

Bison in Yellowstone: A Historical Overview

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Abstract

Bison were prehistorically common in the Yellowstone area, but were virtually exterminated by 1900. Energetic conservation efforts, involving the introduction of animals from domestic herds elsewhere in the US, intensive bison ranching operations from 1902-1950, frequent culling of herds, and other activities, resulted in the reestablishment of three herd groups in Yellowstone National Park (YNP) by 1950. Brucellosis was identified in Yellowstone bison in 1917, and its presence drove management direction, especially regarding possible emigration of bison from the park to surrounding historic winter ranges. Ungulate herd reductions in the 1960s, based on prevailing beliefs about range condition and perceived "overgrazing," reduced bison to a few hundred, but since 1967 and the initiation of the natural regulation policy, bison numbers increased to more than 3,000. Continued controversy surrounds interagency efforts to manage the bison to ensure their survival, satisfy public desire for bison on public lands, and protect livestock interests. Ongoing elements of the bison management issue include attempts to control bison movements beyond park boundaries, especially to the north and west. When the state of Montana achieved brucellosis-free status in 1985, concerns increased over possible infection of Montana livestock by bison, leading to a series of draft environmental assessments and environmental impact statements and a 1995 lawsuit brought by Montana against the NPS and the USDA Animal and Plant Health Inspection Service. All involved agencies currently participate in the Greater Yellowstone Interagency Brucellosis Committee to develop a long-term management strategy.

Introduction

The foremost scholarly source on the history of bison in YNP is Meagher (1973). Her monograph reviewed all aspects of Yellowstone bison, including prehistory, early history, ecology, and management history. Additional work by Meagher (1971, 1974, 1981, 1985, 1989a, 1989b), as well as other writers (Schullery 1976, Barmore 1980, Houston 1982, Schullery 1976, 1986, 1995, Thorne et al. 1989, Meagher et al. 1992, Keiter and Froelicher 1993, Meyer and Meagher, 1993, 1994, Price

and Schullery 1993, Schullery and Whittlesey 1992, Turner et al. 1993, DelGuidice et al. 1994, Singer and Norland 1994, Pearson et al. 1995, Whittlesey 1995, Kirkpatrick et al. 1996, National Park Service 1997), has filled in many aspects of the species' management history, ecology, and current place in the Yellowstone setting. Several papers presented at the present conference further enrich this information base. The present paper briefly reviews the prehistoric and historical context for modern bison management in YNP.

Yellowstone bison in prehistory

Meagher (1973) established that bison are native to YNP and the surrounding country, based on a variety of prehistoric evidence. Much additional evidence has emerged in the past 24 years. The paleontological evidence from Lamar Cave, on Yellowstone's northern range, reveals bison bones on 9 of 16 layers spanning about 3,000 years before present (Hadly 1995). Less than 5% of the park has been surveyed archaeologically, but eight archeological sites in the park (3 in Montana, 5 in Wyoming) contain bison bones; four of these were roasting-pit sites and one was a whole butchered bison (Johnson 1997). Probably because of sampling focus and limited sample size, most of these sites are bunched within the most recent 1500 years. Another form of archeological evidence for bison presence exists in a 9,000-year-old chert knife blade collected in Yellowstone, upon which recent analysis revealed bison blood residue (Yellowstone Science 1995).

The early historical record of the YNP area also revealed abundant evidence of native bison. Schullery and Whittlesey (1995) analyzed 168 pre-1882 accounts of the YNP area, finding numerous reports of bison, including 6 reports of individual animals, 8 reports of small groups, 17 reports of herds, 8 reports of meat, skin, or other parts, 9 reports of tracks, trails, scat, or other sign, and 26 general statements indicated presence of bison in the area. Though the relative abundance of large mammals such as bison prehistorically compared to now continues to be a subject of debate (Schullery and Whittlesey 1992, Kay 1994, Wagner et al. 1995, National Park Service 1997, Schullery 1997), it appears from the most current evidence that bison and other ungulates were common and using available habitats as varying environmental conditions would allow. It is important to emphasize, however, that the paleontological, archeological, and historical research completed so far does not allow for reliable comparisons of the abundance of bison or other ungulates at past times with abundance now. These types of evidence are successful in establishing that these large mammals are native to the YNP area.

Bison management in the new national park

Congress established Yellowstone National Park on March 1, 1872, as "a public park or pleasuring ground for the benefit and enjoyment of the people." The Secretary of the Interior has exclusive jurisdiction in the park and "shall provide for the preservation, from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders, within said park, and their retention in their natural condition . . . and provide against the wanton destruction of fish and game found within the park" (16 USC 21-22).

