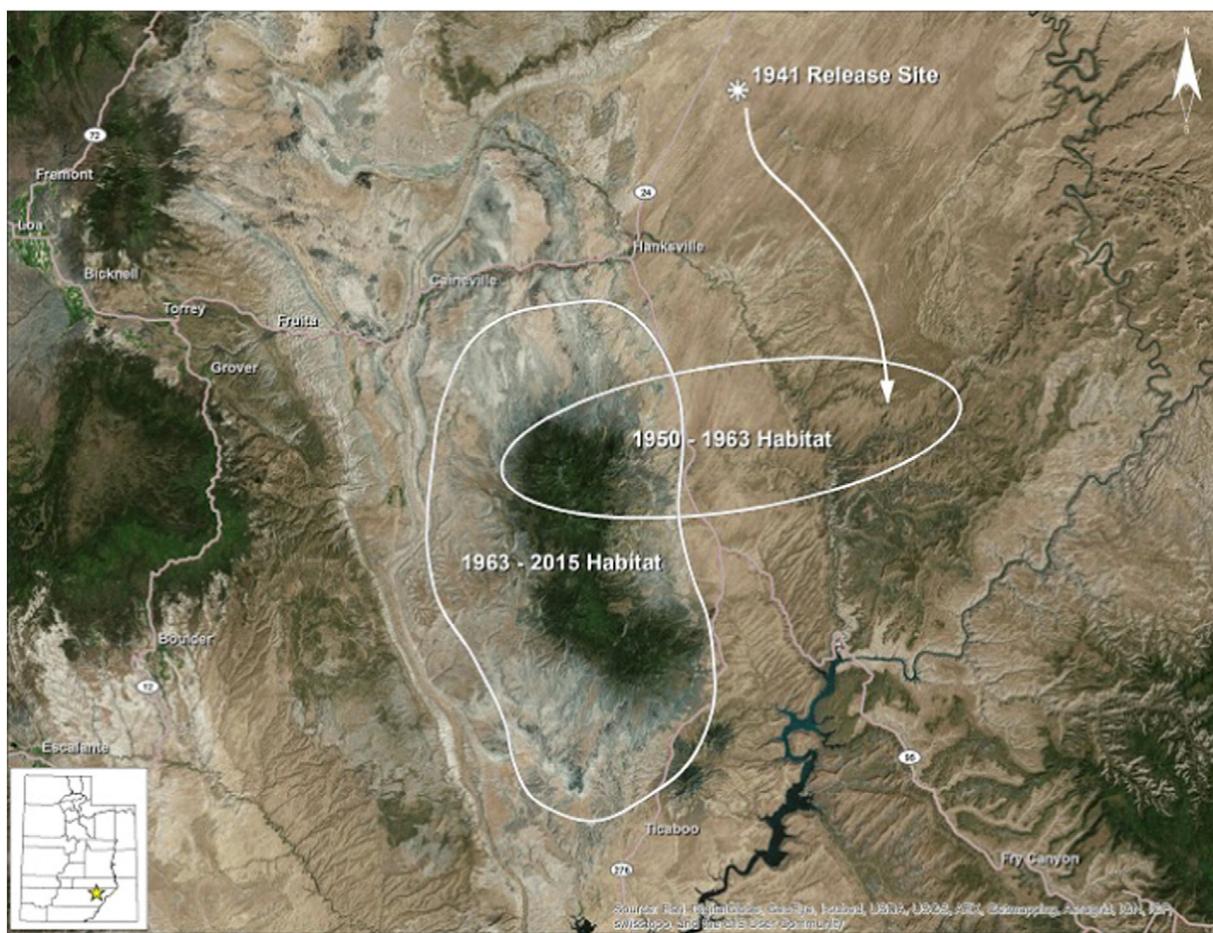


Figure 1. Bison release site and distribution near the Henry Mountains, Utah.

