

Brucellosis Management Action Plan For Bison Using the Absaroka Management Area



Wyoming Game & Fish Department

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SUMMARY

This Brucellosis Management Action Plan (BMAP) specifies management strategies regarding brucellosis in bison of the Absaroka Bison Management Area. The Wyoming Game & Fish Department (WGFD) also has developed a Plan for the Jackson Bison Herd, and Plans for each elk herd in the Jackson-Pinedale Region containing winter elk feedgrounds. These Plans should continue to play an important role in the state of Wyoming maintaining its current brucellosis class-free status.

The objectives of this BMAP are to 1) document and analyze all available quantitative and qualitative data regarding brucellosis in bison, 2) use available data to develop management actions to reduce risk of brucellosis transmission among bison and from bison to cattle, and 3) select appropriate management actions for implementation in the Absaroka Bison Management Area.

Bison occurring east and southeast of Yellowstone National Park (YNP) in the Absaroka Mountains from the Montana state line to the Thorofare area are wandering members of the YNP Herd. When YNP adopted a policy of more natural population regulation of bison in the 1960s, the number of bison grew rapidly. Concomitant with the increase in numbers was an expansion in distribution. The WGFD has since dealt with various numbers of YNP bison in the Absaroka Management Area, defined as all lands in Park, Hot Springs, and Fremont counties east of the Continental Divide, excluding lands administered by the Wind River Indian Reservation (Figure 1).

Previous management plans have been developed for the Absaroka Bison Management Area. The most recent Plan was completed in 1995. This update is based on the 1995 version. The Plan addresses bison numbers, distribution, and removal when bison numbers or distribution exceed objectives. In summary, the fundamental recommendation for the Absaroka Bison Management Area is to maintain the current low number and specific distribution of bull bison in the North Absaroka and Washakie Wilderness Areas (no more than 25), and on Shoshone National Forest (SNF) lands along the North Fork of the Shoshone River (no more than 15). In addition, the WGFD may allow up to 25 bison in the Yellowstone River drainage within the Teton Wilderness. The WGFD should not allow cow bison to occupy this management area except in the Yellowstone River drainage within the Teton Wilderness. Removing bison would be accomplished by hunters when possible, or by Department personnel when hunting is not possible.

This management approach will accommodate current levels of bison use, yet allow bison to increase in the Teton Wilderness, the only area within the Absaroka Bison Management Area where an increase would not conflict with existing resources and uses. This approach will allow bull bison to use some of the high basins along the east boundary of YNP in the North Absaroka Wilderness Area. It also allows the current level of bison use on SNF lands along the North Fork of the Shoshone River corridor and prevents any increased use in these areas or in the Washakie Wilderness. Cattle do not use the areas WGFD anticipates bison to use. Managing for this distribution of bison will minimize risk of disease transmission through spatial separation of bison and cattle.

This document will receive annual re-evaluation to incorporate new brucellosis research results, management protocols, and agency (state, federal, private) recommendations.

INTRODUCTION

BMAP Goal & Objectives

In February 2004, Wyoming lost its brucellosis class-free status when 31 reactor cattle were detected in a Sublette county herd (Galey et al. 2005). Infection of these cattle likely originated from elk on the nearby Muddy Creek feedground. Following this loss of class-free status, increased surveillance of Wyoming cattle revealed a series of herds with the disease in the Greater Yellowstone Ecosystem (GYE)(Galey et al. 2005).

To develop management strategies regarding brucellosis in the GYE of western Wyoming and regain brucellosis class-free status, the Wyoming Brucellosis Coordination Team (WBCT) identified the BMAP process as their highest priority recommendation (Galey et al. 2005). BMAPs have already been finalized for each of seven elk herds in the Jackson-Pinedale Region containing winter elk feedgrounds. An additional BMAP has been drafted for the Jackson Bison Herd. Because of increased surveillance, research and BMAP development efforts, and lack of infection in cattle herds since 2005, Wyoming regained its brucellosis class-free status September 2006.

The objectives of this BMAP are to 1) document and analyze the quantitative and qualitative data regarding brucellosis in bison, 2) use available data to develop management actions to reduce risk of brucellosis transmission among bison and from bison to cattle, and 3) select appropriate management actions for implementation in the Absaroka Bison Management Area. This plan includes data and information relevant to understanding, formulating, and implementing management actions. This document will receive annual re-evaluation to incorporate new brucellosis research results, management protocols, and agency (state, federal, private) recommendations.

Public Involvement in this BMAP

Between 2005 and 2007, BMAPs were developed for each of seven elk herds associated with feedgrounds in the Jackson-Pinedale Region. The WGFD followed the WBCT recommendations to coordinate with cattle producers, land management agencies, and livestock disease regulatory agencies. Opportunity for public feedback on BMAPs was given at WBCT meetings, and a public presentation was made when each document was completed.

WGFD sought to enhance public participation opportunities during drafting of the Bison BMAPs. This was accomplished by including Bison BMAP as an agenda item in the September 2007 WBCT meeting, where brief outlines of the Jackson and Absaroka Bison BMAPs were presented for WBCT consideration and for public comment. The WGFD followed with public meetings to review draft BMAPs in Jackson and Cody during December 2007. Written public comment was accepted until January 18, 2008; comments were taken into consideration during final revisions.

Absaroka Bison Overview

Bison occurring east and southeast of YNP in the Absaroka Mountains from the Montana state line to the Thorofare area are wandering members of the YNP Herd. YNP bison are descendants of 30-40 bison remaining in YNP at the turn of the century and bison brought to YNP from Charles Goodnight National Refuge (Texas) and the Pablo-Allard herd (Montana) in 1902. The resulting population was influenced variously by ranching activities and regulation of population numbers by managed reductions (Meagher 1989a). Intrusive management of bison

within YNP ended in the late 1960s with NPS adoption of a policy of natural regulation of free-ranging ungulates (Meagher 1989a).

