

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6' x 9' black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

**Beyond Boundaries:
Learning from Bison Management in Greater
Yellowstone**

A Dissertation
Presented to the Faculty of the Graduate School
of
Yale University
in Candidacy for the Degree of
Doctor of Philosophy

by
Christina Maria Cromley

Dissertation Directors:
John P. Wargo and Tim W. Clark

May, 2002

UMI Number: 3046142

Copyright 2002 by
Cromley, Christina Maria

All rights reserved.

UMI[®]

UMI Microform 3046142

Copyright 2002 by ProQuest Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

© 2002 by Christina Maria Cromley
All rights reserved.

ABSTRACT

Beyond Boundaries: Learning From Bison Management in Greater Yellowstone

Christina M. Cromley

2002

Bison stir controversy by doing what made them a legend in American folk songs: roaming. Migrations over Park boundaries make for complicated decision-making. When bison enter state, federal, or private land surrounding the Park they wander unwittingly into overlapping jurisdictions of the U.S. Forest Service, state livestock departments, and state wildlife and game agencies. The presence of the disease brucellosis in bison also leave them subject to the scrutiny of the U.S. Animal and Plant Health Inspection Service (APHIS), which has worked decades to eradicate brucellosis from U.S. cattle herds.

Flaws in current policy result largely from fragmented structures of governance; conflicting values and myths; and the failure of scientific management to resolve problems that are fundamentally social and political. The numerous agencies involved operate with conflicting goals, laws, jurisdictions, and expectations: some follow mandates to protect livestock, others to protect wildlife. Conflicts over these mandates have led to at least twelve lawsuits between 1985 and 1998 over policies affecting bison management or brucellosis. Decisions also increasingly involve officials removed from the scene of action. Such fragmentation in decision making can exclude those directly affected by decisions from working with agency officials and other participants. Fragmentation also complicates the task of managing resources in the common interest.

The outcome of bison management may tell us as much about the social and political reality of Western politics, Park management, and the ability of current

structures of governance to meet the common interest as it does about bison, brucellosis, or cattle. The dissertation describes the history of the conflict, discusses openly the political nature of the decision-making process in bison management and assesses the process using common interest as a criteria for effectiveness. Common interest processes and decisions should be inclusive in their participation, should meet the valid expectations of participants, and should remain adaptable to achieve goals in a changing context when put to a practical test. The dissertation concludes with recommendations for improvements in the decision-making process.

.

.

Table of Contents

Acknowledgements	i
1. Introduction	1
2. Theory and Methods	23
3. Bison Management in Greater Yellowstone	61
4. The Value of Finding Common Interest	119
5. The Meaning of Buffalo: Myth and the Policy Process	161
6. The Role of Science in Policy	191
7. Reforming Practices	226
Appendix A List of Abbreviations	279
Appendix B Policy Sciences Framework	280
Figure 1	283

Acknowledgements

This project could not have been completed without the help of many people. First, I would like to thank all of those involved in the bison debate who took time out of their busy schedules for one or more interviews: Jim Angell, Keith Aune, Jim Berkley, Mark Berry, Joe Bohne, Ted Bolling, Wayne Brewster, Ber Brown, Franz Camenzind, Jason Campbell, Jon Catton, Marion Cherry, Mike Clark, Patrick Collins, Peyton Curlee-Griffin, Lloyd Dorsey, Bob Ekey, Matthew Ferrari, Fred Finke, Mike Finley, Harv Forsgren, Arnold Gertonson, Jim Griffin, Anne Harvey, Marty Hayden, Rod Heidschmidt, Jeff Henry, James Holt, Dan Huff, D. Owen James, Robert Keiter, Karen Kovacs, Julie LaPeyre, Pamela Lichtman, Rosalie Little-Thunder, Andrea Lococo, Jim Lyons, Brad Mead, Bill Noblitt, Helga Pac, Mike Philo, Jamie Pinkham, Debbie Pressman, Barry Reiswig, John Russell, Bob Schiller, DJ Schubert, Paul Schullery, Brian Severin, Bruce Smith, Patrick Smith, Jeanne-Marie Souvigney, Larry Stackhouse, Terry Terrell, Tom Thorne, Heather Weiner, Gloria Wells-Norlin, Louisa Wilcox, Chris Wood, and Doug Woody. This study would also not have been possible without financial support from Yale University, the Wilderness Society, the Kendal Foundation, the Northern Rockies Conservation Cooperative, and the Erb Institute. I am also indebted to a number of individuals who could not have been better mentors during the course of my graduate work and dissertation research and writing: Tim Clark of Yale University and the Northern Rockies Conservation Cooperative, Ronald Brunner of the University of Colorado, John Wargo of Yale University, and Andrew Willard of the Yale Law School. Peyton Curlee-Griffin, Denise Casey, and Steve Primm also provided valuable insights. Tori Derr read drafts and offered