Early Population Expansion

The original agreement between sportsmen, livestock operators, UFGD, and the United States Grazing Service indicated that should the restocking be a success, the herd would be managed at 100 animals.¹² However, over time, the population objective was changed. The population stayed under 100 bison until the early 1970s. By 1979, the population increased to 230 adults pre-hunting season, and by the early 1980s hunting permits had tripled to 27. At that time, the Bureau of Land Management (BLM) prepared a management framework plan for the Henry Mountains and took it through the public process. The plan identified sufficient forage to support additional bison, while not impacting livestock. As such, the population objective was raised to 200 adults post-hunting season, which approximately equals 290 total bison (cows, bulls, and calves) pre-hunting season.

The objective of 200 adults was again raised in the mid-1990s due to two transfers of animal unit months (AUM) to bison. An AUM is the amount of forage necessary to support one cow and her calf for 1 month. Tercero Corporation relinquished 166 in 1986, and Jack King sold his allotment of 800 AUMs in 1995. This provided additional forage for bison, and the objective was raised to 275 adult bison post-hunting season. Sportsmen for Habitat, a local conserva-

tion group, purchased an additional 505 AUMs in 2001 on Mount Ellen, but no adjustment was made to the population objective. Although the seller of those AUMs agreed to the request to have the forage reallocated to bison, the consensus of all parties was that forage would best be used as a buffer between bison and cattle during extreme drought events.

Bison Management

The Henry Mountains bison herd has been actively managed since they were reintroduced. Specific practices include annual fixed-wing/helicopter surveys to estimate total abundance, summer ground classification surveys to estimate calf production and bull to cow ratios, water developments, and extensive habitat improvement projects such as pinyon and juniper tree removal to reseed with grasses, shrubs, and forb. A population estimate is derived annually based on the number of animals observed, count conditions, ground classification, hunter harvest, and annual natural mortality rate (Fig. 2).^{13,14}

Sport harvest plays a critical role in the management of bison on the Henry Mountains. Unlike most bison herds that reside in high fence enclosures and are managed through a culling process, the Henry Mountains herd is completely free roaming and managed entirely through hunting. Hunting is essential to maintain the population at the desired objective,

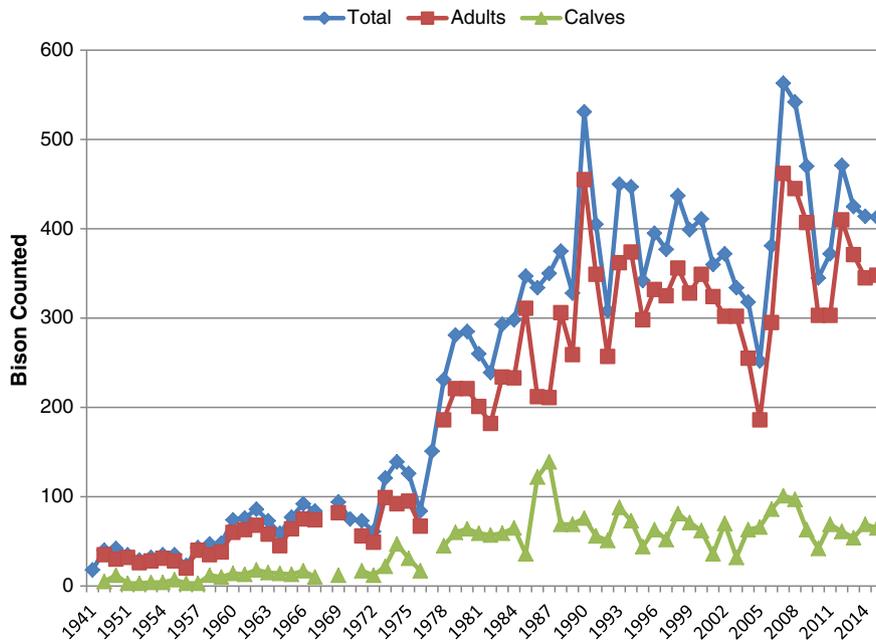


Figure 2. Pre-season bison population estimates for the Henry Mountains, 1941 to 2015.

and also provides a unique hunting opportunity for sportsmen and women. Limited hunting began in 1950 when 10 permits were issued by the UFGD. Since the reestablishment of the Henry Mountains bison herd, 2715 total hunting permits have been issued resulting in the harvest of 2300 (1228 bulls, 1072 cows) bison (Fig. 3).

