

Developing Sustainable Management Practices: Lessons from the Jackson Hole Bison Management Planning Process

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ABSTRACT

The National Elk Refuge in Jackson, Wyoming, provides critical habitat not only for elk, but also a host of other wildlife and plant species, including bison. The refuge, in cooperation with state and other federal agencies, began developing an environmental assessment and management plan in the early 1980s for bison that winter on the refuge. The issue evoked much controversy over how to manage the refuge's wildlife. Dissatisfaction with the agencies' handling of the problem led many Jackson community members to become centrally involved in the process. After nearly two decades, the agencies released a final plan and Finding of No Significant Impact (FONSI) in 1997 which many community members accepted. However, the process is not over: lawsuits have blocked implementation of the plan. Examining the obstacles and achievements in the bison planning process offers an opportunity for learning to improve decision making and to inform other refuge planning processes, including a refuge-wide management plan and an environmental assessment for irrigation. The bison planning process showed the need to identify clearly and comprehensively problems and possible obstacles to implementation early in the process. This necessitates consideration not only of technical and natural science information, but also consideration of the social and political context through methods such as ongoing contact with various publics, surveys, monitoring bison and human interactions, and clarifying agency mandates. Identifying problems also requires clarification of how the community and refuge officials and personnel view the purpose of the refuge and its place in the larger community. One way to clarify such refuge goals is to determine more systematically how people value the refuge, including as wildlife habitat, as open space, and as a place to spend time outdoors. Involving the public early in the decision-making process can also help to clarify goals and potential problems as perceived by those outside the agency. Finally, it is important to understand the role of agencies in decision making. In addition to acting as agents for the public, agencies play a key role in the initial and subsequent framing of a problem and can influence public perception of the refuge and its purposes.

From the top of any peak looking down into Jackson Hole, Wyoming, one notices a sharp line, almost as crisp as a line on a map, on the northern end of town where housing and commercial development ends and open space begins. The open space constitutes the National Elk Refuge, one of the first refuges for wildlife and refuges from development. The precious resources protected by the refuge evoke both pride and controversy over resource management within the Jackson Hole community. The crisp visual line blurs when one places the refuge in its larger ecological, political, and social setting.

The bison is one species that blurs that seemingly clear boundary. South of Yellowstone National Park, a herd of about 300 bison inhabits Jackson Hole.¹ The herd spends much of the winter seeking forage on the refuge. Heated debates have engulfed the development of a Jackson bison management plan and environmental assessment (EA), a cooperative process involving the National Elk Refuge, the National Park Service, and Wyoming Department of Game and Fish. It is challenging meeting the management plan's goal of "maintain[ing] a free-ranging bison herd in Jackson Hole, as free from human intervention as practically possible" (Grand Teton National Park *et al.* 1996: 1)

¹ The NER, south of Grand Teton National Park and north of the town of Jackson, was created in 1912 to protect migratory elk that wander out of the protective boundaries of Yellowstone National Park. Later additions of land to the refuge and federal legislation pertaining to national wildlife refuges expanded the purpose of the refuge to include the protection of migratory birds and other wildlife and plant species.

while managing for other species such as elk, minimizing the risk of disease transmission, and implementing management decisions in a complex natural and social environment. The current bison management plan must be seen as part of a continuous process that has improved over the last two decades but has not reached a resolution.

The debate over bison involves a host of issues, some scientific, many political, such as the kinds of science and analysis needed to formulate practical and effective alternatives, the role of state and federal governments in management, the ethics of hunting, and the onus of preventing transmission of the disease brucellosis from wildlife to cattle. The millions of people that live, work, and visit Jackson hold a range of views on how to manage the valley's bison and other wildlife. In addition, the debates are being carried out amid national controversy over managing bison in Yellowstone National Park. The way the Jackson Hole community, working with government agencies, resolves this issue holds lessons for other resource management debates.

The focus of this paper is the planning process that led to the current form of the bison management plan. The goals of the paper are (1) to outline briefly the history of the bison management planning process and EA; (2) to place bison management in a larger community context; and (3) to find the lessons for future natural resource management. With the National Wildlife Refuge System Improvement Act of 1997 mandating all wildlife refuges to develop management plans, learning from the bison EA and management planning process is timely, vital, and can help to improve future planning processes.

A number of methods were used in gathering data for this project. Review of government documents, newspaper and magazine articles, letters, and other written material provided much background information. Participation in meetings on bison and other natural resource issues in the region as well as interviews with government officials, conservationists, ranchers, researchers, and others involved in the bison EA provided data on the social and political situation leading to the ongoing debates over managing bison. Field visits to the refuge were also conducted. In addition, the analysis draws on policy theory from natural resources and other fields to provide insight into the development of the EA. The information was integrated and analyzed using a conceptual, integrative, policy framework called the policy sciences (Lasswell and McDougal 1992).

ARE BISON ON THE REFUGE A PROBLEM?

The intermingling of dwindling bison populations and bison conservation efforts has a long history in the land surrounding Yellowstone National Park, known today as the Greater Yellowstone Ecosystem (GYE). An estimated 40 to 60 million North American bison were reduced to 50 to 1,000 individuals during the nineteenth century as a result of buffalo hunters, possibly disease, the carving up of western lands and bison habitat by railroads and settlers, and other natural and human causes (Flores 1991). In Jackson Hole, the last bison

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were killed by the mid-1800s. The only surviving free-roaming bison herd in Greater Yellowstone—the largest wild herd in the country—resided in Yellowstone National Park (Dary 1989).

The Yellowstone herd was protected under laws prohibiting killing of wildlife in Yellowstone, and bison in Wyoming were protected under a state law passed in 1871.² By 1945, six years after the Wyoming State Legislature repealed the state law, three of the Yellowstone bison wandered into Jackson Hole. In 1948, 20 of the Yellowstone bison were reintroduced to Jackson Hole by the Jackson Hole Wildlife Park, a private, non-profit group sponsored by the New York Zoological Society, the Jackson Hole Preserve, Inc., and the Wyoming Game and Fish Commission. The bison were property of the state of Wyoming until the expansion of Grand Teton National Park in 1950 encompassed the Jackson Hole Wildlife Park. After the expansion, the National Park Service began managing the herd in cooperation with the Wyoming Game and Fish Department.

The Jackson bison, totaling 15-30 individuals until about 1963, were confined to an enclosure during early management days. Management actions in the 1960s focused mostly on winter feeding, hazing animals that left Grand Teton National Park back into the park, and testing for and vaccinating against the disease brucellosis. Brucellosis, if contracted by domestic livestock, can cause severe economic losses to cattle ranchers.³ In 1963 brucellosis was discovered in the herd. Officials killed all thirteen adult bison to eradicate the disease from the herd, and four yearlings and five calves that had been vaccinated were kept. Twelve bison certified brucellosis-free were introduced from Theodore Roosevelt National Park in 1964. The same year, Grand Teton National Park and the U.S. Department of Agriculture signed a brucellosis plan, which prescribed vaccinating all new calves and testing adults every three years. Managers were unaware at the time of the ineffectiveness of calf vaccinations (Grand Teton National Park *et al.* 1996, Camenzind 1994).

About the same time, in the 1960s, the park began moving toward a more “hands-off” management policy allowing natural processes such as starvation and predation to regulate wildlife populations. By 1969, managers stopped hazing bison back into the park and allowed the nine bison to range free (Gerty 1986). Until about 1975, the herd spent the summer in the park and the winter west and north of the park (Gerty 1986).⁴ A limited number of bison began appearing on the refuge in the winter of 1968-69. By 1975 the entire herd—18 animals—began wintering on the refuge. From the winter of 1991-92 to the winter of 1995-96, 149-252 bison (97-100% of the herd) wintered on the refuge (Grand Teton National Park *et al.* 1996).

Managers at first accepted bison seeking forage on the refuge since human settlement in the region limits ungulate winter range. However, agency officials soon began to perceive bison as a problem. In 1980, bison began eating supplemental feed provided for elk on the refuge. By 1982, managers tried unsuccessfully to haze bison away from the elk feed lines. The district

² In 1871, the Wyoming Territorial Legislature passed a law to protect the few remaining bison in the state. The state legislature adopted the law in 1890 when Wyoming became a state. The law did not apply in national parks, however, so it did not affect Yellowstone. In 1894, the apprehension of a bison poacher in Yellowstone spurred the passage of the Lacey Act, which protects bison and other wildlife in national parks. The Lacey Act is still in effect, but the Wyoming state legislature repealed the state law protecting bison in 1939 (Camenzind 1994).

³ The Cooperative State-Federal Brucellosis Eradication Program began on July 19, 1934. It was instituted under an amendment to a bill, the Jones-Connelly bill, designed to begin a cattle reduction program to relieve the cattle industry from economic depression and Midwestern drought conditions. Efforts began in 1935 to test cattle voluntarily for brucellosis. In 1935, elk from the Jackson Hole area became the first wildlife species to be tested for brucellosis. To ensure uniformity in eradication efforts among states, a Uniform Methods and Rules (UM&R) document was adopted in 1947. By 1954, Congress authorized the goal of eradicating brucellosis from the United States. As early as 1960, the Brucellosis Committee began to see the presence of brucellosis in wildlife, especially the Yellowstone population, as problematic to eradication efforts (Frye and Hillman 1997).

⁴ After closing the wildlife park, then Superintendent Bob Kerr promoted moving the herd to “a more compatible environment,” but that recommendation was not taken (Gerty 1986).

supervisor of Wyoming Game and Fish said that “the more bison we’ve got, the more problems” (quoted in Gerty 1986). A Game and Fish biologist said that brucellosis was one reason for controlling the herd (Stump 1982). He also said that bison interactions with elk were perceived as a problem because “now they’re taking forage away from the elk” (quoted in Associated Press 1982). A refuge biologist said, “We don’t want to see a National Elk and Bison Refuge” (quoted in Gerty 1986). These statements indicate a prioritization for elk over bison and different standards for different species.