encouragement and an understanding ear throughout the research and writing process. And I of course could not have completed this dissertation on my graduate work without the support of my family, friends, and colleagues--especially my mother and Tori--who listened patiently to my struggles and who helped me to see this through to completion. Finally, I would like to dedicate this dissertation to my late father, who would be happier and prouder than anyone.

Chapter 1

Introduction

The Problem

“For the benefit and enjoyment of the people” are the words engraved on the grand arch welcoming visitors into the northern entrance of Yellowstone National Park. These words express an ideal established with the Park in 1872, an ideal that Yellowstone and its unique natural resources should be managed in the common interest, the interest of all the people. One of those resources, the bison, is depicted on the seal of the U.S. Department of Interior and on the badge worn by its employees in the National Park Service. However, under the management policies of recent decades, Yellowstone bison have become controversial by doing what made them a legend in American folk songs and a symbol of the Wild West -- roaming. The persistence of controversy over bison suggests a failure to realize the common interest more than a century after the Park’s creation. The bison now symbolize the discrepancy between the ideal and political reality.

When they roam out of the Park, bison enter into jurisdictions of the U.S. Forest Service, state livestock departments, state wildlife and game agencies, and private landowners. The presence of brucellosis in bison also led the U.S. Animal and Plant Health Inspection Service (APHIS) to claim authority in bison management as an extension of its mandate to eradicate this disease from cattle herds. APHIS gained authority to participate in developing a long-term bison management plan through a 1995 court decision. Each agency involved has specialized mandates, policies, and jurisdictions that tend to bring it into conflict with other agencies and interest groups. Some agencies

have mandates to protect livestock, for example, and others to protect wildlife. Such conflicts have led to extensive litigation involving bison management or brucellosis in wildlife around Greater Yellowstone. Settlements of the lawsuits have granted power over wildlife to judges, established win-lose situations, excluded non-litigating parties, and cost a great deal in dollars and time. Some decisions have been made by officials far removed from the scene of action, and sometimes those directly affected have been excluded from working with officials. This fragmented structure of governance presents obstacles to managing bison in the common interest.

It should be noted that this is *not* merely or essentially a problem of brucellosis, for several reasons. First, the organism causing brucellosis is transmitted only through birthing materials, so females of calf-bearing age are the only potential threat to the cattle. They migrate out of the Park only in the winter, when most cattle that graze in the Yellowstone area are nowhere near the Park. And only about 2000 head of cattle graze on public land around the Park in other seasons, generally after the brucellosis organism in birthing materials has been killed through exposure to the elements. Thus, the risk of brucellosis transmission is small because of the small numbers of bison and cattle involved and their spatial and temporal separation. Second, measures for the management of this risk, in addition to separation, have been unofficially tested in practice by ranchers around Jackson, Wyoming, just south of Yellowstone. The political situation in Jackson and in Wyoming are different than in Montana, due in part to the presence of cattle grazing allotments inside Grand Teton National Park, where cattle graze next to bison; Justifying lethal control of bison *inside* a national park to the public would prove even more difficult than justifying lethal control outside a park's borders. Despite the different