The admonition by Congress to the Secretary of the Interior to protect the wildlife gave no indication of the park's eventual role in wildlife conservation. The organic act only gave the wildlife the protection routinely presumed necessary in the early days of the conservation movement; YNP was treated similar to other public lands, with hunting not only allowed but often necessary for subsistence of travelers (Haines 1977, Schullery 1997).

By the mid-1870's, however, a market-hunting slaughter similar to that experienced by many wildlife populations in North America was underway in Yellowstone (Schullery and Whittlesey 1992, Schullery 1997). The reaction to this wasteful destruction of park wildlife was the issuance of a secretarial order on 15 January 1883, prohibiting all public hunting in the park (Schullery 1997). This order was primarily the result of lobbying by sportsmen-conservationists, led by Forest and Stream editor George Bird Grinnell. They advocated the protection of park wildlife because then the park would serve not merely as a game reserve, but also as a game *reservoir*, from which surrounding public hunting lands would be perpetually restocked by migrating animals. As of 1883, according to Grinnell, the park was to be managed as "a breeding ground for big game which will furnish sport for hundreds of hunters" (Schullery 1997).

This surprisingly ecosystem-oriented principle of wildlife management, while sound in its fundamentals, has caused generations of land managers in and outside of YNP to labor with difficult issues of coordination and land access, in attempting to come to terms with the migratory urges and winter range needs of numerous wildlife populations. It is interesting that in the 1880s, the proponents of this far-reaching approach to greater Yellowstone game management said very little specifically about bison as one of the species whose protection would lead to good hunting beyond the park boundaries. They seem to have been focused primarily on the elk and deer herds, which flourished following the prohibition of hunting. Bison were another matter, because the slaughter of this species had been comprehensive throughout the west in the 1870s. Even in YNP, by 1883 bison numbers were already low and continued to decline through the 1890s. In the park's first decades, an eventual goal of huntable bison on public lands beyond the park was probably in the minds of some park defenders, but they faced a more pressing goal: simply to ensure the survival of the species at all.

During the 1890s, the reports of the U.S. Army's acting superintendents in Yellowstone became progressively more alarming, as bison population estimates declined from hundreds, to scores, to dozens (Meagher 1973). A great sense of national guilt was aroused by a variety of conservation writers, and YNP assumed a high-profile role in bison conservation as our last chance to preserve free-ranging wild bison (there were by this time numerous private herds around the country). In 1902, only 23 wild bison were counted in the Pelican Valley area, and were assumed to be virtually all, or all, of the remaining wild bison in YNP. That year, 21 semi-domesticated plains bison (from the Pablo-Allard herd in Montana and the Goodnight herd in Texas) were brought to Mammoth Hot Springs to ensure survival of some bison in Yellowstone, as the native population's survival appeared doubtful (Meagher 1973, Schullery 1976).

Saving the bison in Yellowstone

The campaign to save Yellowstone's bison was spectacularly successful, and helped make the bison a leading symbol of the growing wildlife conservation movement. For generations, Americans looked upon the Yellowstone bison herds with pride, as proof that we as a nation could act to preserve an important part of our heritage.

A gradual strengthening of legislative mandates had given the managers of YNP more direction and justification for protecting bison. The heroic capture of a bison poacher in YNP in 1894 led to the passage of the first "Lacey Act" (not to be confused with the later act by the same name that forbade interstate commerce in game), which provided stern penalties for those breaking park regulations (Bartlett 1985, Schullery 1995). The National Park Service (NPS) Act of 1916 (16 USC 1 et

seq) directed the NPS to "promote and regulate the use of the federal areas known as national parks...by such means and measures as conform to the fundamental purpose of the said parks . . . which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

When the new bison arrived at YNP in 1902, they were first kept in a facility at Mammoth Hot Springs, near park headquarters, then known as Fort Yellowstone. A few wild bison calves were captured from the free-ranging herd in the Pelican Valley and introduced into the captive herd about the time the captive herd was moved to the Buffalo Ranch in the Lamar Valley in 1907. This captive herd was intensively managed until about the late-1930s. In time, these bison were allowed to range freely in Yellowstone and mix with the native herd, which despite dire predictions had also thrived under the improved protection from poaching provided by the army and the NPS. In 1936, bison were transported to the Firehole and Hayden valleys. In 1954 the entire population numbered 1,477. Eventually the bison ranching operations were phased out and the native and introduced populations were allowed to mix and range freely throughout the Yellowstone region (Meagher 1973).