To address the “problem” of bison competing with elk for supplemental feed, managers established separate feed lines for bison in 1984. The same year, bison gored five U.S. Fish and Wildlife Service horses on the refuge, killing one. Five adult bison were killed as a result. Managers began to see bison as a threat to property and human safety, in addition to claims that supplemental feed for bison reduced winter mortality, placed human influence on a previously naturally regulated population, induced economic costs, and posed property and human safety concerns. Bison also began entering the town of Jackson, although efforts to haze bison further north onto the refuge were successful (Gerty 1986; Griffin 1998; Grand Teton National Park *et al.* 1996). Thus, bison were at this time seen as a problem on the refuge. Throughout this management history, a total of sixty-one bison were shot by private individuals or in management actions.⁵

THE PLANNING AND ENVIRONMENTAL ASSESSMENT PROCESS

THE FIRST PLAN AND ENVIRONMENTAL ASSESSMENT

About 1982 an existing interagency team of biologists, the Jackson Hole Cooperative Elk Studies Group, began drawing up a bison management plan when it became clear that the bison’s seasonal migration to the elk refuge would persist (U.S. Fish and Wildlife Service and National Park Service 1988; Stump 1982). Wyoming Game and Fish officials from Cheyenne told the department’s Jackson representatives not to work on the plan cooperatively because they wanted to develop their own plan (Smith 1998). Thus, Game and Fish biologists took the lead on the plan in 1983, which some questioned since the National Elk Refuge is federal land administered by the U.S. Fish and Wildlife Service. The Wyoming Department of Game and Fish released a management plan for comment in 1985 which called for maintaining the herd at 50 animals, using hunting to cull the approximately 89-animal herd (Lloyd-Davies 1985).⁶

Wyoming Game and Fish offered several justifications for the reduction. They claimed that bison consumed food on the elk feed lines, acted aggressively toward elk, caused property damage, and might transmit brucellosis to cattle grazing in Grand Teton National Park. The plan also stated that “the U.S. Fish and Wildlife Service finds no biological justification for perpetuating a bison herd on the National Elk Refuge, as the Service currently maintains three bison

⁵ Thirteen adults were killed to manage for brucellosis in 1963. During the winter of 1974-75, a private landowner with an inholding in the park killed two bulls on his property. In 1983-84 NER personnel killed five bulls that gored and killed U.S. government horses. In 1987, two bison were shot on the Twin Creek Ranch adjacent to the NER, and in 1988 a single bull was shot on private land near Marbleton, Wyoming. From 1988-1991, thirty-seven bison were shot by agency personnel and sport hunters in an attempt to manage the population size, including three bison shot on private land in the Green River valley in 1990. In 1997, at the request of the Wyoming Livestock Department, the Wyoming Game and Fish Department shot a bison deemed too close to cattle in the Green River Basin (Simpson 1997b).

⁶ A reduction plan required reclassification of bison as wildlife on the National Elk Refuge by the Wyoming Livestock Board, since they were only classified as wildlife on national forest and park lands (Staff 1985). The Wyoming Livestock Board consists of sheep and cattle ranchers appointed by the governor (Gerty 1986). A bison hunt was instituted in Montana the same year.

management refuges” (quoted in Lloyd-Davies 1985). This justification raised a question in many people’s minds regarding the mission of the refuge and the prudence of attempting to prioritize management for one species (Harvey 1998). Several people also mentioned that the refuge manager at the time did not want bison on the refuge and encouraged management practices to minimize their presence (Camenzind 1998b; Griffin 1998; Harvey 1998).

The agency also argued that the increase in bison numbers put the herd over the target population. Such a justification was circular, since it did not independently substantiate the need for the proposed reduction, but instead became a problem only after the reduction target was adopted as a program objective. Such circular arguments have been identified as a common problem termed “self-reference” in literature on group dynamics (Smith and Roffe 1992). Agencies and other “social entit[ies]” tend to define a condition and then “use this definition as the exclusive basis for reflecting on what needs to be redefined” (Smith and Roffe 1992). An analogy may be helpful to explain this concept. “If we notice that water is wet and decide that its wetness is a problem, we may seek a ‘solution’ by attempting to eliminate the wetness of water. No matter how hard we try, that approach is hopeless. By giving up the hope of changing the wetness of water, we no longer become embroiled in the hopelessness of that task and see other alternatives to trying to change what is unchangeable” (Smith and Roffe 1992: 59). In the case of bison, the “wetness of water” may be compared to the migratory nature of bison, an unchangeable condition. Thus, by defining the condition of roaming bison as a problem and setting a population target of 50, the agencies fell victim to the natural tendency to define problems in an irreconcilable way and were unable to look beyond their problem definition.

In 1987, based on the Wyoming Game and Fish plan, the National Elk Refuge (U.S. Fish and Wildlife Service) and Grand Teton National Park devised a management plan and EA. The goal of the plan was to manage a growing herd, reduce economic hardship, and manage for potential safety concerns. The plan set a population size of 50 animals, using an agency hunt to kill 40-50 of 90 total animals and conducting research on the impacts of the herd after the reduction. Officials claimed that a population of 50 would prevent economic costs and risks to humans and livestock and that reducing the herd would not adversely affect the diversity and abundance of other species (National Elk Refuge and Grand Teton National Park 1987).

The public responded negatively to the plan. They questioned justifications given for maintaining the herd at 50 and the perception of problems posed in the plan (Harvey 1998; Lichtman 1998; Thuermer 1998a; Thuermer 1998b). The Greater Yellowstone Coalition, a group of conservation organizations, sponsored a public meeting to stimulate participation in the issue (Thuermer 1998b). Three wildlife biologists stated that the management team was in violation of the National Environmental Policy Act (NEPA)⁷ because the EA did not sufficiently justify plans to reduce the herd (Clark *et al.* 1988; Thuermer

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⁷ NEPA requires that a comprehensive EA be undertaken before any major federal action can occur to clarify any potential ramifications of the action and to insure that the action is not in violation of such federal laws as the Clean Water Act and the Endangered Species Act.

1988b). Many claimed that the plan lacked data concerning economic costs, and only one case (the goring of government horses) had been reported involving a threat to property or safety (Thuermer 1988b). Opponents also felt that it was irrational to initiate research after a reduction, rather than before, to establish baseline conditions and an appropriate population size (Camenzind and Good 1988; Thuermer 1988b). Many people saw an increasing bison population as a success rather than a problem (Associated Press 1988). One group called for a redefinition of the refuge's purpose (Camenzind and Good 1988; Thuermer 1988b). The problem, many argued, would come with reduced genetic viability from a limited herd size (Heller 1988).⁸

The idea of problem definition, discussed in further detail below, remained central to the entire first phase of the development of the EA. For example, many people asked what goal was met by maintaining 50 bison and what goal was hindered by bison's presence on the refuge. If the refuge set the goal of maximizing elk for hunting or public viewing, bison might be seen as a problem and the alternative of 50 seen as an acceptable population target. However, the absence of adequate evidence to indicate that bison hindered elk numbers, hunting opportunities, or favorable public opinion of the refuge raised questions in the public's mind. The public also questioned the "elk only" goal of the refuge, and so questioned the notion that bison, another species favored by the public, on the refuge was a problem in and of itself.

ROUND TWO: RE-INITIATION OF THE ENVIRONMENTAL ASSESSMENT PROCESS

Because of the opposition, managers withdrew the plan. In 1988, the refuge, Grand Teton National Park, Wyoming Game and Fish Department, and Bridger-Teton National Forest adopted the "Interim Agreement for Management of the Jackson Bison Herd," which remained in effect until December 31, 1994. The plan advocated managing the herd at 90 to 110 animals through various reduction strategies. They reclassified the first EA as a scoping document and ordered the completion of another EA by 1994.

Officials from the park stated that the revised plan increased the target population because "that is close to the current herd size" and that population control measures would remain in place "until our research determines . . . the suitable number of animals for the herd" (quoted in Piccoli 1988). The plan also called for hazing bison into the park. Some agency officials felt the plan's importance rested more with the interagency cooperation framework it established than with the bison population numbers (Piccoli 1988). Critics stated that the plan merely continued the status quo, still failed to offer a rationale for the target population, and failed to reflect public comments from earlier draft plans (Thuermer 1988c).

In 1989, Wyoming Statutes 23-1-101 and 23-1-302 designated bison as wildlife in Wyoming (WY Stat § 23-1-302; WY Stat. § 23-1-101). Prior to this, outside of national forest and park lands, bison were designated as livestock and

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⁸ Smaller populations face a greater chance of extinction through chance events such as disease or severe weather because animals with similar genetic makeup are equally susceptible to such events.

subject to the control of the Wyoming Livestock Board (Gerty 1986). The new designation had three main effects. First, it subjected bison to regulations developed by the Wyoming Game and Fish Commissioners, a board of citizens⁹ appointed by the governor. The commission and the Wyoming Livestock Board designated bison as wildlife on the Shoshone and Bridger-Teton National Forests and on selected federal lands in Teton County.¹⁰ Second, it allowed the Wyoming Livestock Board to designate bison on public or private lands as a threat to livestock health or improvements on private and public lands and to require the Game and Fish Commission to remove them. Finally, it provided authorization for a wild bison reduction season.

With the authorization from Statutes 23-1-101 and 23-1-302, Wyoming Game and Fish personnel hunted the herd in 1988-89. They gave sixteen bison shot to Native American groups. The refuge attempted to minimize publicity and gave no advance notice of the hunt, but word leaked out and many groups were upset not only by the hunt, but also by the agency's attempt to keep it quiet (Piccoli 1989; Griffin 1998). In 1989-90 and 1990-1991, the refuge, park, Wyoming Game and Fish Department, and Bridger-Teton National Forest held a hunting permit program. Over 3,800 people applied for 20 permits at a price of \$200 for Wyoming residents and \$1000 for non-residents.

The revised management plan and both hunts, however, resulted in public outcry. Some remarked on the irony of the Wyoming game agency and U.S. Fish and Wildlife Service condoning the shooting of an animal honored on the state seal and the seal of the Department of Interior, the parent authority of the U.S. Fish and Wildlife Service (Thuermer 1989). One resident lamented that "since the bison is no longer appreciated or respected as the state animal, we should consider changing the emblem of the buffalo on the state flag to a steer, or a cowboy or a buffalo chip" (Rupert 1989). The agencies received criticism for exerting their energy toward bison control activities in the interest of elk and livestock and neglecting to account for the values of promoting a dynamic bison population. Agencies failed to conduct public attitude surveys, economic valuation studies, or a risk assessment (Day 1989; Piccoli 1989; Thuermer 1989b). The agency plan, many claimed, failed to meet the goal of maintaining a self-sustaining population (Thuermer 1989b). An agency member even admitted "probably none" of the perceived problems in the plan would be solved by killing 15 to 20 bison (Camenzind 1989).

After the death of thirty-seven animals through hunting, the Legal Action for Animals filed a lawsuit against the U.S. Fish and Wildlife Service (*Legal Action for Animals v. Wyoming Game and Fish Dept. 1990*). The plaintiff claimed that the U.S. Fish and Wildlife Service failed to follow the NEPA process before taking action and that the state and federal government lacked scientific evidence to show that killing bison offered the best way to manage the Jackson Hole herd (McKeever 1994). An out-of-court settlement halted the reductions and suspended the interim plan until the completion of the EA, but the refuge manager said, "I think we're going to have to dispel the notion that

⁹ The citizens tend to be hunting and fishing oriented, with ties to livestock industry, ranchers, and sportsmen (Reiswig 1998).

¹⁰ These designation affected lands north of U.S. Highway 89 and 189-191 north of Hoback Junction.

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we're going to have a free-ranging bison herd that is like it was in past time." He also remarked that the herd survived because of supplemental feeding and that increased shooting would follow the termination of the moratorium (Eastridge 1990).