Unanticipated Events

Several incidents occurred that changed the dynamics of managing the Henry Mountains herd. Previous to 1985, a combination of fixed-wing aerial flights and ground counts were used to estimate bison numbers. In 1986, UDWR began using helicopters to survey bison. As a result of this change,

population abundance estimates increased over the next several years. However, by 1989, livestock operators commented that they still felt that UDWR's population estimates were unrealistically low and competition for forage between cattle and bison was increasing, especially on winter ranges. Indeed, the 1990 helicopter survey estimated more than 530 bison on the Henry Mountains. The estimated 455 pre-season adults were substantially higher than the post-season objective of 275 adults. To address this problem, the Utah Wildlife Board held a special meeting where additional permits were issued to help bring the population back closer to the objective. That fall, 184 total bison permits were issued resulting in a harvest of 47 bull and 103 cow bison.

The second incident occurred about a decade later. Severe drought in southern Utah during the late 1990s and early

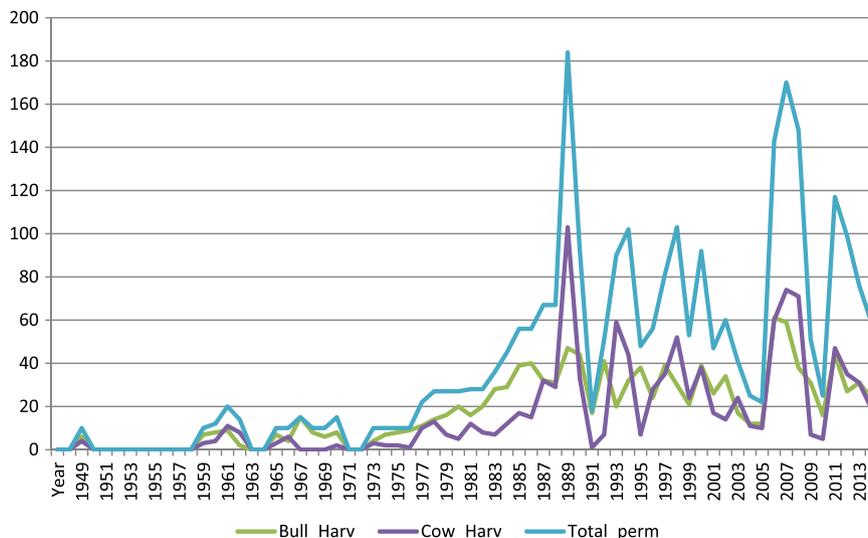


Figure 3. Hunter harvest of bison on the Henry Mountains, 1950 to 2015.

2000s impacted bison habitat use. Large numbers of animals 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 while there was sufficient forage for bison on summer ranges, conflicts were arising on winter ranges where no AUMs had been allocated to bison. Because of this concern, BLM officials asked UDWR to help resolve this problem and suggested purchasing additional AUMs particularly in winter allotments where unresolved conflicts were occurring. In 2003, Sportsmen for Habitat once again purchased an additional 2530 AUMs in bison range from a willing seller, including 586 on Blue Bench. This permit was held in non-use for several years following its purchase and has been used at reduced numbers since. This action provided forage for approximately 300 cow-calf pairs and helped alleviate competition between livestock and bison on much of the unit.

In 2003, wildfires on the Henry Mountains drastically altered the landscape for livestock and wildlife. The Lonesome Beaver fire began on Memorial Day and burned about 4250 acres on Mount Ellen in aspen, conifer, and oak habitat. The Bulldog fire started soon afterward and burned approximately 39,000 acres. The UDWR and BLM worked to reseed burned areas over the next several years. Areas within wilderness study areas were aerially reseeded and other areas on the mountain were chained and mechanically reseeded. Abundant rainfall led to increased forage production, mainly on summer ranges, which benefitted livestock, bison, and other wildlife.