In 1917, it was discovered that at least some park bison carried brucellosis (*Brucella abortus*), compelling managers to treat this wildlife species differently than others in YNP (Meyer and Meagher 1994, Whittlesey 1995). Because brucellosis is a major economic risk to livestock operations, YNP bison were not considered appropriate migrators, as were the elk, moose, deer, pronghorn, and other animals who left the Yellowstone "reservoir" to winter on public and private lands beyond park boundaries.

YNP, especially the park's northern range, has been the site of one of North America's longest-running and most controversial wildlife management challenges. Since the 1920s, many observers from the federal agencies, the scientific community, and the public, have believed that the northern range was overpopulated with ungulates that were causing range deterioration and erosion due to overgrazing (Pengelly 1963, Houston 1982, Wright 1992, Wagner et al. 1995, National Park Service 1997).

In the 1960s, using range assessments based on commercial livestock grazing practices, NPS managers attempted to reduce and then hold ungulate populations at prescribed levels then believed to be best for the condition of the range (Cooper 1963). This resulted in the slaughter of thousands of elk and hundreds of bison in a period of a few years. In 1967 when the reductions were stopped due to strong public opposition, the total bison population numbered only 397 animals. In the late 1960s, NPS managers adopted a policy informally known as "natural regulation," in hopes of determining if ungulate populations in Yellowstone would be regulated by natural processes, launching a whole new phase of the northern range controversy that continues to this day. Bison numbers rebounded steadily following the cessation of reductions, increasing to a summer peak of about 4,200 in 1994 and generally remaining well above 3,000 through the 1990s.

In October, 1996, about 3,500 bison were counted in the park. The winter of 1996-1997 featured a series of thaws and freezes and snowfall approaching 200% of normal on some ranges, resulting in conditions that essentially locked ungulates out of their traditional winter range in the park. This resulted in 1,084 bison being killed when they moved to or beyond the park boundary. Dissatisfaction over bison management in greater Yellowstone reached historic highs, not only

among the public but also among professional managers from several state and federal agencies. Though concern over possible transmission of brucellosis remained an important element in the issue, other topics gained increasing attention. Among the concerns that surfaced or became better known at this stage were: 1) possible effects that winter grooming of park roads might have on movements, distribution, survival, and summer ranges of bison, 2) the need to establish and maintain bison ranges on public lands outside of YNP, 3) a public interest in giving bison a higher priority in the traditional bison vs. livestock equation.

Bison and boundaries

Yellowstone's bison population is one of only three free-ranging bison populations in the nation and is the only population that have remained at least partially so through history. Within a given year, bison populations, just like any wildlife population, will increase in the spring due to birth of calves and continually decrease in summer, fall, and winter due to mortality. They will also fluctuate from year to year based on the sum of births, natural mortality, and removals. Most important for the present discussion, they will respond to changing environmental conditions by seeking out and colonizing more favorable ranges, whether those be warm geothermal areas in the park's high valleys or historic winter ranges beyond the park's boundaries.

From the 1940's through 1967 a few bison periodically moved beyond the park boundaries. Movements did not occur every year but were documented in 16 of 25 years (64%). Most of the movement was along the northern boundary and group sizes ranged from 1 to 150 bison. Movements also occurred on the west boundary at West Yellowstone but more frequently in the southwest corner; group sizes ranged from 1 to 34. Movement also occurred at the south boundary on four occasions; group size was 1 to 3. Very limited movements occurred on the eastern boundary, primarily during summer.

In 1968 a boundary control program was instituted wherein park personnel would shoot bison that approached certain areas near the boundary. Movements were minimal and under this program a total of 5 animals were removed in 1974 and 1978. Approval to shoot bison within the park was rescinded by the Secretary of the Interior in 1978. From 1978 until 1985 a variety of methods were employed as managers attempted to limit movements, including hazing on foot, on horseback, and aircraft; barrier fences; cattle guards on roads, aversive conditioning, and baiting. All met with limited success and proved ultimately unreliable in guaranteeing that bison would not stray from the park.

In 1985, Montana attained brucellosis class-free status and also initiated a public bison control hunt to remove bison migrating from YNP to areas along the north boundary near Reese Creek and areas along the west boundary near West Yellowstone. The control hunts continued each year until the winter of 1988-89 when 569 bison were killed. Due to public controversy over the hunt, the 1989 Montana legislature removed authorization for the hunt and entered into an agreement with the NPS and the USDA Forest Service to develop a long term management plan and environmental impact statement (EIS) for managing bison migrating from Yellowstone into Montana.