From 1987-1993, managers increased biological research efforts.¹¹ They studied bison distribution and migration to identify major use areas. Investigations of interactions of bison and elk on feed lines on the refuge were shown to displace but not harm elk (Helprin 1992). Managers also reviewed ways of maintaining genetic integrity (Shelly and Anderson 1989), although scientists outside the agencies contested the results. The timing and distribution of bison calving was also studied. The agencies rejected proposals by independent scientists, including Mark Boyce, to conduct a risk assessment and social survey.

INCREASED CONCERN ABOUT BRUCELLOSIS

The agencies felt increasing pressure to control bison movements and numbers after 11 of 16 bison killed in the agency hunt in 1989 tested positive for brucellosis (Thuermer 1989a). The same year, the Parker Land and Cattle Company in Dubois lost its entire stock of breeding cattle, valued at \$500,000, to brucellosis. The company sued agencies in the Department of the Interior in charge of wildlife management, including the National Elk Refuge (U.S. Fish and Wildlife Service), Grand Teton National Park, and Yellowstone National Park (National Park Service). Parker alleged under the Federal Tort Claims Act that his cattle contracted brucellosis from Jackson bison and that the federal government was liable because of negligence in managing its wildlife and failing to warn him of the brucellosis risk (Keiter and Froelicher 1993).

The court ruled in favor of the government, concluding that imported cattle, stray cattle, artificial insemination, and domestic animals could have been the source of infection (Carlman 1994; Keiter and Froelicher 1993). However, it also concluded that the Park Service and U.S. Fish and Wildlife Service managed their herd in a negligent manner because they failed to constrain free-roaming bison or vaccinate elk (Keiter and Froelicher 1993). This ruling "sends a powerful message to federal land managers that they must take affirmative steps to protect domestic livestock from wildlife infected with brucellosis" (Keiter and Froelicher 1993).¹²

Thus, while the Parker Land Company lost in the courts, to many, the court's decision renders brucellosis in wildlife a more ominous threat to government agencies and the cattle industry. To some, this threat has biological origins. To others, it has bureaucratic and political origins. While the judge ruled that the infection came from cattle, many ranchers believe the court case focused attention on public-lands grazing (Wilkinson 1997).

It also focused attention on the government's obligation to manage diseases in wildlife (Keiter and Froelicher 1993). The court effectively ruled that the free-roaming bison herd constitutes negligence on the part of the park and that the U.S. Fish and Wildlife Service is demonstrating negligence by not vaccinating elk.

¹¹ Research projects include: (1) a study conducted from 1987-1989 by Grand Teton National Park personnel to determine seasonal distribution and migration routes; (2) a study by a graduate student at Utah State University to determine bison-elk interactions (Helprin 1992); (3) a review of literature on genetic management of small herds and sterilization as a management strategy conducted by the U.S. Fish and Wildlife Service Cooperative Wildlife Research Unit in Laramie, Wyoming (Shelly and Anderson 1989); (4) a study by Grand Teton National Park of bison calving and distribution conducted from 1991 to 1992; and (5) a study of scenarios involving genetics and population size of bison in Jackson Hole (Berger 1996).

¹² Legal professor and scholar Robert Keiter points out that "the decision reflects a fundamental misapplication of FTCA precedent, namely unabashed judicial use of the FTCA to devise federal wildlife brucellosis policy in the absence of any congressional guidance" (Keiter and Froelicher 1993: 38). In previous cases involving rock climbing and dangerous trails, the court determined that the park's discretionary decision not to warn climbers and hikers was coherent with their existing policies. In *Johnson v. United States* (10th Cir. 1991), the plaintiffs alleged that the park had not properly warned against the dangers of mountain climbing. The Tenth Circuit court ruled that the park was not liable because its decision not to warn was coherent with its overall policy of not regulating climbing activity in the park (Keiter and Froelicher 1993). In *Zumwalt v. United States* (10th Cir. 1991), a case alleging Park Service liability for not posting warning signs on a dangerous wilderness trail, the Tenth Circuit court determined

Parker also filed a claim, under Wyoming wildlife law, with the Wyoming Game and Fish Commission¹³ for property damage of over one million dollars. A state-funded compensation program covers damages to livestock by trophy game animals. The commission denied the claim, concluding that the program does not cover non-game species such as bison nor does it cover diseases. They also concluded that the evidence was not strong enough to implicate wildlife. The Wyoming Supreme Court upheld the decision on appeal, in a 4 to 1 vote. While Wyoming Game and Fish triumphed, three of the five justices “held that brucellosis transmission from elk or bison to cattle is a compensable form of damage under the wildlife damage statute” (Carlman 1994).

Researchers have shown that cattle can contract the disease if they consume infected placental remains or afterbirth left by calving bison, elk, or other wildlife, although this method of transmission has never been documented in the wild (Wuerthner 1990; Robinson and Neal 1990). The U.S. Animal and Plant Health Inspection Service (APHIS), part of the U.S. Department of Agriculture, is charged with controlling brucellosis in domestic livestock¹⁴ and grants brucellosis-free status to states with no infected cattle herds, rendering interstate sale of cattle easier. APHIS declared Wyoming brucellosis-free in 1985. Between 1980 and 1989, five herds in the state became infected with brucellosis, all unconfirmed cases in which wildlife were suspected of transmitting the disease.¹⁵ The state maintained its brucellosis-free status because the infections were presumed to be caused by wildlife. APHIS and state veterinarians began to pressure Yellowstone and Jackson to manage bison with the primary goal of eradicating brucellosis. APHIS claims that “the responsibility to protect cattle from becoming infected through exposure to wildlife rests with the Wyoming Game and Fish Department and various federal agencies that control federal lands” (Barton *et al.* 1997).

In a review of the Wyoming Brucellosis Program released in July of 1997, APHIS claimed that “there currently are no brucellosis preventative or control measures being applied to the bison and elk that frequent [sic] the National Elk Refuge” (quoted in Drake 1997). However, APHIS did recognize measures taken by Wyoming Game and Fish employees to keep elk and cattle apart when feeding. These measures included fencing, hazing using snowmobiles, helicopters, and other vehicles, and killing elk that persist in efforts to feed at cattle haystacks (Barton *et al.* 1997). APHIS also recommended that Jackson Hole ranchers test their cattle for brucellosis (Thuermer 1997). This would affect three ranches in particular.

The negative publicity resulting from the brucellosis requirements, much like the attention brought to public land grazing in the Parker case, worry cattlemen. The cattlemen want steps to be taken to assure animal health officials and cattlemen in other states that no brucellosis problem exists in their cattle (Barton *et al.* 1997). Steve Thomas, one member of the conservation community, said, “We see this [requirement of testing cattle] as penalizing [ranchers] for some obscure policy of zero tolerance” (quoted in Thuermer

the decision not to warn was in line with its overall policy (Keiter and Froelicher 1993).

While the previous cases involve visitors to the park and *Parker* involves diseased wildlife, the court in *Parker* failed to consider existing Park Service or U.S. Fish & Wildlife Service wildlife management authority, “specifically the degree of discretion they retain in establishing wildlife policy under the relevant organic legislation” (Keiter and Froelicher 1993). Keiter argues that without determining such discretion, the court cannot properly assess whether a duty to warn is not required under existing park policy. He further argues that lack of congressional mandates regarding wildlife and brucellosis, the U.S. Fish and Wildlife Service’s dedication to wildlife conservation, and the policy of naturalness held to by the Park Service exempt them from FTCA liability and provide them with discretionary judgments (Keiter and Froelicher 1993). Finally, Keiter points out that the court ruled that only the Park Service and U.S. Fish & Wildlife Service—not the Forest Service or Bureau of Land Management—hold the duty to warn ranchers.

¹³ The Wyoming Game and Fish Commission, a group of citizens appointed by the governor of Wyoming, oversees the Wyoming Game and Fish Department. The Commission is composed primarily of those with ties to the livestock and hunting industries (Reiswig 1998).

1997). Thomas also said that “the recommendations they make are totally beyond the scope of their mission...It seems to me as if they ought to stay out of wildlife management and the business of the parks” (quoted in Simpson 1997a).

Furthermore, the state threatened to sue the Park Service and the U.S. Fish and Wildlife Service for not controlling brucellosis in their wildlife populations (Simpson 1997a). Rancher and former Senator Cliff Hansen stated, “I can think of no reason at all why these new rules from APHIS make sense....To my knowledge, none of us has ever had any problem with brucellosis” (quoted in Wilkinson 1997).

ROUND THREE OF THE ENVIRONMENTAL ASSESSMENT

The unfolding events involving brucellosis affected the draft EA and long-term management plan released in 1994 by the National Elk Refuge, Grand Teton National Park, and Bridger-Teton National Forest, and the National Wildlife Health Center. Governor Jim Geringer became involved in the issue in 1995, seeking assurance that the Park Service would do what it could to keep bison and cattle apart to ensure that Wyoming kept its brucellosis-free status (Staff 1995). To address concerns over brucellosis, the plan advocated minimizing bison-cattle interactions, using a new vaccine, and conducting a risk assessment. This plan increased the target population to 150-200 individuals, with a maximum of 200 allowed under the condition that a portion of the herd wintered off the refuge. To reach this objective, the plan called for public sport hunting, irrigation of forage at the Hunter-Talbot site east of the park and north of the refuge, and the baiting of bison at the Hunter-Talbot area to keep them in the park. Introduction of new individuals to ensure genetic diversity was also proposed (Grand Teton National Park *et al.* 1994).

Once again, public debate ensued. The agencies received 160 letters from state and federal agencies, Native American tribes, organizations, and individuals. The Wyoming Stockgrower's Association represented perhaps the most conservative viewpoint and suggested that for “health and safety considerations, we also strongly recommend that the bison be distributed away from the National Elk Refuge, especially during the winter season” (quoted in Gentle 1994). While the Wyoming Stockgrower's Association wanted the herd fenced and culled to 50 disease-free animals (Thuermer 1996), many other individuals and groups, including independent scientists, claimed the herd size was still unjustified and not high enough to maintain genetic fitness. Opponents also considered irrigation of park land and baiting animals in violation of park policy and in danger of setting a poor precedent. The risk assessment, many members of the public claimed, should come before, not after, adopting a management strategy and should include an assessment of risk from diseases other than brucellosis. Some suggested the need for studies to understand actual private property losses from bison, sociological surveys on the economic and other values of bison to the public, a more thorough economic analysis of

¹⁴ APHIS began its eradication efforts in 1934. The efforts began to reduce the cattle population due to drought conditions, but many states saw this effort as an opportunity to reduce losses from brucellosis. APHIS works with state governments and livestock producers, and only 26 herds in the country were known to be infected as of April 1997 (Barton *et al.* 1997).