2007 Management Plan

As a result of the habitat enhancement projects and reduced competition with livestock, UDWR began a process to revise the Henry Mountains Bison Management Plan and consider increasing the population objective. The Henry Mountains Bison Working Group was established in 2005, consisting of 24 members. The committee included three county commissioners, eight livestock permittees, one representative of the Utah Farm Bureau, three representatives from sportsmen's groups, one public access representative, three UDWR employees, four BLM employees, and one representative from the Trust Lands Administration. Committee meetings began in April 2006 and were held bimonthly through March 2007. Not all members attended each meeting, but all interests were adequately represented. Although the group was quite large, an open approach led to lively discussions that encompassed a myriad of issues that needed to be resolved by the plan. Ground rules were set, and consensus was chosen as the way to make decisions. Only one vote needed to be held when consensus could not be reached: the proposal to remove all bison from the Henry Mountains. That vote failed 23 to 1.

The committee identified 15 issues to be addressed in the plan (Table 2). Many of the issues centered on conflicts between livestock and bison, particularly on winter ranges. Questions

arose concerning the accuracy of the annual survey conducted by UDWR, as demonstrated by the higher numbers counted in 1990. From a national perspective, genetic issues with bison were becoming a larger concern. Given that Yellowstone National Park was the source herd, it was believed that the Henry Mountains herd would not have cattle gene introgression. Further, the Henry Mountains bison herd was believed to be only one of four populations that could be classified as both genetically pure and disease free. Thus, the need to maintain a viable population was identified as a concern.

After many months of discussions the committee came up with an overall goal: maintain the Henry Mountain bison herd as a genetically viable free-roaming bison population in balance with available habitat and other land uses. The new population objective was proposed as a post-hunting season population size of 325 adult and yearling bison by 2012. The draft plan also included goals, objectives, and strategies to provide quality habitat for healthy populations of bison on the Henry Mountains; achieve a distribution of bison that better utilizes available habitat and minimizes conflict; conduct research to determine the accuracy of the bison survey and to learn more about bison ecology and interactions with cattle; and to provide for a 'Once In a Lifetime' bison hunting opportunity and high quality opportunities to view bison.

Coinciding with this effort to revise the unit management plan was a precipitous drop in the number of bison observed during the annual surveys in 2004 and 2005. At the time, biologists thought the years of drought were causing the population to decline. More likely, the reduced survey counts were due to changes in bison behavior and habitat use. Instead of being found in the typical areas, bison were using areas with steeper slopes that were more heavily wooded when the surveys were conducted. Changes in vegetation after the large fires in 2003 likely influenced those changes. Also, changes in observers flying in the helicopter during the surveys may have played a role in the lower counts. In 2006, higher bison numbers were counted, but the low counts in previous years led to distrust of UDWR population estimates, particularly by livestock producers and elected officials, further highlighting the need to determine the accuracy of the survey.

Regardless, efforts to approve the new management plan moved forward. The draft plan was taken through the UDWR Regional Advisory Council process in July 2007. Based on their feelings of distrust, members of the livestock community on the committee voiced concerns and opposition to the plan during the first two meetings in Cedar City and Green River, Utah. Specifically, they did not believe UDWR population estimates were accurate, that bison numbers would be brought back to the current objective, or that UDWR would address habitat concerns on cattle winter ranges. At that point, UDWR leadership instructed those involved in the process to get support from all affected parties or they would pull the plan from the agenda. That evening, UDWR biologists met with the affected livestock producers in the parking lot at the John

Table 2. Henry Mountains Bison Plan issues and concerns, 2007

Rank	Issue
1	Designing and implementing habitat projects to resolve conflicts between bison and livestock
2	Maintain viable bison numbers to prevent Endangered Species Act 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 conservation group allotments
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 (e.g., deer)
10	Wilderness Study Area issues
11	Bison Permits for permittees to offset drought-related expenses
12	Consistency with revised BLM Resource Management Plan
13	Private land issues
14	Access issues
15	Bison survey accuracy

Abbreviation: BLM, Bureau of Land Management.

Wesley Powell Museum in Green River. Under a streetlight, issues were pushed back to the point that each person was asked what they wanted. Everyone wanted to protect the health and integrity of the range resource and have livestock operators be able to run successful operations. Everyone supported bison on the range, provided the first two needs could be met. With that agreement, the plan moved forward and was recommended for approval by the UDWR Regional Advisory Council to the Wildlife Board in August.