While developing the long term EIS, Montana needed an interim management plan to accomplish 3 main objectives: 1) Protect private property, 2) Provide for human safety, and 3) Protect Montana's brucellosis class-free status.

In 1990, the NPS completed an environmental assessment (EA) that provided for limited Park Service management of bison (hazing and monitoring). Also, NPS personnel could participate in bison shooting operations outside of Park boundaries at the request and under the authority of the Montana Department of Fish, Wildlife and Parks.

In 1992, another EA was produced that provided for management actions like those described in the 1990 EA. Since 1990, NPS personnel have monitored, hazed, and, at the request and under the authority of the state of Montana, shot bison on private land along the northern and western boundaries. During this period NPS, Montana Department of Fish, Wildlife and Parks, Montana Department of Livestock, USDA Forest Service, and USDA Animal and Plant Health Inspection Service continued work on the long term management plan and draft Environmental Impact Statement (EIS). The Agency Review Draft of the EIS was provided to cooperating agencies on December 22, 1994.

On January 19, 1995, the state of Montana sued the USDA Animal and Plant Health Inspection Service (APHIS) over the threatened policy of revoking Montana's brucellosis class-free status because of the presence of brucellosis exposed bison from Yellowstone in Montana. Montana also sued the NPS over management policies that allowed bison that had been exposed to disease to enter Montana.

On November 13, 1995, a settlement agreement was reached in this suit. The primary points agreed to were:

1. The NPS and State of Montana will prepare an Environmental Assessment, having as a proposed action Interim Bison Management Operating Procedures described in the settlement agreement. The proposed action calls for capturing bison moving from YNP to lands north of the Reese Creek boundary. The capture facilities would be constructed inside the Park in the Stephens Creek area. All bison captured in the facility would be sent to slaughter. In the West Yellowstone area, bison would be captured and all bison testing positive for exposure to brucellosis would be sent to slaughter. Further, all pregnant females, including those testing negative for exposure to brucellosis, would be sent to slaughter. The remaining bison testing negative would be marked and released. Bison migrating into the Eagle Creek/Bear Creek area, and Hellroaring Creek and Slough Creek drainages, north of the Park boundary and those found in the Lee Metcalf Wilderness and Cabin Creek Recreation and Wildlife Management area west of the Park boundary would simply be monitored and not captured.
2. The settlement agreement also called for completion of the long term bison management plan and draft EIS by November 15, 1996, with the final EIS due May 1, 1997.
3. APHIS will not seek to downgrade Montana's brucellosis class-free status as long as Montana complies with the Interim Bison Management Procedures.
4. Additionally, NPS recognizes Royal Teton Ranch's right to build a fence on its property, in compliance with federal and state laws, to exclude bison from Royal Teton Ranch property.

The draft Environmental Assessment on the revised operating procedures was completed and released for public comment December 20, 1995. Because of requests from the public, the comment

period was extended from January 19 to February 2, 1996. A total of 260 comments were received. The public comments were analyzed and responses to the comments prepared. A decision on the Interim bison management plan was signed on August 5 and released to the public on August 9.

In recent years, a few bison have entered the North Fork of the Shoshone river drainage in Wyoming; these have been almost exclusively mature bulls. Through a limited hunting program, Wyoming Game and Fish Department now manages this situation and allows only 15 bull bison in the area.

Bison management in Yellowstone today

In national parks, the overall NPS policy is to maintain and provide for natural ecosystem processes and the biotic and abiotic components which interact and depend on those processes. Under the biotic component, NPS policy on wildlife seeks perpetuation of native animal populations as part of the natural ecosystems of parks, with emphasis on minimizing human impacts on natural animal population dynamics. This includes protecting native animal populations within parks by restricting harvest, removal, destruction, harassment, or harm through human action. Therefore, by definition, NPS policy dictates minimal intervention. NPS policy directs that parks may remove individual animals from a population only when necessary for human safety and health; to protect property or landscaped areas; as part of an NPS research project described in an approved resource management plan; as part of a research project conducted by others who have an appropriate NPS collection permit; or to restore native populations in other parks or cooperating areas without diminishing the viability of the populations from which the animals are taken. NPS policy further directs parks to ensure preservation of migratory species populations and their habitat within the park, and wherever possible to cooperate with others to ensure the preservation of migratory populations and their habitats outside the parks.

Individual parks then interpret and implement these overall NPS policies and guidance for particular situations within each park. Yellowstone's bison management objective is "to maintain a self-sustaining population of free ranging bison in the park while cooperating with other agencies to reduce the potential for human conflicts and brucellosis transmission outside the park" (NPS 1991).