¹⁵ These herds include the following: (1) On March 16, 1982, two cows that aborted in a herd at Bondurant, Wyoming tested positive for brucellosis. No source of infection was proven, but this herd commingled with elk and “wildlife was considered the most probably source” (Barton *et al.* 1997: 3). (2) In 1983, an infected herd was found in Cora, Wyoming (Sublette County). The Black Butte elk feed ground lies within the outer borders of the ranch and “no source of infection could be found other than diseased elk” (Barton *et al.* 1997: 3). (3) Seven cattle tested positive in November of 1984 in Jackson, and “no source of infection other than wildlife was found” (Barton *et al.* 1997: 3). (4) A dairy herd in Lincoln County tested positive in October 1985, and “the owner revealed that elk frequented his property and were known to feed with the dairy cattle” (Barton *et al.* 1997: 3). (5) In 1989, a herd in Dubois was found to be infected. The conclusion of a court case was that “the Parker brucellosis outbreak was most likely caused by contact with infected elk or bison as those are the only two known sources of the disease in the entire State of Wyoming” (Barton *et al.* 1997: 3).

costs of managing bison as well as an economic analysis of contributions of bison to Jackson Hole and an analysis of bison's impact on elk (Curlee 1995; Anonymous 1994).

Representatives from Wyoming's Agriculture and Game and Fish Departments, the state Livestock Board, APHIS, the U.S. Forest Service, the National Park Service, and the U.S. Fish and Wildlife Service began meeting in January 1995 to revise the plan. Ron Micheli, director of the state Agriculture Department said, "This group was assembled to protect the class-free status of Wyoming cattle" (quoted in Neal 1996).

The Totem Studies Group, a citizen-based problem-solving forum, was formed within the Jackson Hole community in 1995 to "develop and apply an innovative intelligence-gathering and decision-making process to guide natural resource management practices in the Greater Yellowstone Ecosystem" (Curlee and Day 1995b). Many members felt frustrated with management practices and expressed concern not only over bison management, but also over decision making and models of public participation (Curlee 1998). The overall goals of the group included identifying and creating the best possible future for the GYE bison herds, using the project as a pilot to redesign the decision-making process for wildlife management in the GYE, disseminating ideas and knowledge, and forging new relationships (Curlee 1998). The group began by clarifying the "bison problem" as three-tiered, including population size, the specific process leading to the management of bison, and barriers such as rigid organizational cultures.¹⁶ The membership of this group (Jackson citizens, conservationists, agency personnel, county commissioners, educational institutions, Native Americans, members of the agricultural community, and independent scientists) demonstrates inclusiveness in decision making.

In 1996, the agencies issued another EA and long-term plan. The accepted herd size grew to 200-250 animals, with no more than 200 wintering on the refuge. It called for the same strategies to manage the herd as the previous plan (i.e., hunting, irrigating the Hunter-Talbot site, baiting bison into the park, minimizing bison-cattle interactions, using a new vaccine, and conducting a risk assessment). It also called for a Native American hunt (Grand Teton National Park *et al.* 1996).

The public responded to the 1996 plan with similar comments as the 1994 plan. Agencies received 144 letters. One letter advocated the reduction of the herd to fifty and complete depopulation and repopulation with a disease-free herd, and one letter argued against a free-ranging herd (Anonymous 1996). The majority of people who wrote letters, however, felt the elk feeding program presented a larger problem, believed the alternative set a poor precedent for park policy, set an inadequate population goal to maintain genetic viability, and was deficient by presenting bison on the refuge as a problem and a pest species rather than as a valuable member of the wildlife community (Anonymous 1996).¹⁷

¹⁶ The groups defined the problem as follows: "In the specific case of bison management, the problem can be conceptualized in three concentric circles. In the inner-most circle are the specific issues of bison management, such as conflicts with livestock ranching and other land uses, or in other words the subject. In the middle circle is the decision-making process that acts on the subject. And in the outermost circle are the contextual variables influencing the decision-making process, such as bureaucratic culture and structure, federal and state tensions, and human values and attitudes" (Curlee and Day 1995a).

¹⁷ Twenty-six letters suggested the "problems" associated with bison in fact arose from the elk feeding program (33 letters mentioned the need to address elk feed grounds either in conjunction with bison feeding or as a problem); 21 letters stated that the environmental consequences are not adequately evaluated; 14 letters questioned the different management priorities for elk and bison and/or mentioned that the bison herd needs to be considered in a larger context; 14 letters questioned the justification for the preferred alternative and the science used to indicate consequences; 13 letters complained that special interests were being favored (one letter referring to wildlife special interests, twelve letters to livestock and or hunting); 11 letters questioned the strategy of keeping bison in the park and irrigating the Hunter-Talbot area either because it seems unfeasible and/or violates the park's natural regulation policy; 10 letters questioned the ability of the plan to maintain genetic viability and/or the strategy of introducing female bison to maintain a genetically viable herd; nine letters request more

The agencies listened to the comments, revised a number of the alternative proposed in the final plan released in 1996, and released a Finding of No Significant Impact (FONSI) in August 1997. The overall goal of bison management, according to the final Bison Long Term Management Plan and Environmental Assessment, is to “maintain a free-ranging bison herd in Jackson Hole, as free from human intervention as practically possible” (Grand Teton National Park *et al.* 1996). Specific objectives include maintaining a self-sustaining population, minimizing potential for the transmission of brucellosis from bison and elk to domestic livestock, reducing bison dependency on supplemental feeding, maintaining recreational opportunities associated with a free-ranging herd, and minimizing the potential for bison-human conflicts and bison-induced property damage (Grand Teton National Park *et al.* 1996; Grand Teton National Park and National Elk Refuge 1997).

The FONSI examined four key management issues, including herd size, herd reduction methods, winter distribution, and disease management. It received the support of diverse groups. The plan proposes to maintain the bison population at 350-400 animals over a running five-year average.¹⁸ Herd reduction methods include public hunting and culling of animals for use by Indian tribes and low-income groups. The Wyoming Game and Fish Department will administer hunts on the National Elk Refuge and national forest lands. Grand Teton National Park will consider reduction within the park if reduction goals are not met outside the park. Agencies will also consider shipping bison live.

Bison will be allowed to continue wintering on the National Elk Refuge, eating natural forage and supplemental feed. They will be hazed from the southern portion of the refuge to avoid human conflict. Finally, attempts will be made to minimize the potential for brucellosis transmission among bison, elk, and other wildlife and cattle and to work toward eliminating brucellosis. Disease management plans include a risk assessment for the potential of transmission from bison to cattle, a bison vaccination program (pending the development of a safe and effective vaccine), and the vaccination of all cattle grazed in and trailed through Grand Teton National Park. Officials from Grand Teton National Park and the Bridger Teton National Forest will also work with grazing permittees to minimize transmission from bison to cattle (Grand Teton National Park and National Elk Refuge 1997).

LAWSUIT REQUIRES NEW PLAN, CONTROVERSY CONTINUES

The plan was released and accepted by a diverse group of stakeholders and agencies. The controversy continues, however. The lawsuit filed by the state of Wyoming over vaccinating elk on the refuge against brucellosis and the state opposition to allowing a special Native American hunt indicate that inter-agency cooperation on the bison management plan and EA is not stable.

In addition, the Fund for Animals filed a request on October 2, 1998, to stop a controlled bison hunt (Gearino 1998a). The judge ruled to stop the hunt on October 30 and ordered the U.S. Fish and Wildlife Service to complete an EA

biological and socioeconomic research (5 letters requested a delay in reduction pending such research); eight letters raised the issue of grazing on public lands (five letters raised the issue of grazing in the park as part of the problem; three letters opposed grazing on public lands); seven letters mentioned the responsibility of APHIS for driving the issue (2), the financial responsibility it should take for vaccinating cattle (4), and the financial responsibility it should take for a risk assessment (1); six letters mentioned the need for a better, less positivistic problem orientation, justifications, information, and public participation; four letters mentioned the lack of transmission in Grand Teton National Park, the success of cattle vaccination programs, and/or the well-being of livestock producers; three letters criticized the effectiveness of the Greater Yellowstone Interagency Bison Committee; three letters promoted eradicating brucellosis and two letters opposed it; three letters suggested conducting a risk assessment; two letters promoted the idea of carrying capacity as a determination of population size over genetic viability, and two letters opposed such a strategy for calculating a target population; two letters criticized the use of brucellosis as a justification for reducing the herd, three letters opposed the hunt—calling it “public bloodletting sitting duck slaughter” and criticizing the words “popular” and “beneficial” to describe the hunt as euphemisms for slaughter—and three letters made suggestions concerning the location of the hunt, price of the licenses, and method of hunting; one letter supported and one letter opposed the distribution of meat to Native Americans; three letters criticized the Native American hunt as a political ploy; two letters supported such a hunt; and two letters promoted receiving more input

or environmental impact statement on its elk feeding program. The judge ruled the EA should have included consideration of the effects of bison and elk supplemental feeding. The judge dismissed arguments by the Fish and Wildlife Service that the elk feeding program was exempt from NEPA because it began in 1912 and that the bison hunt was exempt from NEPA because it was conducted by a state game agency rather than a federal agency (Gearino 1998a).

The controversy persists in Montana, as well, over bison that migrate out of Yellowstone National Park. While the social dynamics differ in Montana—the ranching community, for example, seems more concerned about transmission of brucellosis in Montana than those in the Jackson Hole region—many of the same agencies and pressures may affect Jackson Hole in the future. APHIS and state veterinarians retain much power over regulations concerning cattle, brucellosis, sanctions for states with brucellosis-infected wildlife, and the perception of possible risk transmission from wildlife to cattle.

In addition, the elk herd maintains a brucellosis infection rate of between 25 and 35 percent annually (Camenzind 1998a). The high prevalence has been attributed to feed grounds, which Wyoming Game and Fish and others maintain are necessary to keep elk separated from cattle herds. There is currently discussion among agencies and local groups about reducing the dependence on feed grounds.

Finally, the National Wildlife Refuge System Improvement Act of 1997 mandates a refuge-wide management plan. Given the controversy over elk population and management, bison management, and other refuge issues, the refuge can expect controversy over the development of this plan. Understanding the factors that led to the controversy in the bison EA process and learning from the process can help future planning.

FACTORS CONDITIONING THE FIFTEEN-YEAR PROCESS AND RESOLUTION

The process of developing an EA and long-term management plan brought many specific management issues to the surface, including herd size, methods of controlling the population, disease transmission, and carrying capacity. However, integral components of these discussions include issues that strike a deeper chord with the Jackson and GYE communities. These issues involve philosophical debates about managing wildlife and about the changing nature of the West. They involve resolving fundamental differences in worldviews, values, and priorities.

Essentially, a clash of individual and cultural values is deeply embedded in the bison debates. The questions regarding bison result from “the pictures in our heads” about the way the world should work as much as from empirical observations (Lippman 1922). People develop inner visions of the land, wildlife, and humanity’s role in the environment. They identify “problems” and demand “solutions” based on beliefs regarding their natural and man-made environments.

from Native Americans or opening the hunt to other tribes in addition to plains tribes; one letter raised the issue of the legality of hunting bison on U.S. Fish and Wildlife Service land; three letters re-requested more information concerning sterilization; two letters questioned the killing of bison in the park; one letter promoted depopulation; one letter promoted test and slaughter for scientific purposes (Anonymous 1996). These estimates were taken from a compilation of comments and should be considered rough estimates.