However, in July 2007, bison returned to utilizing their more traditional ranges during the summer in open chained areas and grasslands on winter ranges used by cattle. The pre-hunting season estimate increased from 381 total bison in 2006 to 563 in 2007. The pre-hunting season estimate of 462 adults was substantially over the objective of 275 adults post-season. Realizing that it would be very difficult to remove over 200 bison during a single hunting season due to hunter crowding issues and the likelihood that bison would move to more inaccessible habitats and lower hunter success, UDWR biologists proposed a 3-year hunt strategy to get the herd back to the objective of 275. The hunt strategy was then presented to the bison committee. Prior to consideration of the draft management plan, UDWR biologists presented the 3-year hunt strategy to the Wildlife Board, which increased the number of hunts from three to five and increased the number of hunting permits from 70 to 143. A similar number of hunting permits were to be requested the following 2 years to bring the herd back to objective.

The Wildlife Board approved the 3-year hunt strategy and then considered drafting the Henry Mountains Bison Plan. Livestock interests from the committee were at the meeting. At the end of the presentation, one by one, each testified that although the plan was not perfect, it was the best the committee could agree upon. If UDWR would follow through with the plan and get the herd back to objective, they would support it. Based on that testimony, the Wildlife Board unanimously approved the plan that increased the objective to 325, provided that the herd was brought back to 275 adults post-hunting season prior to increasing the herd. At the same meeting, the Wildlife Board also passed the Book Cliffs Bison Plan. That plan called for 70 bison to be moved from the Henry Mountains to the Book Cliffs, which would further help bring the population back to objective in a timely manner.

The 3-year harvest plan and transplant resolved livestock representatives concerns over UDWR's commitment to manage to objective. Over 460 bison permits were issued on the unit from 2007 to 2009, and hunters harvested 363 animals. In addition, 71 bison were moved to the Book Cliffs unit (Fig. 4). A total of 434 bison were removed from the Henry Mountains during that 3-year period. The post-hunting season estimate of adult bison on the unit was 270 in 2010. Permit numbers were reduced to 51, and the population began a gradual increase, reaching a post-hunting season estimate of 320 adults in 2014.

Concerns over competition with cattle on winter ranges were addressed through habitat enhancement. Between 2007



Figure 4. Bison translocated to the Book Cliffs were capture with a net gun and flown by helicopter to a staging area prior to transport.

and 2015, almost 10,000 acres of habitat improvements were completed. Treatment types included chaining, pinyon-juniper lop and scatter, reseeding, and water has been developed in numerous areas. Those projects, costing \$1.4 million, were designed to increase the amount and quality of forage available to both bison and livestock and improve their distribution. Funding for habitat projects came from several sources including UDWR, federal agencies, and various conservation groups. However, there are still several issues to be addressed. The foremost is to find a way to alleviate conflict between bison and cattle on several winter allotments. Reclamation of winter ranges in areas with extremely low rainfall has proven difficult, and efforts have been hampered by lawsuits from environmental groups opposed to habitat treatments in these areas. UDWR, livestock operators, and sportsmen remain committed to looking for solutions to this issue.

Accuracy of the bison survey and competition between bison and livestock were addressed through research projects. UDWR partnered with Sportsmen for Fish and Wildlife and the BLM to fund bison research on the Henry Mountains through Utah State University. To help improve monitoring and management, a sample of bison were marked with GPS collars to: 1) assess their movements and dispersion in relation to sex, season, and vegetation quality; 2) determine their spatial and temporal use of cattle grazing allotments; and 3) observe their foraging behavior in relation to competitive interactions with cattle and lagomorphs. A set of exclosures was deployed to experimentally assess the degree of forage competition amongst herbivores that use the range. The GPS collars also provided known locations of bison that helped estimate detection probabilities of bison during helicopter surveys (i.e., sightability), as well as probabilities of attaining duplicate observations. Marked individuals were also followed to estimate adult survival and factors that may affect it. The best models for abundance and survival

were then combined with long-term helicopter survey data, herd composition surveys, and harvest data in an integrated population model to help direct adaptive management of the Henry Mountains bison population for meeting stakeholder objectives.^{15,16}

In addition to the population model, which helped correct counts made under unfavorable conditions, other significant findings of the research included the observation that lagomorphs were significant competitors for forage when rabbit populations were at high levels.¹⁷ Additionally, genetic analysis of the Henry Mountains bison herd indicated that the herd was indeed pure and free from any cattle gene introgression. As expected, the herd's ancestry is dominated by genomic contributions from the Yellowstone herd, with minor contributions from the National Bison Range, Fort Niobrara, and Wind Cave.¹⁸ Contributions from these other herds occurred at Yellowstone National Park prior to the transplant to Utah.