In subsequent years, the bison population on the northern winter range of YNP expanded from the traditional core along the lower Lamar River, occupying new forage areas within the park as well as moving outside the park. Further expansion was halted because of conflicts with human interests (Meagher 1973b). In addition to the risk of transmitting brucellosis to cattle, potential conflicts between bison and interests outside the park include damage to fences, consumption of hay, and occasional hazard to people (Meagher 1989b).

In 1979, in response to bison expansion outside of YNP, as well as an increasing bison population in the Jackson area, the Wyoming Game and Fish Commission and the Wyoming Livestock Board each designated bison as “wildlife” in Teton National Forest, the Washakie and Absaroka Wilderness areas of the Shoshone National Forest and Grand Teton National Park. Two Hunt Areas were created, one for the Absaroka area, and one for the Jackson area.

Hunt Area 1 for bison, Absaroka, is identical to the Absaroka Bison Management Area (Figure 1). The Absaroka Bison Management Area consists of all lands in Park, Hot Springs, and Fremont counties east of the Continental Divide, excluding lands administered by the Wind River Indian Reservation. However, bison occurring in the Absaroka Management Area actually occupy only a fraction of Hunt Area 1 (Figure 2).

Previous Management Plans

Multiple bison management plans for the Absaroka area have been completed by the WGFD. In 1984, a management plan was written for the Absaroka area in response to increasing numbers of bison in YNP and anticipated movements east of YNP. The 1984 plan assumed 50 YNP bison were using Wilderness areas on Shoshone and Teton National Forest lands east of YNP in Park County and recommended maintaining a population of 50 bison in this area. Search of Forest Service, WGFD, and National Park Service (NPS) records indicated that since 1900, 50 or more bison had probably never occurred east of YNP in the Absaroka Mountains. In addition, the 1984 plan did not recognize that bison using areas east of YNP were part of the YNP herd and not a separate herd. The plan stated that if more than 50 bison occurred, excess bison would be removed by one of several methods, including shooting by hunters, shooting by WGFD personnel, or trapping and removal.

The WGFD wrote a subsequent plan for the Absaroka Management Area in 1995. The 1995 plan primarily reduced the number of bison allowed east of YNP before management actions would be taken. The 1995 plan also incorporated strategies to maintain spatial separation between cattle and bison because of brucellosis concerns. In short, when a pre-determined number of bison moved out of YNP (no more than 25 bull bison in the North Absaroka and Washakie Wilderness Areas, no more than 15 bull bison on SNF lands along the North Fork of the Shoshone River corridor, no more than 25 bison in the Teton Wilderness in Park County, no cow bison in the Absaroka Management Area except in the Teton Wilderness of the Bridger-Teton National Forest (BTNF) in Park County), WGFD would respond by either removing the animals or allowing hunters to remove animals. The number of bison moving out of YNP has seldom surpassed the numbers designated as warranting attention. Hunts did occur in the winters of 1995-96, and 1996-97. Since that time routine monitoring has occurred, but no management actions other than hazing (about once every 2-3 years) have needed to be taken. Thus, managers believe the 1995 plan is still sufficient. This document serves as an update to the 1995 plan, and includes additional information on brucellosis management in the Absaroka Management Area.