¹⁸ The running five-year average means that the herd may fall below or rise above this limit during certain years, as long as an average of 350-400 animals is maintained over five years.

Differences, of course, exist within groups based on individual identities and values, but many groups speak with one public voice. Individuals tend to identify and align themselves with groups of people holding similar values (Lippman 1922) and representatives of these groups advocate on behalf of a group consensus (Smith and Berg 1987). For example, agency officials who define bison as a “risk” that can be controlled hold a vision of the proper balance of big game species, bison as a wildlife species, and how to manage wildlife. Ranchers, environmentalists, ecologists, and others also hold visions of a proper balance between wildlife and domestic livestock or wildlife and human development.

Bison, as free-ranging herd animals, are difficult to control, and discussions over fundamental worldviews intersect in discussions of management over wildlife. Bison migrations run counter to jurisdictional boundaries. When animals such as bison and wolves cross political boundaries and affect the region’s cattle interests, they also cross ethical boundaries relating to land management (Bohne 1998). Managing for such species challenges the status quo, and yet the public holds deep affection for charismatic species such as bison (Bohne 1998), which symbolize for many the West and the ethic of conservation (Geist 1996).

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BRUCELLOSIS AND ESCALATING TENSION IN THE LIVESTOCK INDUSTRY

Mandates about wildlife and livestock interests that predate the admission of Wyoming to statehood exemplify the mix of values people have traditionally and continue to place on this land. As early as 1864, “the U.S. Supreme Court held that “states should hold wildlife in trust for the public” (Steller 1995). The Wyoming Constitution also includes a clause which “specifically directed the legislature to protect livestock interests,” a clause that demonstrates the political power of the livestock industry (Carlman 1994: 93).¹⁹ Ira N. Gabrielson of the Wildlife Management Institute reported to the Wyoming Game and Fish Commission in 1952 that “only in Wyoming had he found laws which gave “so much special consideration to livestock operators at the expense of the fish and game resources” (quoted in Carlman 1994: 94).

The *Parker* case described above is one indication of competing values, agency jurisdictions, and conceptions of the best allocation of land, power, and responsibility for wildlife and cattle management. Jackson lawyer Leonard Carlman (1994: 98-99) points out that, “While the specific agent of change in *Parker* appears to have been a microscopic bacteria, large economic, demographic, and political forces continue to bring about inevitable changes in the American West. These changes are typically described in terms of a transition from an extractive, intensive use of land to one which emphasizes recreational land use and a resettlement of the West by people employed in the trade of information and expertise. As large scale cultural change proceeds, the legal relationship between wildlife and livestock interests in Wyoming is likely to

¹⁹ Similar laws followed. In 1925, the Wyoming legislature authorized compensation for animal depredations, and in 1929 they instituted a damage compensation law. In 1980, an amendment was added to the damage claim law that added livestock killed or injured by trophy game species to a list of damages including land, crops, and grass (Carlman 1994).

experience its own set of related changes.” Many of the public comments regarding the bison management plan are statements about livestock management, the livestock industry, and the changing social makeup of the West that echo Carlman’s insight.

For example, many people questioned what management priorities drive bison policy, specifically after brucellosis became a more central issue in the 1994 and 1996 plans. At the heart of the issue, according to many, is the question “Is brucellosis a livestock or wildlife problem?” (Clark 1994). One resident promotes treating “the whole brucellosis problem in a comprehensive and unified way, which means acknowledging that elk management and cattle management are at least as much a part of the picture as is bison management” (Harvey 1995). Similarly, Camenzind stated that “since brucellosis appears to be more of a problem for cattle than for wildlife, solutions should be developed within the cattle industry, not at the expense of the wildlife populations” (Camenzind 1995).

Refuge manager Barry Reiswig stated his belief that “it’s more realistic to have a program of managing the risks of possible transmission of brucellosis from wildlife to domestic cattle as recommended in the NAS report” than to manage for eradication (U.S. Fish and Wildlife Service 1997). The Wyoming Department of Agriculture makes different claims. Director Bill Gentle feels that the brucellosis-free designation Wyoming now enjoys “is jeopardized by an unmanaged bison herd or a herd for which disease management is not provided” (Gentle 1994). He goes on to claim that “only herd reduction or population control will control the bison population” (Gentle 1994). At least one rancher in Jackson Hole agrees with the Department of Agriculture. He is quoted in a local newspaper as saying, “I think there is a place for bison, but I don’t think they should be uncontrolled” (quoted in Thuermer 1995). He seems worried because “the last four area ranchers whose herds had infected animals are all out of the cattle business” (Thuermer 1995).

The livestock industry in fact represents a diversity of interests. One cattle rancher, Henry N. Hall, wrote, “I am a *cattle* farmer and I do not believe that these bison present any brucellosis threat to cattle,” and he requested the bison herd size be increased to 400 (quoted in Adams 1996). Lisa Jaeger wrote, “I work for ranchers here in Pavillion and I think that killing bison for fear of brucellosis is crazy” (quoted in Adams 1996). Many ranchers feel that their practices, including calf vaccinations, keep their herds brucellosis-free and that feed grounds help to keep elk away from cattle, making the risk virtually zero (Barton *et al.* 1997). Many feel trapped by government agencies and complain about inconsistency in agency mandates. They also refrain from actively opposing bison and elk because they realize a decision between wildlife or cattle on public land would most likely be a loss for cattle (Wilkinson 1997). The ranchers resent requirements by APHIS (Wilkinson 1997).

Thus, the debate over brucellosis involves not only actual biological disease management, but also the reconciliation of different groups’ expectations

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about disease, wildlife, and livestock management. Many in the conservation community complain that since brucellosis has little effect on bison populations, the risk aversion measures taken should come from the livestock industry. Many within the livestock industry point to 35 brucellosis-free years as evidence that current measures they take against brucellosis work. Yet, changing regulations and expectations about the presence of brucellosis in Yellowstone's domestic and wildlife populations and who should manage the risk continue to fuel debate.

OTHER CONTROVERSIES IN THE REGION

Many related controversies exist in the region that may affect bison management on the refuge. For example, there has been ongoing debate about grizzly bear and cattle interactions, the delisting of grizzlies from the Endangered Species Act, the reintroduction of wolves into the GYE, the interaction of wolves with livestock and wildlife, and oil and gas leasing. Many of the same organizations and individuals interact in attempting to resolve these issues. The relationships—positive and negative—that develop in one case can affect other cases.

There has also been a recent effort to find ways to conserve open space in the West (e.g., Glick *et al.* 1998). In Jackson, the effort includes a controversy over extending cattle grazing leases in Grand Teton National Park, where cattle may intermingle with not only bison, but also predators such as grizzlies.²⁰ Currently, there are eight permittees with allotments in Grand Teton National Park and two with trailing privileges.²¹ While ranchers contend that they help to preserve open space and the ranching culture by grazing in the park, others argue that domestic cattle grazing runs counter to park mandates and favors a special interest. In addition, APHIS requests all ranchers grazing livestock in the park to test their cattle, which places a large expense on cattle operations and may generate negative publicity in other states (Thorne 1998).

Increasingly contentious conflicts over wildlife, steeped in deeply-held fundamental worldviews, can erode trust among all stakeholders. However, a perception of improved relations in other areas, such as relations with the U.S. Forest Service (USFS) over oil and gas leasing, can lead to a more open and trusting atmosphere. Park biologists are also putting more of an effort into understanding what is happening with bison, and there is daily interaction among members of the community and the park (Lichtman 1998).

MANAGEMENT PHILOSOPHIES

Philosophies over managing nature are in flux. These philosophies change with time and differ among constituent groups and among and within agencies. As an example, the bison management plan refers to “range condition” and “maximum carrying capacity.” These paradigms originally developed to manage livestock, and one resident conservation biologist claims that these philosophies “may not be in synch with current dynamic views of ecological systems

²⁰ A controversy erupted, for example, when Grizzly Bear 209 was taken from Grand Teton National Park in 1996 and killed because he repeatedly preyed on cattle that grazed in the park.

²¹ Five of the permittees graze cattle in the park, the first beginning on May 15 and the last ending on November 9. Park officials attempt to separate cattle from birthing bison. Since scientists claim the most likely way for bison to transmit brucellosis to cattle is through aborted fetuses, these dates roughly follow the end of the bison birthing season. However, bison are not highly predictable in their birthing periods, and the birthing season can last from February into June (Barton *et al.* 1997; Griffin 1998).

that largely debunk the ‘stability’ models of the past and place importance instead on ecological processes and interaction forces, and even view disturbance regimes (e.g., pest outbreaks, wildfire, flooding, etc.) as important elements for the maintenance of ecosystem elements and function” (Curlee 1995).

Another resident and zoologist points out that a more appropriate model to manage bison may be a “social carrying capacity,” measured when bison begin showing up on private property, golf courses, and other areas (Camenzind 1998b). “We will have to accept control programs. Jackson Hole isn’t big enough to let bison (or elk) control their own numbers” (Camenzind 1996). An official from the Wyoming Game and Fish Department also points out that having no cap on bison will cause problems, such as complaints from private landowners, loss of tolerance in the agricultural community, and increased pressure from APHIS to manage bison more aggressively (Bohne 1998). For example, a member of the agricultural community complained that “the ‘free-ranging’ characterization of the bison mentioned repeatedly...implies a lack of management” and that “in effect, an unmanaged bison herd creates an unfunded mandate to care for a free-roaming, brucellosis-infected, damage-inflicting bison herd, for which the citizens of this state will have to bear the costs” (Gentle 1994). Thus, a philosophy of too heavy-handed or too little management may result in similar undesired outcomes and conflict.

There are also differences in management philosophies among agencies and differing levels of tolerance within the public for management actions taken on land owned by different agencies. For example, most groups accept hunting bison on the National Elk Refuge. In addition, while most people agree that artificial feeding is not ideal because of disease, cost, and the unnatural distribution it creates, they accept it on the refuge as necessary. All these direct intervention strategies people seem to accept on the National Elk Refuge, a wildlife refuge administered by the U.S. Fish and Wildlife Service. However, much controversy emerged over the proposal to bait bison into the park and irrigate winter range in the park. According to many, “baiting destroys the animals’ status as a free-ranging herd” (Adams 1996). Another resident remarked that “I’m not sure a case can be made that diversion of water and cultivation of irrigated pasture, with or without hay cutting, is more natural or less of a human intervention than spreading pellets at the NER. It could be seen as a transfer of artificiality from the NER into the Park” (Harvey 1995). Finally, proposed herd reductions in the park are “a serious consideration because of National Park policy prohibiting wildlife hunting in National Parks” (Curlee 1995) and would “represent a significant change in Park policy” (Harvey 1995).