political situation, policy makers can learn from the experience of Jackson ranchers, which has demonstrated over several decades that vaccination of cattle effectively prevents brucellosis, even if cattle graze next to bison. However, there is no safe and effective vaccine to prevent brucellosis in bison. Third, despite the small risk and effective risk management measures, Montana state officials insist that in the spring just before cattle return to grazing allotments outside the park, the only acceptable policy is to haze, remove, or capture and test *all* bison that leave the park for brucellosis and to slaughter those that test positive--including bulls and calves--even though a test-positive result may indicate either resistance to the disease or infection by it. Thus the problem is largely political, an inability to resolve policy differences among participants involved in the fragmented structure. The outcome will tell us more about politics and governance than about bison, brucellosis, or cattle.

Currently, the common interest means finding a consensus on management alternatives that integrate the two major interests in conflict under present policies: Protecting the livestock industry by minimizing and containing the risk of brucellosis transmission from bison to cattle, *and* protecting the wild, free-roaming bison herds in Yellowstone from intensive management measures that would reduce them to livestock. These interests are broadly supported and officially accepted as goals in the Draft Environmental Impact Statement (EIS) released by federal and state agencies in June 1998 and in the final Record of Decision (ROD) released by federal and state agencies in December 2000. Risk management measures on an ecosystem scale would meet both of these goals (Keiter and Froelicher 1993; Keiter 1997). However, many of the management alternatives in the Draft EIS and in the final ROD fall short of securing these

goals, as detailed below--despite effective risk management unofficially tested in the Jackson area (National Park Service, et al. 1998; U.S. Department of Interior and U.S. Department of Agriculture 2000.). The search for a consensus is complicated by the geographic and social context (Figure 1). Greater Yellowstone covers 19.9 million acres, most of which are owned by the federal government (69%), including two national parks, Yellowstone and Grand Teton, six national forests, three federal wildlife refuges, five "gateway" communities, and thirteen counties in three states (Baden and Leal 1990). Indian reservations (4%), states (3%), and private citizens (24%) own the remainder.

Finding effective solutions in such a fragmented geographic, social, and political landscape will require identifying the social and political factors contributing to the bison controversy. To identify these factors, understand their impact on bison management, and assess policies affecting bison management, the policy sciences theory and methods were used. The theory and methodology are discussed in detail in chapter two, but I will briefly describe them here. From a policy sciences' perspective, the continual interaction of people attempting to get their expectations and demands met forms the foundation of all policies--written and unwritten, formal and informal. Whether or not a policy is a governmental one, all policies include a program of goals and actions (alternatives) for achieving the goals.

Human interactions lead to the continual formation, reinforcement or change in, and end of policies. This iterative process, called "politics" by many, affects the distribution of power. Improving policy outcomes requires understanding the politics that lead to decisions, identifying the trends and conditions that prevent participants from

achieving their goals, and inventing solutions that address the underlying social and political problems.

Many trends and conditions—political, social, and ecological—contribute to the failure to reach the goals of maintaining a wild, free-roaming herd of bison and while minimizing the risk of transmission from wild bison to cattle. People cite snowmobile trails; an expanded bison population; the federal Administration (be it Clinton-Gore or Bush-Cheney); state veterinarians; the influx of “green” urban residents into rural, ranching America; and a host of other factors as the source of the problem. However, closing snowmobile trails, killing massive numbers of bison, electing and appointing new government officials, and closing state borders to new residents (even if feasible) would not resolve the debate over bison. Without a change in four related factors—whether evolutionary or revolutionary—the bison problem is unlikely to be resolved. These four factors include structures of governance guiding the management of bison (Chapter 3), the failure to consider values and myths in policy making (Chapters 4 and 5, respectively), and the changing role of science in natural resource management (Chapter 6).