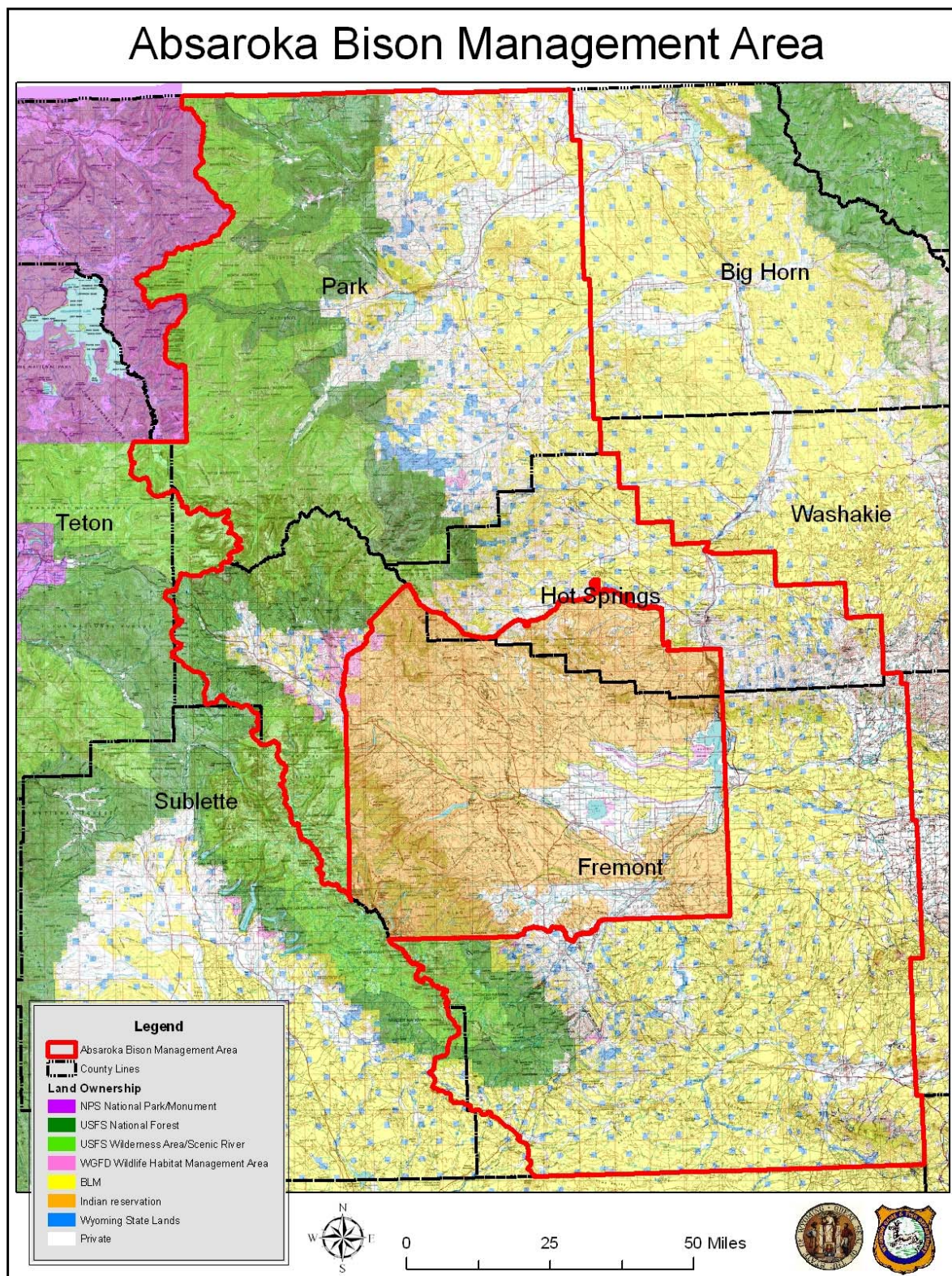
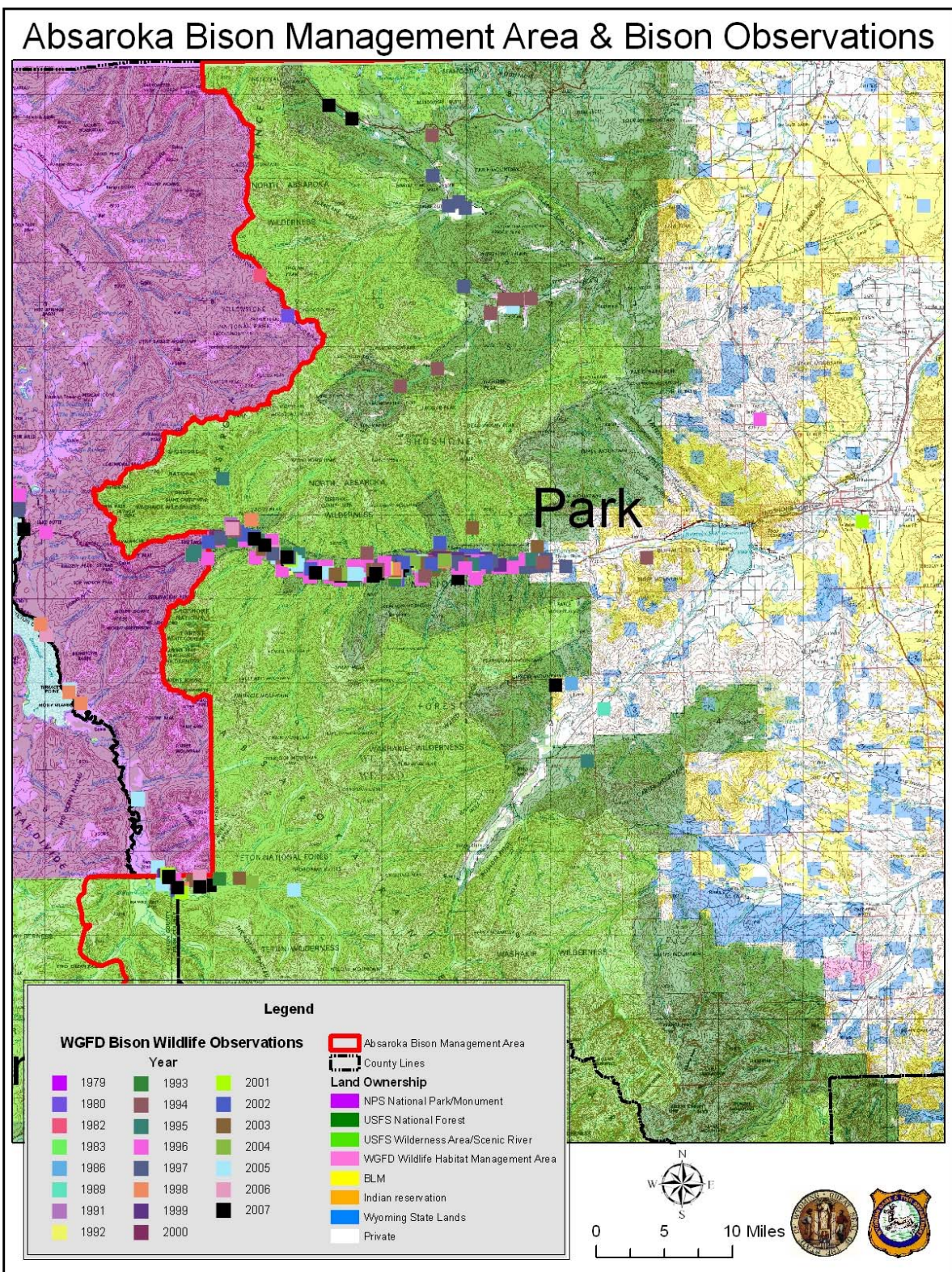


Figure 1. Absaroka Bison Management Area. Hunt Area 1 for bison, Absaroka, is identical to the Absaroka Bison Management Area.