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PERCEPTION OF ELK AND BISON

The Jackson community has a long history of managing and protecting elk. Over 80 years ago, the citizens of Jackson and the United States set out to protect thousands of elk by establishing the National Elk Refuge and beginning supplemental feeding. In addition, elk have traditionally had a strong hunting

constituency and are part of the identity of the Jackson community (Reiswig 1998). Outfitters in the region and the Wyoming Game and Fish Department generate revenue from elk hunting. In contrast, bison, while they enjoy support from the general public, have enjoyed a less favorable opinion from agencies (Bohne 1998). While the current refuge manager accepts bison on the refuge, past managers and other agency officials and personnel have tended to see them more as a burden because they are harder to control (Bohne 1998; Griffin 1998). Thus, management decisions are being made with different levels of tolerance for and perceptions of elk and bison.

Many in the community, however, place equal value on both species and object to the treatment of bison as a problem. They cite differences in population targets, brucellosis control programs, and acceptance of feeding as examples of inconsistent management practices for different ungulate species. Some complain that “no justification is presented that explains why it is acceptable to have elk dependent on supplemental feed but it isn’t okay to have bison dependent on supplemental feed” (Curlee 1995). Others point out that “when you realize that elk numbers are way over desired herd levels, and bison numbers are below the levels necessary to even sustain themselves over the long-term, it becomes clear that the problem is too many elk, not too many bison” (Camenzind 1996).

Many point to the differential treatment of bison and elk in reference to brucellosis as one more example of the influence of preconceived ideas about management of different species. They say that a focus on controlling brucellosis only in bison “assumes bison are a larger transmission risk than the elk population which is also infected with brucellosis. This plan singles out bison as a unique management problem” (Jackson Hole Conservation Alliance 1997). A member of the animal rights community also said that “they’re targeting bison and bison alone, and that is a problematic approach” (quoted in Adams 1996). The differing treatment of bison and elk led some to conclude that “either the agencies have a bias against bison, believing they are less desirable than other wildlife populations, or there are other ‘problems’ or forces driving the bison management Plan / EA” (Lichtman 1995). Kelly author Ted Kerasote wrote “this plan needs to go back to the drawing board and consider elk and bison as a unit” (quoted in Thuermer 1996).

People also question the agency perception that feeding bison costs too much (\$120 per winter for each bison in the herd). Ann Harvey questions “viewing this cost as a problem, when the costs of feeding elk are viewed as a necessary expense of wildlife management.” Such a discrepancy, she points out, “indicates that bison and elk are viewed differently; elk are a valuable species that should be fed in order to have the high numbers we want; but feeding bison is a ‘problem’” (Harvey 1995). Furthermore, many believe that the high level of manipulation on the refuge necessitates further justification for why manipulation of elk is acceptable but manipulation of bison is not (Curlee 1995). Thus, a question arises concerning the many values of the Jackson bison herd.

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STATES' RIGHTS AND JURISDICTIONAL BOUNDARIES

Much of the controversy involves one value in particular—power. This may be expected since, as R. M. MacIver (1947: 42) pointed out, “the central myth in the maintenance of any social system is the myth of authority,” and that myth is being debated in the bison case. Power struggles—struggles over defining authoritarian relationships—ensue amid unclear allocation of authority and control over wildlife that cross jurisdictional boundaries or fall under the jurisdiction of multiple agencies within one political boundary. Federal agencies have authority over land, but the state traditionally has managed wildlife species even on federal land. The determination of who has management authority persists as an issue among agencies, and it periodically surfaces in on-the-ground debates over wildlife management (Bohne 1998).

Some of the state's power has been called into question in the EA. In response to the lawsuit over hunting brought by the Legal Action for Animals, for example, a Game and Fish spokesperson asserted that “the harsh reality of the animal rights movement has arrived in Wyoming. Not too surprisingly, it's being driven by forces outside our borders. We are viewing this action as a serious threat to the state's authority to manage wildlife and the public's right to participate in the harvest of these, and eventually other, animals” (quoted in Thuermer 1990). This statement indicates three dominant perceptions in Wyoming politics. First, there is a mistrust of outsiders, of “forces outside our borders.” Second is the view that states should have primacy over wildlife, that outsiders threaten “the state's authority to manage wildlife.” Third, there is a perception that it is in the public interest and within the “public's right,” to hunt animals. In a recent talk on brucellosis in bison, elk, and cattle in the GYE, a Game and Fish official repeatedly emphasized the importance of hunting to the state (Thorne 1998).

The state management and control over hunting arose again more recently in relation to allowing a special Native American hunt of bison on the refuge. The federal agencies claim they can authorize Indians to hunt, but the state claims the hunt must also comply with state regulations, which prohibit granting special hunting privileges. The park and refuge maintain that they hold concurrent jurisdiction with the state for hunting on federal land, while the state maintains it retains sole jurisdiction for hunting.²² The norms for bison hunting—and issues of control over wildlife management on federal land—are being worked out through this case.

The issue becomes more complex because of two factors: first, Wyoming Game and Fish manages bison concurrently with the state agricultural department; second, a lawsuit filed by outfitters regarding license allocations has implications for holding a special Native American hunt. Wyoming residents opposed a proposal to allocate licenses for landowners to sell if they allowed hunting on their private land. Opponents argue that this sets a precedent for privatizing wildlife. Offering special privileges to Native Americans might push

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²² For elk hunting in the park, hunters must obtain both a state and park permit, which are essentially identical and were developed jointly (Bohne 1998).

the issue of offering special privileges to private landowners (Bohne 1998; Camenzind 1998b).

The Native American hunting issue involves a debate over jurisdictional boundaries that dates to the establishment of Wyoming as a state. In 1896 the state won a lawsuit filed over treaty rights held by Bannock Indians to hunt elk on traditional hunting grounds in Jackson Hole. The U.S. Supreme Court ruled that state law superseded treaty-international-law and that state sanctions against hunting prohibited the Bannock from using their traditional hunting ground.²³ Now, the Department of the Interior is again, according to Wyoming Game and Fish Department, pushing to establish that they can allow hunting outside of state authority (Bohne 1998).

A lawsuit by Wyoming Governor Geringer, filed in February 1998 against the Secretary of the Interior over the state's right to vaccinate elk on the National Elk Refuge, indicates another case in which the state is vying to maintain its power. The lawsuit asserted that the "plaintiff (Wyoming) has a right to control disease in wildlife located on the National Elk Refuge" (quoted in Camenzind 1998a). Geringer remarked that "this is a point of demarcation that says we have to resolve who has the primary responsibility to see to animal health" (quoted in Gearino 1998b). He believes the state should be involved in wildlife health-related issues.

While the judge ordered the state to restate its argument because it seemed not to have a sound premise, the lawsuit could have potentially given states sole authority over managing wildlife, even on federal land (Angell 1998). In addition, Franz Camenzind points out that in the struggle over the state's right to control wildlife, the state is harming itself. He observes that by pushing for authority to vaccinate on the refuge, the state is indicating that brucellosis is a true problem, rather than trying to use the money contributed toward the lawsuit to promote the health of the state's cattle industry (Camenzind 1998b).

Part of the tension comes from different political pressures among agencies. Wyoming Game and Fish is in a perhaps more political position than other agencies (Camenzind 1998b; Reiswig 1998). The department is run by a board of commissioners, appointed by the governor and composed primarily of sportsmen and citizens connected to the livestock and outfitting industries. The top two appointments on the Game and Fish Commission are now made by the governor. Many management decisions come from Cheyenne rather than regional offices. Additionally, the governor's role in appointing the commissioners renders his opinion vitally important, including his commitment to eradicating brucellosis from the state. The authorization for Wyoming Department of Game and Fish follows a different set of standards, a different path of authorization, and different laws (Reiswig 1998). Game and Fish will also be in the forefront of projected lawsuits over hunting by animal rights groups (Camenzind 1998b).

²³ The court stated that if the treaty held authority over state game laws "Wyoming, then, will have been admitted into the Union, not as an equal member, but as one shorn of a legislative power vested in all the other States of the Union, a power resulting from the fact of statehood and incident to its plenary existence....The enabling act declares that the State of Wyoming is admitted on equal terms with the other States, and this declaration, which is simply an expression of the general rule, which presupposes that States, when admitted into the Union, are endowed with powers and attributes equal in scope to those enjoyed by the States already admitted, repels any presumption that in this particular case Congress intended to admit the State of Wyoming with diminished governmental authority" (quoted in Commissioner of Indian Affairs 1896: 65).

The opinion goes on to say that "the whole argument of the defendant in error rests on the assumption that there was a perpetual right conveyed by the treaty, when in fact the privilege given was temporary" (quoted in Commissioner of Indian Affairs 1896: 65).

LEADERSHIP

Many people cited the importance of individual personalities and leadership styles—in agencies, in conservation organizations, and in the community—to the process (Bohne 1998; Curlee 1998; Griffin 1998; Harvey 1998; Lichtman 1998). Three different managers, for example, have directed the refuge during the planning process. Many people attribute at least part of the acceptance of the final FONSI to the current refuge manager for his role in listening to the public, changing the perception of the problem in the agency, and having a more open mind about various issues (Bohne 1998; Curlee 1998; Griffin 1998; Lichtman 1998). The directorship of active conservation groups such as the Jackson Hole Conservation Alliance has also changed, and some members within the organization feel that a change in leadership in the interest group community also aided the process (Lichtman 1998).

Members of the Jackson Hole community also emerged as leaders in this process. Two individuals in particular, Candra Day and Peyton Curlee, organized a “21st Century Totem Study Group” to discuss bison management within the context of the Jackson Hole Community and larger resource management issues (Curlee 1998). This active and constructive effort helped agency officials realize that leadership among members of the public could help management efforts (Griffin 1998; Reiswig 1998).

Leadership has also been observed influencing other natural resources problems, such as endangered species recovery. Often, natural resource agency personnel are trained in a scientific field and display commendable skills conducting the scientific research that informs policy decisions. However, many “natural resource” problems are fundamentally people problems. As such, valuable skills include such things as crisis management to deal with “complicated, urgent, and ambiguous” situations such as bison management (Westrum 1994: 341). A leader’s role is not necessarily to make the “right” decision but rather “to create the kind of intellectual environment in which good decisions will be made” (Westrum 1994: 342). This includes both technical skills and “the process skills that promote interdisciplinary teamwork” (Clark *et al.* 1994: 427).

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THE ROLE OF SCIENCE AND SOUND JUSTIFICATIONS IN POLICY MAKING

The “problem,” according to the plan, arises from claims that bison transmit brucellosis to domestic livestock, threaten human safety, can cause property damage, and compete with elk for supplemental feed. Lichtman, however, argues that “there is no data to support these claims” (Lichtman 1995). Franz Camenzind of the Conservation Alliance believes that minimizing the risk of brucellosis transmission and property damage is driving the planning process “at the expense of...achieving maximum, environmentally determined population levels” (Camenzind 1995). Furthermore, he points out, “the Draft Plan presents no evidence to support the credibility of either of the two driving forces” (Camenzind 1995).

While the above statements indicate that science is a necessary tool in policy making, some feel it is often abused and does not offer answers, only information that managers must interpret with other social and political information. For example, one official notes that genetic viability is being used as a tool to argue for more bison and that science can be “used unethically” (Bohne 1998). In addition, researchers from different agencies and independent researchers often differ in their conclusions about the same data or use different data to argue for different management alternatives (Reiswig 1998).