The lessons learned from efforts to increase the population objective were essential to obtaining social approval of the management plan. Those included the need to admit and rectify mistakes, recognize the need to listen to the concerns of other resource users, create a mutual purpose to meet the needs of all affected parties, and follow through with commitments. In essence, trust is essential to any cooperative effort to reintroduce bison onto public lands.

Book Cliffs Bison Herd

Plans to reintroduce bison into the Book Cliffs began decades before these efforts came to fruition. Collaborating with the Rocky Mountain Elk Foundation, The Nature Conservancy, and the BLM, UDWR led efforts to purchase two ranches in the Book Cliffs in the 1990s. Private lands from these purchases were transferred to UDWR, and grazing permits associated with the ranches were redistributed with a portion of forage being set aside for wildlife.¹⁹

The lessons learned from the Henry Mountains plan were used to gain approval to establish a bison herd in the Book Cliffs. UDWR assembled a committee for this plan as well, with a similar makeup as the Henry Mountains Bison Working Group. The committee worked together to identify and resolve issues. Goals and objectives were set to address those concerns, and UDWR personnel met with Uintah and Grand counties to resolve any outstanding issues. The Book Cliffs Bison Plan was presented simultaneously with the Henry Mountains plan, and with a good base of support, the management plan was passed by the Utah Wildlife Board in August 2007.

The Ute Tribe reintroduced a herd on the Hill Creek Extension of the Uintah and Ouray Reservation, beginning with the release of six animals in 1986. This was followed by several other Ute Tribal releases to establish a viable herd. Although many of these animals came from the National Bison Range with some from the Henry Mountains, other animals came from sources that may have had some cattle gene introgression. The 2006 to 2007 winter bison population on Ute Tribal grounds was estimated at 580 animals. Whereas bison from the Ute herd localized their year-long residence principally within the Hill Creek Extension, small groups began frequenting ranges outside of the trust boundary. Prior to reintroduction on public lands, bison were regularly observed in the West Willow and Willow Creek drainages, Steer Ridge, Rock Springs Mesa, Winter Ridge, Sunday School Canyon, Wild Horse Bench, Seep Ridge, Indian Ridge, Wood Canyon, and as far east as Long Draw and Big Park. The number of bison commonly observed in these areas was around 35.

To expedite the establishment of a bison herd on the Book Cliffs, a transplant was initiated in August 2008 when 15 yearling bulls and cows were moved from Ute Tribal lands to the Book Cliffs. The animals were captured during the Tribe's annual roundup, tested for disease, and loaded in horse trailers. The animals were released in Bogart Canyon (Fig. 5). In January 2009, capture efforts began to move bison from the Henry Mountains to the Book Cliffs. A helicopter was used to locate bison and individuals were captured using a net gun shot from a helicopter. Muggers hobbled and blindfolded bison, which were then slung to a site where they were fitted with a radio collar, given a health inspection, had blood samples taken, and finally were placed into horse trailers for transport. A total of 31 bison, consisting mostly of young cows and yearlings, were transferred to Antelope Island holding facilities, where they were held for several days awaiting results from tuberculosis and brucellosis testing. Once proclaimed disease free, these bison were released on Steer Ridge in the Book Cliffs.

An additional 40 bison were captured in January 2010 following the same process outlined above. In all, 71 bison were moved from the Henry Mountains to the Book Cliffs (Fig. 6). The animals separated into several small herds, intermingling with the animals obtained from the Ute Tribe. Since its establishment, the Book Cliffs bison herd has shown steady growth with a 2015 population estimate of 200 animals, not including any bison on Ute Tribal Trust Lands.

The overall objective for this herd is 450 adult and yearling bison post-hunting season. Occasional intermingling of the two bison herds has been documented.