BIOLOGY AND MANAGEMENT

Bison and Brucellosis

Brucellosis, caused by infection with the bacterium *Brucella abortus*, has sparked controversy because of its persistence in elk (*Cervus elaphus*) and bison (*Bison bison*) of the GYE of Wyoming, Montana, and Idaho (Thorne et al. 1978) and potential threat to domestic livestock (Kistner et al. 1982). Presumably, *B. abortus* was transmitted from domestic livestock to free-ranging bison and elk just prior to 1917 (Meagher and Meyer 1994) after repetitive commingling and subsequent contact with aborted fetuses contaminated with brucellosis. Subsequently, brucellosis was isolated from free-ranging bison (Mohler 1917) and elk (Rush 1932) of western Wyoming in 1917 and 1931, respectively.

Brucella transmission usually occurs via the oral route, with ingestion of bacteria that are shed by infected females in high numbers in aborted fetuses, fetal membranes and fluids, or uterine discharges (Thorne et al. 1982, Cheville et al. 1998). The role of lactation in brucellosis transmission is unknown (Gross et al. 2002), but Meyer and Meagher (1995) hypothesized that excretion of *B. abortus* throughout most or all of the lactation period was a reasonable explanation for high infection rates seen among subadult bison. Infection usually results in reproductive failure (abortion of the first pregnancy) and other clinical syndromes such as retained placenta, thickened and leathery placenta, necrotic cotyledons, vaginal discharge, metritis, and possible sterility (Thorne et al. 1982, Jubb et al. 1985 cited by Meyer and Meagher 1995). In males, the consequences can include epididymitis, orchitis, seminal vesiculitis, and possible sterility (Manthei and Deyoe 1970 cited by Meyer and Meagher 1995).

Researchers rely on detecting antibodies in the bloodstream to determine the prevalence of brucellosis in wildlife. To determine the serostatus of bison, the following five tests are used: 1) Card test, 2) Standard plate agglutination (SPT) test, 3) Complement-fixation (CF) test 4) Rivanol test, and 5) the fluorescent polarization assay (FPA). An animal is considered “seropositive” if 1) either two or more tests react at certain dilution rates, or 2) if the CF test alone shows a reaction at a dilution rate of 2+ 1:20 or higher. The criteria used to determine what is called a positive reactor (positive) for the five serology tests is as follows: 1) Card – positive or negative (no dilution), 2) SPT – 1:100 dilution or greater, 3) CF – 2 + 1:20 dilution or greater, 4) Rivanol – 1:25 dilution or greater, 5) FPA – positive or negative (no dilution). Killing the animal(s) and culturing *Brucella* from host tissues determines actual infection.

Researchers have tested GYE bison for brucellosis seroprevalence levels assorted times in recent decades. Roffe et al. (1999) tested female bison killed through management actions by the Montana Dept. of Livestock and YNP in the mid-1990s. Twenty-eight (27 adults and 1 calf) of 37 (76%) bison were seropositive; 46% of the seropositives were in turn culture positive. This was a higher rate of culture positive to seropositive than had previously been reported for YNP bison. The previous data on YNP bison, however, included numerous animals from which samples were limited to <5 tissues, and <20% of seropositive animals were identified as infected (Meyer and Meagher 1995). During the winter of 1988-89 approximately 900 bison emigrated into Montana (Ferlicka 1989, cited by Meyer and Meagher 1995). Of these, 569 were shot; among the 202 females from which blood samples were obtained, 89 (44%) were seropositive. Of the 240 YNP bison removed in the winter of 1991-92, 85 (35%) were seropositive and 24 (10%) were suspect, for a combined antibody prevalence of 45% (Meyer and Meagher 1995). Twenty-eight of 35 (80%) adult bison in the Jackson herd tested from 1989 to 1990 tested

positive for antibodies (Williams et al. 1993). Williams et al. (1993) went on to perform culture tests on several tissues from 4 of the seropositives; 2 of those 4 were culture positive.

WGFD has limited information on brucellosis seroprevalence of bison in the Absaroka Management Area. Licensed hunters harvested 29 bison (27 bulls, 1 cow, 1 calf) in the Absaroka Bison Management Area in the winters of 1995-96 and 1996-97. In addition, WGFD lethally removed five cow bison from the North Fork of the Shoshone River in 1994-95, prior to a hunting season being in place. Usable blood samples were collected from 35 bison over this time period. These blood samples were tested using the standard tests described above. Serology results indicated 60% ($n=21/35$) of all bison tested were positive for *B. abortus* antibodies; only four were considered 'hot' positives. Knowing the serology of adult cows specifically would be most useful because they could potentially transmit the bacteria. Adult females, however, made up only a small percentage of the total sample size.

In addition to bison, elk in northwest Wyoming, primarily those associated with winter feedgrounds in the Jackson area, carry brucellosis. The incidence of brucellosis in elk herds that use the Absaroka Bison Management Area is very low. Since 1991 WGFD has tested non-fed elk from various herds in northwest Wyoming, including those elk herds using the Absaroka Bison Management Area, through hunter surveillance. Seroprevalence from elk hunt areas around the North Fork of the Shoshone, Crandall, and Sunlight Basins (Hunt Areas 50-56 and 121) has ranged from 0 to 5.5%. Overall seroprevalence rates based on hunter surveillance from the area are only at 2.1% ($n = 24/1153$ from 1991 through 2006). Out of 60 female elk captured as part of an ongoing study in January of 2007, 6 were seropositive (10%).

Infection rates of bison are part of determining the level of risk that bison might abort, thus potentially transmitting *Brucella*. The gestation period of bison, in turn, determines the period of exposure *when* bison could potentially abort and spread the bacteria. Of special concern is the third trimester of bison pregnancy (U.S. Dept. of Interior and U.S. Dept. of Agriculture 2000). The Wyoming Livestock Board (WLSB) has defined the "period of exposure" for cattle as 1 January to 1 May (WLSB 2006). However, precisely when parturition occurs among bison of the GYE seems to vary by location and year (Gogan et al. 2005, Berger and Cain 1999).