There is a growing body of literature on the role of science in policy making. In one of the earliest works on the nature of science, Thomas Kuhn described worldviews within the scientific community as “paradigms” (Kuhn 1962, 1970). Different scientific communities use unique criteria to identify problems, criteria that can “insulate the community from those socially important problems that are not reducible to the puzzle form, because they cannot be stated in terms of the conceptual and instrumental tools the paradigm supplies” (Kuhn 1962, 1970: 37). In other words, people tend to identify problems based on terms, conditions, frameworks, and criteria with which they are familiar, such as range conditions, optimal herd size, genetic viability and other “scientific” definitions. Less attention is given to understanding the social context in which such biological and ecological studies are being conducted.

More recently, two authors have observed that “where science and professionalism have come to dominate, goals are utilitarian, and no distinction is made between what is good for science and professional groups and what serves the public interest” (Schneider and Ingram 1997: 172). In addition, when the same scientists studying the biological components of a problem set management goals, those goals are often challenged because they conflict with public values (Schneider and Ingram 1997). The original goal statement of the bison management plan, for example, was to maintain a herd population of 50, which would serve agency officials by decreasing the complexity of the species managed for on the refuge.

Expert knowledge is vital in carrying out policy debates (Lasswell 1971). However, natural science is only one tool to reduce uncertainty. Understanding not only scientific factors but also varying perspectives, values, ideologies, and motivations is important in creating effective policies that meet the interests of a diversity of actors, including the wildlife over which debates are carried out. Expert knowledge thus includes experts not only on biological issues within conservation debates, but also those with expertise in understanding social and political factors that affect debates about managing the natural world, i.e., experts in “content and procedure” (Lasswell 1971: 39). In addition, employing the public earlier in the planning process can help provide another perspective to check scientific and other biases of agency experts who determine objectives in a management plan.

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OVERALL DECISION-MAKING PROCESS

A common complaint among participants relates to the overall decision-making process, including flaws with the initial conception of the problem, the justifications given for proposed alternatives, and the role of the public in the process (Clark 1994). Conservationists and environmentalists alike argued as late as 1996 that “the Jackson Hole bison plan is trying to address a problem that may not exist” (Adams 1996), specifically brucellosis. One rancher said that “we don’t think there is a problem” (quoted in Thuermer 1997). Tim Clark remarked that “the bison problem may be narrowly seen as a biological issue, when in fact it might be better understood as a community policy issue” (quoted in Thuermer 1996). Pam Lichtman of the Jackson Hole Conservation Alliance pointed out that “While the Plan/EA has been *re-written* and *re-packaged*, the agencies have not *re-examined* the underlying premise behind their proposal to manage the Jackson bison herd, which is that bison are a ‘problem’ that needs to be managed” (Lichtman 1995).

People essentially questioned what agencies based the goals and management alternatives on. For example, the original EA called for managing bison at a level of 50 to minimize their impacts on livestock, elk, other wildlife, human safety and property, and habitat. Yet, despite a population over 200, one individual claims, “such anticipated problems as impacts on other ungulates and damage to vegetation have been negligible” (Harvey 1995). She called for a stronger correlation between bison numbers and bison-caused problems before allowing culling to a low number. Even agency officials commented that as the bison population grew throughout the planning process, early arguments that higher numbers would result in more damage grew weaker (Bohne 1998). This is evidence of the importance of scientific tests, not just scientific speculation, when writing management plans.

In addition, “the agencies have paid little attention to the social dimensions of bison management, despite their central importance” (Clark 1994). These social dimensions include, among other things, “just how the bison ‘problem’ is being formulated, by whom, and with what perspective and outcome in mind” (Clark 1994). The plan, according to many, should embody the ideals of the democratic process, and preferred alternatives should be justified both by sound science and other community standards. It is important to consider community norms and opinions about the management plan “in terms of basic premises held by the community” (Clark 1994).

LESSONS AND RECOMMENDATIONS

One researcher wrote that “every retrospective analysis in problem definition is also a look ahead and an implicit argument about what government should be doing next” (Rocheffort and Cobb 1990: 3). In this sense, examining the various problems that emerged in developing the bison management plan can help in future planning processes. Despite the long process of arriving at a final plan for bison management, it reached a point where parties agreed enough to

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celebrate together (Lichtman 1998). Local conservation groups said that the plan “is an example of the agencies and the public working together to arrive at an acceptable solution” (Camenzind 1997). The controversy over managing bison is not finished, but lessons can be drawn from the obstacles and successes of the planning process. Based on interviews and the public comments written regarding the management plan, the following are some lessons for future policy debates.

UNDERSTANDING THE PROBLEM

Tom Toman, Wyoming Game and Fish district supervisor, said that “the biggest problem that I can identify is that agencies often derive solutions to problems before the problems have been clearly identified or defined” (Toman 1996). The original conception of the problem was, to some degree, an artifact of the areas of interest and expertise of those who framed it. The first team to develop a bison management plan was the Jackson Hole Cooperative Elk Studies Group, who primarily sought to protect the Jackson elk herds. There were also many pressures in and out of government to design management plans for bison that minimized conflicts between bison, elk and livestock. All of the factors listed above influencing this EA process—a GYE-wide focus on brucellosis, other regional controversies, differing management philosophies, different perceptions of elk and bison, leadership, the role of science, and overall problems with the decision process—influenced the development of a narrow initial conception of the problem.

Primm and Clark (1996) describe many problem definitions in the Greater Yellowstone Ecosystem that apply to this case. One problem definition focuses on science, claiming that inadequate research prevents policy changes. Such arguments place the focus and burden on scientists to develop policy. A second problem definition points to economics. One side claims that protection in the GYE may cost too much, while the opposing side claims that extractive industries fail to account for the true economy, which relies on intact ecosystems. Such a problem definition can lead to feelings of powerlessness in the face of larger economic forces. A third problem definition blames bureaucracy. One side argues that agencies lack skills to conduct ecosystem management, while the other side calls for agency reforms to pave the way for ecosystem management (Primm and Clark 1996). Such a definition places the focus and burden for improved decision making primarily on agency personnel. All these problem definitions—science, economics, and bureaucracy—have arisen in the Jackson bison case.

The overall lesson is that initial and subsequent definitions of a problem in a policy situation determine who is included in discussions, the type of information used to make decisions, and the alternatives discussed. While technical considerations are of utmost importance in natural resource issues, an overly narrow definition of a problem that ignores the social and political context can lead to continued controversy and continued degradation of resources.

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Clarifying the goals of the refuge and bison management

It is necessary to examine goals not only relating to bison specifically but also ones relating to the refuge and community. While the original enabling legislation for the refuge explicitly stated it was for elk, subsequent expansions of refuge land include management priority for birds and other big game animals.²⁴ The overall mission of the refuge includes preserving, restoring, and enhancing endangered species in their natural ecosystems, preserving and protecting archaeological and historical sites, perpetuating migratory bird habitat, and managing elk. Achieving the mandates of the National Wildlife Refuge Improvement Act must also be a goal.

The planning process to manage for bison on the refuge has shown that it is necessary to abide by missions broader than protecting elk and to place the management of any single species within larger ecological and community goals. Issues such as brucellosis force agencies to think beyond bison management because it also affects elk and involves regulatory agencies beyond the valley's borders (Harvey 1998). When the goal of managing the refuge is to maximize elk production, bison are seen as a problem. Expanding the goal to meet the needs and desires of the community in a sound, scientific manner shifts the problem definition. Bison are no longer seen as "the" problem, and pulling together as a community to minimize intervention by outside agencies becomes a priority.

Clarifying refuge goals might include formal activities such as an agency workshop or exercise to assess the views of managing the refuge from within the agency, as well as goal-clarification workshops conducted with the public. Groups such as the Sonoran Institute, the Center for Resolution, or the Northern Rockies Conservation Cooperative can act as advisors in such processes. It would also be informative to assess goals through more informal activities, such as monitoring formally or informally the public's reaction to various refuge activities or maintaining contact with individual citizens and community groups. For example, the response to the bison EA showed that the community sees bison conservation as a necessary refuge goal.

Reliable, comprehensive, and selective information

Many people complained that management personnel seemed to hold *a priori* views of bison management (i.e., reduction) without first completing any studies. This EA process showed that the public demands clearly articulated goals and supporting documentation for decisions made to reach those goals. People questioned the alleged problems because there were no clear goals set for bison and a striking lack of information about bison. For example, many people questioned the concern for elk, tourists, refuge and concessionaire property, and brucellosis management over bison conservation. They asked why the number of bison was set at 50, 90, or 300 and what property damage was being done. Recent studies also indicate that people value the refuge for more than the protection it provides to elk (Kahn, this volume).

²⁴ This legislation includes Executive Order 3596, dated Dec. 22, 1921, which designated land on the refuge "as Refuges and breeding grounds for birds" and 44 Stat. 1246 dated Feb. 25, 1927, which grants title to certain lands to add to the refuge "for the grazing of, and as a Refuge for, American elk and other big game animals."

In addition, once clearer goals were articulated (such as the maintenance of a free-roaming herd) and biological studies were conducted concerning the potential of various alternatives to meet that goal, the alternatives drastically changed. The agencies increased the target population. They eliminated Hunter-Talbot as a possibility for winter range given both natural bison winter migrations out of the park and park mandates that conflict with baiting or otherwise artificially enhancing winter forage in the park. Adequate goal clarification of all participants and both biological and socioeconomic research can improve decision making. The research should come from both agency and independent researchers.

It is important to learn not just from scientific studies, but also from history and experience. For example, the attempt to eradicate brucellosis from the Jackson herd failed in the 1960s because of an inadequate vaccination and possibly re-infection of bison by elk. Given no safe, effective vaccine and the continued infection of elk, attempts to eradicate brucellosis from bison would probably fail. Additionally, Jackson area ranchers have grazed cattle next to bison for decades without a brucellosis outbreak, and they claim that vaccinating cattle works effectively to prevent the spread of brucellosis. One resident stated, “A serious attempt should be made to better educate the states bordering Wyoming as to the high improbability of cattle cont[r]acting brucellosis from the bison and to inform them that killing a herd of bison that may not even have brucellosis will serve no purpose” (Steller 1995). Experiential data like this can be used to promote Wyoming’s cattle as clean despite brucellosis in wildlife (Camenzind 1998b).

It is, of course, important to recognize the existence of agency constraints and the larger political context in which decisions are being made. However, this political context should not preclude founding decisions on adequate biological, socioeconomic, and experiential information. Opportunities to work within or change the political atmosphere—for example, by attempting to build trust through daily personal contact—can be sought.

Overall, data collection should be timely, being conducted before alternatives are developed, and open. An open research process can be achieved by enhancing agency research and expertise with the expertise of outside researchers as well as developing cooperative arrangements with groups such as universities, the Teton Science School, and other organized interests that include research in their daily operations. An open process can not only reduce the burden on agency personnel and budgets, but can also add credibility to the data. Given limited agency time and budgets, enlisting graduate students or outside researchers may provide the opportunity to gather social, economic, political, and ecological information in a systematic manner.