Such social and political foundations pervade not only bison management, but also all other natural resource issues. For example, in Greater Yellowstone, wolves re-introduced to Yellowstone National Park are doing well biologically. However, social tension--evidenced by illegal kills of wolves and lawsuits over the re-introduction process--threatens the survival of the species in Yellowstone. Continued land development in Greater Yellowstone also threatens wildlife, habitat, and aesthetic and cultural values. Unmanaged growth and urban sprawl proliferate nationwide (Katz and

Bradley 1999). Natural resources are exploited unsoundly in developed and developing countries (Ascher 1999). Bison management was chosen among these many natural resource issues because it demonstrates well how social and political dimensions affect natural resource debates, and how current fragmented institutions are ineffective at resolving debates. While each resource problem has a unique social and political context and lessons from one case do not necessarily transfer directly to other cases, the processes governing the management of resource in Greater Yellowstone --including bison --are likely to affect other natural resource issues (Keiter and Boyce 1991).

In the remainder of this chapter, I will: (1) describe the importance of these factors; (2) discuss natural resource problems as failures to clarify and secure common interest; (3) identify the lessons of broader significance, elaborated on in later chapters.

Redefining natural resource problems to find more effective solutions

As stated above, people view the bison problem through many conventional lenses. Many officials view brucellosis as the problem. Some people believe the herd size is too large. Others blame the presence of snowmobile trails, which pave the way for bison to leave the park in winter months. Many fault the park for its refusal and inability to keep park wildlife within its boundaries. Others define the problem as one of intolerance for wildlife on public and private land outside the park. None of these understandings of the problem is wrong, but none is complete. Resolution of any of these factors individually will not make the bison problem disappear. It is therefore vital to reframe and redefine the problem with bison management beyond conventional understanding if we are to make headway towards resolving it.

Fragmented structures of governance

The first barrier to resolving the bison debate stems from fragmented structures of governance. This fragmentation contributes to the intensity and endurance of the bison debate. This problem is not unique to bison management. Policy scientist Ronald D. Brunner (Brunner, Colburn et. al. 2001) called the bison management situation a “microcosm” of a more encompassing problem in the United States: inadequate structures of governance to find and secure common interest policy solutions. The fragmented structure of governance contributes most profoundly to the endurance of the debate.

Problems are discrepancies between goals and outcomes. The goals in bison management are to maintain a wild and free-roaming herd of bison and to protect the economic interests of the livestock industry by minimizing the threat of transmission of brucellosis from bison to cattle. While people agree on the goals, many think the outcomes of current policies--such as the continued killing of bison and lingering threats of sanctions against Montana’s cattle by other states--are insufficient to meet those goals. People disagree over the acceptable management practices to reach the goals. Many argue the policy of killing bison when they leave the park is not meeting the goal of maintaining a wild and free-roaming herd. For example, Yellowstone National Park Superintendent Mike Finley said “when people describe what’s happening here as a national tragedy, I don’t disagree with them” ” (quoted in Peacock 1997a: 43). Like religious wars that make little sense to outsiders, the death of these bison seems illogical and unnecessary to many.

Conflict among participants about the best management practices is not the problem. Rather, lack of structures and processes to find an effective means to resolve the issues is the problem. More science and longer Environmental Impact Statements will

inform but not resolve the issue. Lawsuits, which frames the problem in “win-lose” terms and addresses issues in a “win-lose” arena, will not resolve the issue. Interagency groups help officials coordinate among agencies, but not with citizens. A common interest, integrative solution must be found, bought into, implemented, monitored, and changed when appropriate for the issue to be resolved. A group of diverse citizens and agency representatives made headway in the early 1990s toward finding that solution. They focused on risk management, such as keeping bison and cattle separated temporally and spatially to reduce the risk of brucellosis being transmitted from wildlife to cattle. Such community-based initiatives (described in chapters 3 and 7) provide a promising means of managing resources, a means to be used in conjunction with rather than to replace existing structures of governance.