Meagher (1973a) reported that most calves in the YNP herd are born during a 6-week period from mid-April to the end of May. Gogan et al. (2005) suggested the majority of YNP bison parturition dates were in April and May, with a small percentage occurring through the summer; they found that median birth dates for YNP bison over a period of recent years ranged widely, from 28 April to 22 May. Median birth dates varied between the Northern and Central herds, probably because of the earlier onset of the growing season, leading to higher nutrition and thus earlier birth dates, for the Northern herd. Timing and duration of parturition periods might depend largely on temporal variation in the quantity and quality of food, affecting nutrients available to mothers and offspring; thus the length of the birth season generally varies with the length of the growing season (Green and Rothstein 1993). Thus, the extent and timing of parturition in bison can be expected to vary across years.

Median birth dates reported for the Jackson bison herd have been 20 May, 23 May (Berger and Cain 1999), and the first week of June (Cain et al. 2005, Fig. 3). Berger and Cain (1999) found that 95% of births in the Jackson bison herd had occurred by the end of June, based on 52 births. With a larger sample size ($n = 125$) spread over several years, Cain et al. (2005) determined that 90% of calving was completed by the end of July, but that 95% was not complete until almost September; one birth occurred the first week of December. Berger and

Cain (1999) suggested that brucellosis-infected females might abort early in pregnancy and conceive again late in the same breeding season, thus extending the calving season by birthing later than non-aborting bison.

Because bison could calve throughout the year and they do come in relatively close contact with cattle, they are an important potential source of brucellosis to cattle. Experimental *B. abortus* infections in captive bison have produced abortions and transmission to cattle under controlled conditions (Davis et al. 1990), and there has been one documented case of bison to cattle transmission in confined ranching conditions (Flagg 1983). But there is no documentation that transmission from free-ranging bison to cattle or to humans has ever occurred (Meyer and Meagher 1995), and only a few *Brucella*-induced abortion events in bison in the GYE have been documented (Mohler 1917, Williams et al. 1993, Rhyen et al. 1994, Clarke et al. 2005). Still, bovine infection and loss of the brucellosis-free status by Wyoming due to bison (or elk) could cause wildlife directed resentment by many Wyoming stockgrowers. Thus, a critical component in any brucellosis management plan is spatial-temporal separation of *Brucella*-infected wildlife from cattle, and vice versa.

Bison Distribution in the Absaroka Area

Because bison using the Absaroka Management Area are not a distinct herd, but are part of the YNP bison herd, WGFD does not have a population estimate, or conduct formal trend counts. Efforts to assess the number of animals in the Absaroka Bison Management Area have included YNP officials at the East Entrance documenting bison movements in the vicinity of the east entrance, and WGFD personnel documenting bison encounters on SNF and private lands (Table 1; Figure 2). These efforts have mainly occurred since implementation of the 1995 Absaroka Bison Plan, and will continue.

Bison herds can be viewed as two separate groups, cow/calf groups and bull groups (M. Meagher, YNP, retired, personal communication). The main herds composed of cow/calf groups have very traditional seasonal range patterns and movements. Wandering bull groups can show up anywhere. As a result of the winter road system in YNP, the fires of 1988, and natural environmental gradients the main bison herds of YNP move west then north as food becomes limiting (Meagher 1998). These movement patterns appear entrenched, and as a result most movement of bison will be westerly or northwesterly away from the eastern boundary of YNP. However, wandering bulls can be expected to use areas east of YNP in any particular year. Also, as occurred in February 1995, some cows and calves will follow the YNP east entrance snowmachine trail and find their way to the North Fork of the Shoshone River. This could also occur through the YNP northeast entrance at Silver Gate.

Records from the NPS, WGFD, and USFS indicated movement of bison east of YNP occurred only sporadically, and in small numbers, over most of the latter 20th century. Movements became more consistent after 1988. NPS records indicated a few bull bison were seen in the summer of 1966 at the head of Timber Creek west of Crandall (Figure 2). WGFD personnel saw up to 15 bison and bison sign in the upper basins of the Crandall Creek drainage in 1979 and 1980 (B. Rudd, WGFD, personal communication).

Records of consistent movements across the eastern boundary started in 1988, a major fire year in YNP. During late summer 1988 one lone bull was spotted on the Wood River southwest of Meeteetse, Wyoming. Three or four bulls moved through Cooke City, as far east as Cooke Pass, during winter 1988-89 but returned to YNP after only a few days. Also during the winter 1988-89, 22 bison (12 bulls, 6 cows, and 4 calves) moved over Sylvan Pass and wintered

on SNF lands along the North Fork of the Shoshone River. One bull died after being struck by a vehicle and at least 1 cow and 2 calves died of starvation that winter. All surviving bison returned to YNP by late May 1989.

Since 1988 a few bull bison, with as many as 15 to 18 in winter 1992-93, have moved over Sylvan Pass to winter in the North Fork of the Shoshone River drainage. During winters 1992-93 and 1993-94 some of these bulls stayed on the North Fork until late June or early July before returning to YNP. Four bull bison moved from Hoodoo Basin in YNP into Sunlight Basin in late July 1994. They moved down Sunlight Creek and spent most of their time on the WGFD Sunlight winter range, SNF lands adjacent to the Sunlight Unit, and private lands on the Holding Ranch and 7D Ranch. Two individuals moved to Reef Creek along the Clark's Fork Highway but returned within a week. Two of the bulls were moved off private property on two separate occasions when they began damaging young trees and grass sod around a summer home. All four bulls were moved off private lands on several occasions to prevent contact with cattle. In late September 1994 three of the bulls returned to YNP moving through Crandall and Cooke City. The remaining bull was killed by WGFD personnel on the Holding Ranch.