Bison hunting on the Book Cliffs began in 2012, when 6 permits were issued for the Wild Horse Bench area. Permits have continued to increase since they were initiated with 7, 11, and 16 permits being issued in 2013, 2014, and 2015 respectively. These permits have provided hunting opportunities while also helping to address problems associated with Tribal bison leaving trust lands. Hunter success has been 100% on all hunts, with 35 bulls and 5 cows harvested. In keeping with Tribal agreements, each year a percentage of the permits has been issued to the Ute Tribe.

Since bison were reintroduced in the Book Cliffs in 2007, UDWR and its partners have aggressively conducted habitat restoration projects to benefit bison, livestock, and other wildlife species. Much of this habitat restoration has consisted of developing water, treating winter ranges, and enhancing the limited summer range that exists in this area. From 2007 to 2015, nearly \$7,000,000 was spent and over 23,000 acres have been treated. These projects have improved habitat and helped to reduce conflicts between bison and cattle on the Book Cliffs.

Several challenges have arisen with management of the Book Cliffs bison herd. The most complex involves tribal bison that have wandered to the west off of tribal lands, crossed the Green River, and moved off the Book Cliffs Management Unit. Some of the bison have also moved onto neighboring private lands, which has caused concerns with some landowners. The Ute Tribe has maintained that these are their bison and have attempted to herd them back to tribal lands with limited success. Other bison managed by UDWR on public lands have moved across the state line into Colorado, where they are no longer protected as wildlife, because Colorado has not defined bison as wildlife through state statute. UDWR is working with Colorado to locate animals that cross the state line to provide an opportunity to move them back to Utah. Distribution of bison is also becoming a concern as the population continues to increase toward objective. It is imperative that mutual trust is maintained through communication and keeping commitments by all parties as the herd expands.

Conclusions

A species once on the brink of extinction, the bison was named as the National Mammal by President Barack Obama in 2016 (<http://www.nature.nps.gov/biology/bisonbellow/may12.cfm>). Nationally, there is an effort to restore the ecological function of bison on Department of Interior lands; however, these efforts are proving to be very difficult.

It is fortuitous that sportsmen, livestock operators, UDWR, and the U.S. Grazing Service took it upon themselves to move 18 bison from Yellowstone National Park to a remote desert grassland in south central Utah. Interestingly, although many years later, the successful effort in the Book Cliffs followed a similar pattern. Both began as a collaboration where mutual trust had to be developed and



Figure 5. Book Cliffs bison herd release sites and distribution, 2008 to 2016.

maintained over time. It was essential that the interests and concerns of all affected parties were heard and met.

Although some luck may have been involved in selecting a genetically-pure source for the Henry Mountains bison herd, the success of the project was the result of determination, hard work, collaboration, and an adaptive approach to change. Based on the Utah experience, there are several key elements of a successful program to restore bison. First, one must identify and obtain a genetically-pure and disease-free source, releasing the animals on large expanses of suitable habitat. Bison are nomadic and are going to go where they want to go. They are not easily contained with fences. Second, potential conflicts must be identified and addressed in a transparent manner. Our experience shows that livestock producers running cattle on the unit were aware of problems and conflicts before they were detected through agency monitoring. Openly addressing the questions led to improvements in management strategies and revealed some unexpected results. Third, mutual purpose and trust must be developed and continually nurtured. In our efforts to increase bison numbers, we could not move forward until the needs of all affected stakeholders were met. We had to ask two questions: what is it you want,

and how do we provide what you want while maintaining a viable bison herd on the unit? Mistakes must be acknowledged and promises fulfilled to maintain trust. Lastly, it is essential to maintain an active and flexible management program to adjust to the changing environment. In Utah, we have adjusted our survey methods, increased or decreased hunting permits, and implemented habitat improvement projects as necessary to meet the needs of both bison and other resource users.

Bison in Utah are unique. As free-ranging animals managed as wildlife through hunting, they most closely reflect the ecological role filled historically by this species. These bison are truly wild. Bison are majestic, and they will continue to exist on these ranges as we successfully manage to preserve them and their habitats. Hopefully, lessons learned from our experience can be used as a model for others to follow and adjust in future efforts to restore bison to fill their ecological role.

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Figure 6. Translocated free-ranging bison find a new home in the Book Cliffs in eastern Utah.

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