Values and myth in the policy process

The second barrier underlying the bison debate stems from lack of consideration of the competing value demands and views about the way the world works and should work. Park officials made a decision to stop controlling the size of the bison herd because of changing scientific paradigms, a value demand to manage according to the most up-to-date science. They groom snowmobile trails to provide recreational opportunity and to generate revenue in the traditional off-season, a value demand to manage in a way to generate revenue from tourism. State officials made the decision not to tolerate bison outside park borders in part because of the demands of ranchers and state veterinarians, a value demand to protect the economic interest and well-being of ranchers. Special interest groups, scientists, and citizens influenced these and other policies, which are essentially

about the values people place on our natural resources. For example, veterinarians outside of Greater Yellowstone threatened sanctions against Montana cattle because of brucellosis in bison, which makes a political threat potentially more damaging than the biological one.

The bison case demonstrates the need to recognize and embrace the role of values in formulating natural resource policy. Attempting to resolve natural resource debates without understanding implicit value demands and involving the participants making those demands is like trying to perform heart surgery without the patient.

In addition, we must create a new environmental myth, or world view that recognizes social, ecological, economic, and spiritual well-being cannot be separated. Conflict will likely endure without an alternative world view and policies to support it that integrate the desire and need to use the land and its resources and the desire and need to preserve them. Moving toward operating under that new world view will require recognizing the limitations of science.

Scientific management

The focus on brucellosis presents a third barrier to resolving the bison controversy. Members of Congress, agency leadership, and scientists pour resources into research on brucellosis in an attempt to resolve the debate using science, to no avail. Biophysical conditions are the symptoms of natural resource issues; social processes and politics are the underlying problem and therefore the source of the solution. The role of science in policy-making must be rethought if we are to heal the problem and not just study and mask the symptoms. Science cannot solve political problems.

Despite this insight made by many in both academia and in the field, the focus in bison management remains on the biophysical aspects of the disease brucellosis rather than social and political aspects of bison migrations, park management, or the economics of the ranching industry and market pressures. Rather than including such factors as who influences decisions and how, traditional resource management philosophies and principles involve such concepts as carrying capacity, ecological succession, predator-prey relationships, inter-and intraspecific competition, and habitat.

The focus on biophysical problems stems from the traditional conception of natural resource management goals in biophysical terms. For example, a well-known conservation biologist said, “a conservation strategy is more likely to succeed if it has clearly defined and scientifically justifiable goals and objectives” (quoted in Maguire 1994: 270). The failure to take into consideration the economic, social, and political dimensions of resource problems allows those problems to persist (Decker, Brown et al. 1992).

Aldo Leopold, one hero of the environmental movement, recommended biophysical goals such as maintaining viable populations of native species in a natural state, representing all native ecosystem types in protected areas, maintaining evolutionary and ecological processes, and managing for long-term goals. These goals are often condensed into the terms “sustainability,” “ecosystem” or “ecological health,” and “biodiversity.” Leopold understood, however, that in addition to considering ecological processes and identifying ecological indicators of health, we must also consider social and political processes and identify social and political indicators of health (Leopold 1942).

More recently, Brunner and Clark (1997: 31) point out that “ecosystem management is not a technical problem,” but rather it involves fundamental beliefs and practical preferences. Management of natural resources--whether named ecosystem, natural resource, or environmental management--requires attention to people and processes. People set goals and objectives. Differing values, expectations, demands, and worldviews influence people. Their actions are motivated by a need to fulfill social, economic, and political needs as well as ecological goals.