In early September 1994 three bull bison returned to the North Fork of the Shoshone River from YNP. These three bulls were joined by five more bull bison by late September 1994. In late January and early February 1995, 24 additional bison, including five cows and one female calf, moved over Sylvan Pass from YNP to the North Fork. At the time, these were the earliest movements recorded and the largest number (total of 32) wintering on the North Fork. The five cows and one calf were lethally removed by WGFD personnel.

Bison numbers have only exceeded the threshold to hold a hunt on two occasions, 1995-96, and 1996-97. In the winter of 1995-96, a total of 28 bulls and 1 cow moved out of YNP. Twelve bull bison were harvested in the North Fork; the cow died from starvation. In the winter of 1996-97, 26 bulls, one cow, and one calf were counted outside YNP in the North Fork. Fourteen of the bulls along with the cow and calf were harvested by hunters, also one bull was killed in a vehicle collision. Two bulls in poor condition moved into Crandall Basin via Cooke City; one died of starvation, one was harvested by a hunter.

From the winter of 1997-98 to the present, movements of bison outside of YNP into the Absaroka Bison Management Area have been limited to between 5 and 11 bulls (Table 1). Over the last decade a pattern has become established of a few bison moving east out of Pelican Valley crossing over Sylvan Pass (confirmed) and Jones Pass (speculated) in September or October. Most movement occurs along the East Gate snowmachine trail over Sylvan Pass in December and January. Bison return to YNP following the same routes from April to June. The WGFD believes no bison have stayed out of YNP over the length of the summer.

WGFD personnel, when in the North Absaroka and Washakie Wilderness areas, also have been opportunistically documenting bison in the wildlife observation system (WOS). Over the last decade they have not observed any bison in those areas. Some bison have been seen in the Thorofare area of the Teton Wilderness, but well below the numbers that would lead to development of a new management plan for that area.

Table 1. Bison movements outside of YNP into the North Fork of the Shoshone River, Absaroka Bison Management Area, 1988-2007[¶].

Years	Bison Documented			Mortalities			Latest Date Returned to YNP
	Bulls	Cows	Calves	Harvest	Removal	Other ^{\$}	
88-89	12	6	4			4	N/A
89-94*	5-20				1		N/A
94-95	26	5	1		6		N/A
95-96	28	1		12		1	N/A
96-97	26	1	1	16		1	N/A
97-98	9						18 May
98-99	9						24 May
99-00	8						29 May
00-01	10						20 May
01-02	8						14 June
02-03	5						3 June
03-04	7						31 May
04-05	5						15 January
05-06	10						15 June
06-07	9						12 May

[¶] Only includes data through early 2007; as of December 2007 \leq 11 bulls were documented.

^{\$} Vehicle collision, starvation.

*Multiple years covered.

Nearly all USFS lands in the Absaroka Mountains southeast and east of YNP are rugged, mountainous areas of steep ridges and narrow drainages, unlike the broad valleys and plateaus frequented by bison in YNP. This steep topography is suited well for supporting elk, mule deer, and bighorn sheep but is less suitable as bison habitat. The area could be used by a few bison in summer but likely will not support many bison yearlong. Bison using this area will probably work their way down the narrow drainages, eventually approaching private lands at lower elevations; this has been experienced on the North Fork of the Shoshone River since 1988.

There are three exceptions to this general habitat summary. The broad valley along the Yellowstone and Thorofare Rivers in the Teton Wilderness of the BTNF southeast of YNP provides suitable summer habitat, and possibly limited winter habitat, on public lands for bison and a large summer population of elk, mule deer, and moose. No cattle grazing is permitted in this area. The high benches along the Greybull River could also support bison in the summer. However, cattle use some of this area in the summer and the most likely winter range for bison would be on lower elevation mixed public and private lands with winter cattle use. Although the more open basins in the Crandall and Sunlight areas could support bison throughout the year as well, about 20-25% of the area is privately owned. Concerns about disease transmission to cattle and property damage make the Greybull River and Crandall-Sunlight areas unsuitable for bison.

BRUCELLOSIS MANAGEMENT ACTIONS

Factors influencing the management needed for bison occurring in the Absaroka Management Area include:

- 1) Bison in the Absaroka Management Area are not a separate herd but part of a viable, self-sustaining YNP herd.
- 2) Limited habitat for a yearlong population of bison.
- 3) Presence of brucellosis in YNP bison and the potential added management costs for state and federal management agencies and the livestock industry.
- 4) Nomadic nature of bison and topography of the area encouraging a continual movement of bison toward lower elevation private lands with domestic livestock.
- 5) Additional WGFD costs associated with managing bison and maintaining spatial separation of bison and cattle.

Considering all these factors, the fundamental management recommendation for the Absaroka Bison Management Area is to maintain the current low number and specific distribution of bull bison in the North Absaroka and Washakie Wilderness Areas (no more than 25), and on SNF lands along the North Fork of the Shoshone River (no more than 15). In addition, the WGFD may allow up to 25 bison in the Yellowstone River drainage within the Teton Wilderness. The WGFD should not allow cow bison to occupy this management area except in the Yellowstone River drainage within the Teton Wilderness.