The Resources Management Plan (RMP) recognizes the need for management of bison at boundary areas where potential conflicts exist both from trans-boundary movement and from a disease aspect. The RMP maintains the objective of allowing natural processes (predation, severe winters, old age, injuries, etc.) to determine population levels. An additional planning objective seeks cooperation with other interest groups in developing a long range bison management plan while addressing the immediate needs through interim procedures.

Parallel to this policy, NPS supports the Goal, Mission, and Objectives of the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) as presented in the Memorandum of Understanding (MOU) signed by the Secretaries of Interior and Agriculture and the Governors of Wyoming, Montana, and Idaho which established GYIBC. It must be stressed that the objectives of GYIBC are a "package deal" and that one cannot be given preference to the exclusion of another.

The NPS is an active participant in the GYIBC (Greater Yellowstone Interagency Brucellosis Committee). The goal of the GYIBC is "...to protect and sustain the existing free-ranging elk and bison populations in the Greater Yellowstone Area (GYA) and protect the public interests and eco-

conomic viability of the livestock industry in Wyoming, Montana, and Idaho.” The mission of the GYIBC is to develop and implement brucellosis management plans for elk and bison in the GYA.

Some of the 10 objectives of the GYIBC include maintaining viable elk and bison populations, maintaining the brucellosis-free status of Wyoming, Montana, and Idaho, aggressively seeking public involvement in the decision making process, and planning for the elimination of *Brucella abortus* from the GYA by the year 2010. The NPS fully supports the goal, mission, and objectives of the GYIBC.

The NPS is also involved in a number of research projects to collect data on various aspects of bison ecology and how *Brucella abortus* survives and functions in a wild environment. These projects involve Grand Teton and Yellowstone National Parks as well as cooperators in Wyoming Game and Fish Department, Montana Department of Fish Wildlife and Parks, Idaho Fish and Game Department, U.S. Geological Survey Biological Resources Division, Agricultural Research Service, APHIS, University of Wyoming, Montana State University, University of Montana, and other cooperators. The information gathered from the research will aid managers in making sound decisions based on science for the future management of bison and elk in the 2 parks and the GYA. The much-needed research falls under 4 major headings: 1) Epidemiology and pathogenesis of brucellosis in wild bison, 2) Development and testing of new brucellosis vaccines for use in wildlife, 3) Risk assessment of brucellosis transmission in a wildland setting, and 4) Ecology and carrying capacity of bison in Grand Teton and Yellowstone National Parks.

Many options for bison management have been explored, tried, and discussed during the evolution of the current situation. Through this fluid situation, YNP has attempted to adhere to a number of objectives. The objectives are consistent with overall National Park Service policy and the agreements with cooperating agencies and the MOU establishing the GYIBC.

1. Maintain a population of wild, free-ranging bison in Yellowstone National Park, as is done for elk and other wildlife populations, and allow natural processes to regulate those populations to the greatest extent possible, in cooperation with adjacent state and federal land and wildlife management agencies.
2. Maintain bison populations in the park in a manner consistent with dynamic ecological carrying capacities and with natural processes dominating the determination of upper and lower population levels.
3. Support the legitimacy of having wild, free-ranging bison on portions of adjacent federal land where wildlife management is a legal and stated priority, and where domestic livestock are not grazed.
4. Recognize and support the premise that a limit exists on public land beyond which free-ranging bison will not be tolerated because of potential conflict with private property and other public land uses.
5. Support a State's legal responsibility to manage all wildlife within its jurisdiction.
6. Encourage and support the use of public hunting of bison where appropriate as a legitimate

management method as conducted for other ungulates adjacent to Yellowstone under the ethical concepts of "fair chase".

7. Continue requirements for humane treatment of animals.
8. Work with Native American tribes, private landowners, and state and federal agencies to utilize bison taken in management actions in the most appropriate manner such as reestablishment of populations in other areas or donation of surplus meat.
9. Continue to participate in the cooperative effort to find acceptable and appropriate means to manage and eventually eliminate *Brucella abortus* in wild, free ranging populations of bison, elk, and other wildlife in the GYA.
10. Increase knowledge, through scientific research, on *Brucella abortus* and its effects in free-ranging wildlife and development of management techniques applicable to free-ranging populations in large wildland environments.
11. Maintain scientific credibility in management decisions.

By keeping sight of these goals, YNP should successfully cooperate with other agencies, interested organizations, and the general public in ensuring the future of this extraordinary wildlife resource. But progress will continue to be difficult and each step will be controversial, because of the conflicting mandates of the agencies involved and the highly charged emotional atmosphere among public pro-bison constituencies.

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