Sustainability, ecosystem health, and biodiversity are as much social as biophysical goals. These ambiguous concepts become concrete only in specific contexts such as bison management (Brunner and Clark 1997). When specific contexts are examined, it is sometimes even found that justifications such as ecosystem health are used not to improve outcomes on the land but rather to change traditional land-use regimes and mask the goal of “centralization of economic and political power” (Sharma 1996: 563). Achieving sustainability and other goals that may at first seem biophysical will therefore require attention to the social, political, and institutional factors affecting resources (e.g., see Brewer 1995, Heberlein 1988, Ludwig et al. 1993, Miller et al. 1994).

For example, the term “sustainability” in bison management to many means maintaining a wild, free-roaming herd of bison. Achieving a “wild, free-roaming” herd has as much to do with the values and perspectives of participants in the decision-making process as with biophysical criteria such as population size. Does “wild and free-roaming” require confining a small herd to the park, allowing a larger herd wander freely, or something between these extremes? Due to differences in specific conceptions of the goal, the means promoted to achieve a wild and free-roaming herd range from no lethal

control of bison to intensive testing and slaughtering techniques. The concept of a free-roaming herd accepted in management documents and the alternatives chosen to maintain such a herd depend as much upon the values and influence of participants as they do upon biophysical data. We must rethink the role of science in policy.

Clarifying and securing the common interest

While achieving sustainability, biodiversity, and ecosystem health are all vital, they are goals that should be evaluated in terms of the common interest and that cannot be achieved through scientific inquiry alone. Evaluating natural resource policies using common interest as a goal requires defining a few key terms--interest, common interest, and special interest--and setting criteria for assessing whether common interest has been met in a specific case.

An interest is defined as “a pattern of demands and its supporting expectations” (Lasswell and Kaplan 1950: 17). Common interests are patterns of demands and expectations shared by community members. In contrast, special interests benefit only select community members at the expense of the rest of the community. Zero-tolerance for lethal control of bison and zero tolerance for brucellosis-infected bison are examples of special interests. The former serves only the moral values of animal rights groups or others morally opposed to the death of animals at human hands. But the consequences of no lethal control include potential habitat degradation, property damage, and threats to personal safety, consequences clearly not in the common interest. Zero tolerance for brucellosis-infected bison serves the special interests of veterinarians, who may wish to display their skill at eradicating diseases or exert power over wildlife and wildlife

agencies. It may serve the political interests of state officials in a conservative Western state dominated by a more liberal federal administration. Many ranchers may perceive that eradication will also serve their economic demands. But zero-tolerance compromises the larger community goal of maintaining a wild and free-roaming herd of bison. It is possible to find common interest among competing special interest groups. The common interest in bison management, described in greater detail in chapter three, depends on risk management measures rather than eradication, given current technology.

Many people might argue that the goals described earlier--sustainability, ecosystem health, and biodiversity--are in the common interest and perhaps indistinguishable from it. Clearly clean water and air, sustainable resources, and the preservation of species for their instrumental and intrinsic value benefit everyone. However, policies intended to meet these goals are complicated by potential adverse consequences. For example, maintaining a wild and free-roaming herd of bison is in line with the broader goals of achieving sustainability, ecosystem health, and biodiversity. As discussed above and in further detail in chapter three, however, the means to achieve this goal can potentially harm human and ecological communities. A herd allowed to grow with no control could potentially damage its own habitat as well as cause political complications for ranchers in Greater Yellowstone trying to market their cattle nationally and internationally.

Working toward common interest policies requires addressing such potential consequences directly. Resources can only be managed in a sustainable manner if the effects on and values of human communities are considered. Criteria to assess whether

policies are in the common interest include not only results-oriented goals, but also procedural and social goals such as maintaining open and inclusive processes.

More specifically, three criteria can be used to assess whether policies are in the common interest. First, processes and decisions can be considered in the common interest if they are inclusive, transparent and open. Second, processes should meet the valid expectations and demands of participants. Valid expectations and demands are those that can be met without an undue expense to the larger community. The examples of zero tolerance for bison outside the park and zero tolerance for killing bison are invalid demands of members of veterinary and animal rights groups, respectively.