This management approach will accommodate current levels of bison use, yet allow bison to increase in the Teton Wilderness, the only area within the Absaroka Bison Management Area where an increase would not conflict with existing resources and uses. This approach will allow bull bison to use some of the high basins along the east boundary of YNP in the North Absaroka Wilderness Area. It also allows the current level of bison use on SNF lands along the North Fork of the Shoshone River corridor and prevents any increased use in these areas or in the Washakie Wilderness. Cattle do not use the areas the WGFD anticipates bison to use. Managing for this distribution of bison will minimize the risk of brucellosis transmission through spatial separation of bison and cattle.

Specific actions to be taken by the WGFD to achieve the management goals for bison in the Absaroka Management Area are described below. Most of these action items have been in place since the 1995 Bison Management Plan. Some of the actions included in that plan have been revised, or removed, based on what is feasible and what has developed since 1995.

A. Yellowstone River drainage within the Teton Wilderness

The Yellowstone River drainage within the Teton Wilderness area is the only part of the Absaroka Bison Management Area where cow bison will be allowed. The WGFD will continue to monitor locations of wandering bison in the Yellowstone River drainage within the Teton Wilderness. If 25 individual bison are observed in each of three consecutive years in the Yellowstone River drainage within the Teton Wilderness and bison are increasing their use of the area, a management plan for that specific area will be developed. The plan should be jointly prepared by the WGFD, BTNF, YNP, and the general public to determine the desired number of YNP bison for that area.

B. Yellowstone National Park East Boundary

The WGFD will request that YNP personnel continue to document all bison movements through the Northeast and East gates. In addition, YNP personnel should record all movements of bison they detect along the east and southeast boundaries of YNP. Monthly written reports of movements will also be provided by YNP. In recent years, YNP has assisted in this manner, and continued communication between YNP and WGFD personnel is critical in the success of this Plan. The WGFD Cody Region Wildlife Management Coordinator will maintain records of movements and sightings.

C. Shoshone National Forest Wilderness Areas

Regional WGFD personnel will continue to verify sex and location of bison reported on SNF lands. Cow bison outside of YNP on SNF lands will be lethally removed if it is logistically feasible.

Cow bison in proximity to intact female cattle would pose the greatest risk of transmitting *Brucella* bacteria; bull bison pose a potential risk as well, but significantly less than cow bison. If bison pose a health threat to livestock, as determined by the WLSB, the WLSB may order the WGFD to remove those bison immediately (as per Chapter 41 regulations). Therefore, when WGFD personnel sight any bison near cattle, the livestock owner, along with the WLSB, will be notified. When bison move off of SNF lands, livestock owners and the WLSB will be notified. Bull bison in proximity to cattle and declared a threat by the WLSB may also be lethally removed. Any bulls wandering outside wilderness, except on SNF lands in the North Fork of the Shoshone River corridor, may also be removed.

Due to the topography and altitude of the wilderness areas in Park and Hot Springs Counties, and past movements of bison leaving YNP along the east boundary, we expect few bison (< 50) will use SNF wilderness areas or stay in these areas for extended periods of time. They will either move back into YNP or down drainage and off wilderness. If these use patterns change significantly in the future and more bison (> 50 in each of three consecutive years) begin moving out of YNP to use wilderness areas east of YNP, the WGFD will work with the SNF, YNP, the livestock industry, and the general public to draft a plan to determine the desired number and/or distribution of bison in these wilderness areas.

D. Shoshone National Forest in the North Fork of the Shoshone River

Allow a maximum of 15 bull bison to use SNF lands in the North Fork of the Shoshone River drainage, including the narrow corridor along the river outside of wilderness. This 21-mile corridor is the most developed and most used recreation area on the SNF (B. Spanogle, SNF-Cody retired, personal communication). Concerns for safety, property damage, and available forage on crucial winter ranges dictate that only a small number of bulls be allowed in the area. Minimizing potential brucellosis transmission to wintering elk on crucial winter ranges along the North Fork corridor and preventing establishment of a breeding population of bison outside YNP dictate that cow bison be removed. The absence of permitted livestock use in the North Fork Corridor on SNF lands essentially eliminates concerns of disease transmission to livestock. However, livestock do use private lands east of SNF lands.

The 1995 plan recommended that a double-wide cattle guard, and associated buck & pole fencing, be installed on U.S. Highway 14-16-20 near Hanging Rock to reduce the chance of bison moving off SNF land and to minimize the management effort needed to keep bison from entering private land. The Department dropped this recommendation after being advised by YNP personnel that a cattle guard would not sufficiently work. WGFD personnel occasionally

(about once every 2-3 years) haze bison to keep them on SNF lands. Hazing efforts have been successful, and they should continue as necessary. WGFD will haze any bull bison that move off SNF lands in the North Fork Shoshone River corridor back onto SNF lands as long as the number of bison using the corridor does not exceed 15. Any bulls in excess of 15 will be removed. Any bulls that will not move back onto SNF lands or must be continually moved back onto SNF lands will be removed regardless of the number of bison present. Bison causing property damage within the corridor that cannot be controlled through fencing and/or hazing may be removed upon request of the SNF, regardless of the number of bison present.

E. Removal Methods

Properly licensed hunters will harvest bison designated for removal within the management area when feasible. When hunters cannot be used to harvest bison, WGFD personnel or WLSB personnel (as per Chapter 41) will harvest and dispose of the animal(s).

INTERAGENCY COORDINATION

Wyoming Livestock Board

The WGFD and the WLSB have cooperatively developed criteria to deal with bison that leave the established Herd Units (Absaroka and Jackson) and pose a threat to livestock. The WGFC and the WLSB created Chapter 41 of their respective regulations to designate bison found in the Absaroka wild bison management area and Jackson wild bison herd area as wildlife.

Chapter 41 of the WGFC Regulations goes on to regulate the removal of privately-owned bison, and the removal of wild bison. Privately-owned bison running at large shall be removed by the owner within 48 hours of a request from the Livestock Board. If a privately-owned bison is suspected of having been exposed to wild bison infected with brucellosis, quarantine and testing of the privately-owned bison will be done to ensure the bison is brucellosis free.