Most basically, monitoring can be done and statistics kept not only concerning bison population and distribution, but also concerning interactions with cattle, with humans, and with other wildlife. Costs of bison management can be tracked. Actual risk of disease transmission and the perception of risk

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should be determined. In a debate filled with unknowns, such data can resolve some of the questions regarding impact on human safety and property. In addition, social surveys can be conducted by a graduate student or other researcher to determine the general perception of the refuge, i.e., to determine what the public thinks the goals of refuge management should be in relation to the community.

COMMUNITY EFFORTS, INCLUSIVE DECISION MAKING, AND THE POWER OF THE PUBLIC

While the Yellowstone brucellosis controversy added pressure to agencies in Jackson, it also helped community efforts.²⁵ The Jackson community realized its place in the larger Greater Yellowstone Ecosystem and realized that to minimize intervention by agencies such as APHIS, it had to become an example of how communities can resolve issues (Curlee 1998).

Many people have stated the importance of public comments in this planning process and the organization of the public around this issue (Bohne 1998; Camenzind 1998b; Griffin 1998; Harvey 1998; Lichtman 1998; Reiswig 1998). These individuals assert that the more responsive agencies can be to the public, the smoother things will proceed. Courts play a much larger role when public sentiment is not considered early in the planning process, thereby reducing the overall efficiency and timeliness of implementation. In the bison management plan, the agencies eventually became more flexible in their views on possible alternatives, rather than trying to convince the public that what is good for the agency is good for all (Bohne 1998).

Many people in the community expressed serious concerns about the planning process for bison management, but their involvement indicates not only agency obstacles but also an opportunity for the agency. People have limited time and resources, and spending those limited resources on finding ways to solve the bison "problem" indicates a concern, respect, and affinity for the refuge. Of course, the quality of public involvement depends not only on agency efforts but also the abilities of the members of the public who are becoming involved.

While public participation seems at times to reduce the efficiency of planning processes, including the public early in decision making can actually make the job of managers easier. The broad-based acceptance of hunting by the public—with the exception of a few animal rights groups—came as a surprise to agencies (Bohne 1998). The lesson from such public opinion is that agencies can achieve broad-based support for seemingly highly controversial issues (Bohne 1998), and that public participation can help expand (or change) problem definition early in the process to help facilitate the remainder of the process. In addition, adaptive management only works with trust that is built from agency responsiveness and openness (Lichtman 1998). Those within the agency are beginning to advocate working with the public and bringing people to the refuge who are concerned with bison (or elk) to listen to them and what

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²⁵ Bison management in Jackson differs quite a bit from Yellowstone. The herd is much smaller, migrations tend to remain on federal Department of Interior land in Grand Teton National Park and the National Elk Refuge, and Wyoming ranchers tend to accept bison more readily than their Montana counterparts because they have had no problems with brucellosis after 30 years of cattle and bison commingling (Camenzind 1998). However, the bison controversy still involves many of the same federal agencies and federal controversy, namely eradication of brucellosis.

they want, as well as to educate them about the agency's perspective (Griffin 1998; Reiswig 1998). The public has perceived this increasing openness and appreciates efforts on the part of the agency.

However, there is always the possibility that certain members of the public will disagree with decisions made by agencies, despite efforts to incorporate public input. For example, the recent lawsuit by the Fund for Animals indicates that certain groups will use the litigation process to oppose decisions obtained even through collaborative agreements. Litigation can both help and hinder the process of finding common interest in a public policy debate. It can serve to bring key issues to the attention of decision makers and the public, and the public participation process includes appeals and litigation as inherent and powerful components. While such litigation can also serve to polarize issues further and degrade trust and can decrease efficiency in making decisions because policies get tied up in court, it is a necessary component of American democracy. The best strategy for decision makers is to listen to groups early in the process and work to the best of their ability with those willing to work collaboratively on difficult natural resource policy and management issues.

Capitalizing on community groups

The Jackson community will become involved either reactively or proactively. It would benefit the agencies to involve them early in the planning process by informing the public about refuge policy and actions and finding ways to incorporate their input. The Totem Studies group provides an example of how public participation may proceed. The refuge could create partnerships with groups such as the Community Foundation of Jackson Hole, or contact key participants in the Totem Studies Group to seek an ongoing partnership. One of the primary goals of the Totem group was to improve decision-making processes, and lessons can be learned from the successes and obstacles of that group as an inclusive citizen's group.

Direct contact with members of the public in an organized and systematic fashion can help to test agency perception of public perception. For example, a perception exists within the refuge that the public views the refuge primarily as habitat for elk. The reaction of vocal residents and special interest groups to elk "starving" in the winter or numbers dropping reinforces such a perception. However, the negative reaction to plans to maintain a low population of bison indicates that a larger perception of refuge goals may already exist among many members of the public.

THE ROLE OF AGENCIES

There is often a perception within agencies that once a position is taken publicly on a management issue, it creates poor press to change that position and moving away from that position can be difficult (Reiswig 1998). However, the lesson from the bison management plan is that changing a position in light of public comments and new scientific information can lead to respect and trust

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from the community, not condemnation. The evidence of this comes from the difference between the final 1996 EA document and the 1997 Finding of No Significant Impact. The two documents differ significantly, largely in response to public comment and new data (Harvey 1998). When agencies are more open and flexible, the public feels less of a need for them to state exact management strategies in a rigid fashion (Lichtman 1998).

Many people also feel more confident about public processes because there has been a reorientation in the agency reflected in the changing dialogue. The refuge manager is interested in larger issues and in redefining old paradigms. He has told the public that he is in favor of bison on the refuge, and that once the agency realized bison would enter the refuge despite agency preference, they could move beyond the fight over where bison should or should not be. They could shift the dialogue to discuss the place of bison on the refuge (Reiswig 1998, Curlee 1998). The agencies learned from mistakes made in Montana, as well. The agencies in Montana showed no flexibility; they took a dogmatic approach. Agency officials and community members decided that they could come out political winners if they listened to the public rather than only to others within government agencies (Bohne 1998). While jurisdictional boundaries remain tentative and in constant tension, retreating into those boundaries and attempting to assert authority and control can lead to more harm for all involved than good. Agencies working together can overcome differences if they are open and come up with reasonable compromise (Bohne 1998).

Framing a policy debate

An agency also has the power to frame a policy debate, at least initially to define the language used to talk about an issue. Framing problems more comprehensively can expand the focus beyond technical issues such as brucellosis to include broad underlying problems. The public may not always appreciate the larger political and regulatory situation of agencies, which contribute to problems in reaching resolution, when public documents contain only technical issues. A more comprehensive view can also help to clarify what the community expects.

Influencing public perception

While officials must remain aware of public values as they exist, many members of the public respect agency expertise, and this respect can be used to expand the perception of refuge use. For example, a new visitor center is currently being planned. This visitor center offers a prime opportunity to educate the public that the "Elk Refuge" serves the purpose of more than providing elk habitat. Displays may be established not only to educate visitors about the refuge's elk population, but also about other biodiversity on the refuge, including bird species, invertebrates, plant and flower species, and other mammals such as bighorn sheep and bison. The place of the refuge in the Greater Yellowstone

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Ecosystem, including migration routes for bison, elk, bighorn sheep, shore birds, and other species would also be informative for visitors. Historical information about the formation of the refuge and the conservation success story of species such as bison might be developed in conjunction with the Jackson Hole Historical Society. There might also be displays about how the refuge fits into the community. For example, uses such as biking, fishing, hunting, and hiking might be pointed to as recreational values the community holds. Finally, displays could be developed about the law and policy of the refuge. There might even be a display on the new refuge management act and on the involvement of the refuge in controversies such as brucellosis. This will allow visitors—the American public—to realize that protected land does not necessarily mean protected resources, and that it takes active management and much time and effort to truly protect resources on the refuge and manage them in the common interest.

Again, given limited agency time and budgets, developing such displays may be difficult. However, displays could be developed in conjunction with community groups. For example, involving local schools would provide a hands-on learning opportunity for students in the community. Seasonal or temporary displays could be built by them and directed by refuge personnel and teachers. Such cooperation could also provide an opportunity to educate teachers and parents about the refuge. The historical society, wildlife museum, and Teton Science School are other potential partners.

A final strategy would be to change the name of the National Elk Refuge to the Jackson Hole National Elk and Wildlife Refuge, the Jackson Hole National Wildlife Refuge, the Grand Teton National Wildlife Refuge or a similar more encompassing name.

The power of names

A final strategy would be to change the name of the National Elk Refuge to the Jackson Hole National Elk and Wildlife Refuge, the Jackson Hole National Wildlife Refuge, the Grand Teton National Wildlife Refuge or a similar more encompassing name. While early refuges were set up for single species management, current trends in wildlife and natural resource management are moving towards more watershed, ecosystem, and multiple species management. The change in name could be justified with such management paradigms in mind, and elk could remain a priority management species. While such discussions may incite controversy, they would also provide an opportunity for dialogue to determine how people value the refuge and what they see as refuge goals and community goals for the refuge.

CONCLUSIONS

The Jackson community has been engaged in a lengthy and controversial planning process for the Jackson bison herd. While the controversy is not over, the bison EA process has shown that the Jackson community can pull together. For example, Jackson ranchers assert that if they vaccinate their cattle, bison and brucellosis pose a minimal threat, and the Jackson community has supported them in their assertions. The plan also reflects the dedication and

cooperation of state and federal agency officials and biologists, at least temporarily and regionally. The support of the final plan by environmental organizations, including the Jackson Hole Conservation Alliance, the Greater Yellowstone Coalition, and the Wyoming Wildlife Federation, also reflect the agency's willingness, in the end, to respond to public interests.

This process contains lessons for future management. Most of the process was marked by low agency responsiveness to public comments, secretiveness regarding prescriptions for managing the herd, inadequate justification for the perception of bison as a problem, discrepancies between standards for managing bison and elk, and a narrow conception of the context in which bison management was occurring. Several drafts invoked the same complaints by the public. Finally, between the last Environmental Assessment and the release of the Finding of No Significant Impact, the agencies were willing to expand the discussion to include the community and ecological context of bison management. They addressed public concerns, and they showed flexibility from earlier iterations of the problem and solutions. The lawsuit by the Fund for Animals indicates that there is still room for learning and improvement in management, however, as well as the need to realize that no plan can or will please all publics.

Management regimes for different species and resources on the refuge are difficult to separate. All involve a complex ecological, social, and political context. The tendency in complex situations in natural resource management is to look for an increasingly detailed understanding of the technical issues. While such an understanding is vital, it is also necessary for policy makers to take a more comprehensive, macroscopic view of a given situation. Framing policy debates in a broader context—such as disease management or, even more broadly, as maintaining a sustainable community—can benefit the agencies and the resources they are charged to manage.

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