Section 8 of Chapter 41 outlines the removal of wild bison within the Absaroka and Jackson areas through hunting seasons. If wild bison pose a health threat to livestock, as determined by the WLSB, the WLSB may order WGFD to remove the wild bison immediately. Chapter 41 does not specify a time of year (period of exposure) when this applies, only that the WLSB or its designee determines whether a health threat to livestock is occurring. Additionally, WGFD may remove a wild bison immediately if it poses an immediate threat to public safety.

As outlined in the actions contained in this Plan, the WGFD and WLSB will continue to cooperate on dealing with bison that potentially pose a health threat to livestock.

Shoshone National Forest

Personnel from the SNF and the WGFD will continue to share information on bison locations and movements. The SNF may be able to stipulate in their term grazing permits that permittees notify SNF personnel if bison are near cattle; currently it is not a requirement. SNF would in turn share that information with the WGFD, and Department personnel would be able to respond to each situation as outlined in this Plan. Continued communication between the SNF and WGFD on status of grazing allotments will enable Department personnel to plan for and respond to potential bison-cattle commingling situations.

Yellowstone National Park

The WGFD will continue to work with YNP, and continue to request information, on bison movements and locations along the eastern park boundary. More formal involvement from YNP regarding bison in the Absaroka Management Area will be requested if bison use increases substantially and consistently in the Yellowstone River drainage within the Teton Wilderness, or in Absaroka and Washakie Wilderness Areas east of YNP.

Area Livestock Producers

The goal of this Plan is to develop strategies that the WGFD will use to maintain spatial separation of bison from cattle. Cooperation from area livestock producers will be highly beneficial in fulfilling the actions outlined in this Plan. The WGFD will continue to notify livestock owners when bison move from SNF to private lands in the North Fork of the Shoshone River. When any bison are sighted near cattle, the livestock owner, along with the WLSB, will be notified. Likewise, the Department will act upon information that livestock owners share with the WGFD regarding potential bison commingling situations swiftly and aggressively. The WGFD also will continue to collaborate with the WLSB regarding bison that pose a health threat to livestock.

ADDITIONAL ACTIONS

Brucellosis Surveillance

The WGFD has monitored brucellosis seroprevalence in the Absaroka Bison Management Area by testing blood samples provided by bison hunters. This has been occurring since 1995-96. In addition, when WGFD personnel lethally remove bison, blood samples should be taken and tested. Given current funding and status of the disease, these practices should continue to monitor prevalence of the disease.

Information and Education

WGFD personnel regularly inform and educate various publics about wildlife diseases, including brucellosis. Outreach, particularly from the Information & Education (I&E) branch, has included group presentations, regular news releases, interpretive signs at feedgrounds and crucial winter ranges, Game and Fish brucellosis website (<http://gf.state.wy.us/wildlife/Brucellosis/>), and various brochures and publications. Participation in the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) and the Wyoming Brucellosis Education Team (WBET) has increased I&E brucellosis efforts on statewide and regional levels. Regional I&E Specialists work closely with the Veterinary Services branch of WGFD and the Wyoming State Veterinary Lab to dispense information. The I&E branch also works to inform elk and bison hunters of brucellosis surveillance in order to increase participation in both statewide and regional efforts.

WGFD personnel at various meetings and conferences present the importance of quality wildlife habitat, habitat enhancement, disease research, and damage management activities to the public. WGFD personnel make numerous private landowner contacts regarding habitat improvement projects, wildlife-friendly management techniques, or ways to prevent commingling of wildlife and livestock. Additionally, efforts are focused on area school groups

and educational exhibits at events such as the WGFD's annual Hunting and Fishing Expo and the annual elk antler auction in Jackson to inform children and their parents of the Brucellosis-Feedground-Habitat (BFH) program and brucellosis management.

These efforts should be continued to inform the public of WGFD's active and cooperative role in brucellosis management. Additionally, as management actions are implemented, I&E efforts should focus on why the actions are being pursued and what benefits may be realized. The public should be made aware of any proactive management embarked upon by the WGFD, and their interests in the actions should be heard.

Progress Reporting

Efforts associated with this plan and/or the Wyoming Governor's Brucellosis Coordination Team (Galey et al. 2005) will be summarized and reported on an annual basis.

Research

Sound management of brucellosis in bison and the risk of transmission from bison to cattle necessitate accurate and reliable data to facilitate decisions. Potential research topics that could assist in management decisions are listed below. Items 1-5 were project recommendations included in the WBCT (Galey et al. 2005) report specifically relative to bison.

1. Efficacious vaccines for elk and bison (all types, including subunit and DNA vaccines).
2. Cost-benefit and risk analysis of brucellosis eradication in elk and bison.
3. Vaccine delivery systems (including oral, aerosol, and biobullet) development for elk/bison.
4. Efficacy of contraception in elk and wild bison as alternative to test and culling.
5. Efficacy of RB51 in bison.
6. Bison parturition habitat site characteristics and proximity to cattle.
7. Effects of habitat improvement projects on or near bison seasonal ranges on subsequent bison behavior (i.e., distribution, dispersal, length of feeding season, brucellosis seroprevalence).
8. Relationship of brucellosis seroprevalence and feeding duration of bison.
9. Snow-water equivalency measurements in areas of habitat enhancement projects, both past and future, and explore relationships with bison use and distribution.
10. Alteration of feeding patterns (on the NER) and effect on contact rates of elk with aborted fetuses.
11. Brucellosis social survey examining attitudes and knowledge of brucellosis issues among the Wyoming public, in order to focus information and education efforts.

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