A third criteria to judge a policy's ability to meet the common interest is whether the policy leads to the achievement of goals when put to a practical test. A policy should be judged under this standard with the understanding that circumstances and knowledge changes, and the policy should remain adaptable to changing circumstances as lessons are learned on the ground. So for a policy to be in the common interest, it should pass a procedural, substantive, and experiential test. This dissertation applies these criteria to the bison management case study. It must be noted, however, that these are not absolute criteria but rather they are guides to use to assess whether policies are in the common interest and will be effective at meeting common goals.

Common interest is not a concept in opposition to preserving biodiversity and ecosystems. The environmental hero Aldo Leopold even proposed "democracy as a possible answer to our problem" (Leopold 1942: 264). Democracy is the philosophical and institutional common interest on which this country was formed. The Preamble to the U.S. Constitution identifies common goals: "We the people of the United States, in order

to form a more perfect Union, establish justice, ensure domestic tranquility, provide for the common defence, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.” The Constitution establishes means to meet these common goals through such mechanisms as the separation of powers in the judicial, legislative, and executive branches of government.

Citizens of the United States continue to uphold democracy as in the common interest. However, democracy and common interest are not equivalent or interchangeable concepts. Democracy is in the common interest of the nation as a whole, but common interest must be worked out repeatedly in specific contexts in an iterative process as contexts change. Democracy, as a form of government in the common interest of the people of the United States, focuses on the rights of citizens. The responsibility and solutions for problems lie with “the people.”

More people are recognizing the need to seek common interest through democratic processes, to start putting people back into the picture when considering how to manage natural resources. Jim Burchfield, director of the Bolle Center for People and Forests at the University of Montana’s School of Forestry, said, “I’m not sure that by preserving ecosystems we necessarily meet the best interests of people. Perhaps the mission of the Forest Service should be ‘serving people by caring for the land’” (Anonymous 1998: 15). And Dan Kemmis, former mayor of Missoula, Montana, director of the Center for the Rocky Mountain West at the University of Montana, and a fellow at the Institute of Politics at Harvard University, said, “we have to get away from the dualism of human needs versus the needs of the land” (Anonymous 1998: 15).

Empirical data shows that common interest and more traditional natural resource policy goals are complimentary. Internationally, it has been found that when local communities are excluded from decision-making, resource degradation often results. Community members violate rules instated without their participation or consent (Ostrom, Burger et al. 1999). Incorporating local values and needs early in conservation planning--in intelligence-gathering, promotion, and prescription--can facilitate the protection of resources while upholding human dignity (Wilshusen 2000). Emphasizing environmental interests over other human needs can compromise human dignity and the very natural resources managers attempt to protect. Searching for common interest rather than sustainability, ecosystem health, or biodiversity alone can expand the focus of attention from biophysical factors to the social and political issues at the heart of natural resource debates. But like ecosystems that are constantly in flux, so too are interests. Searching for common interest is an iterative process.

Gaining insight into the influence of human dimensions of natural resources management is not easy. However, tools exist in the policy sciences to do so. These tools are described in more detail in chapter two, and this dissertation demonstrates their use.

Contribution

Treating the bison problem as a political problem requires consideration of more than bison, brucellosis, and cattle. This dissertation therefore examines the role of social and political factors in bison management using policy sciences, assesses bison management using common interest as a criteria for success, and offers alternatives for improving bison management and natural resource management more generally. Drawing

on the lessons learned from bison management, the dissertation goes on to identify research and professional needs in the natural resource field.

In constructing the dissertation in such a way, I have attempted to contribute to the field of natural resource policy in a number of ways. First, it is becoming more common but still fairly unique in academic literature to treat natural resource problems as ones of politics, not of science. This is significant because reducing scientific uncertainty often fails to achieve solutions to pervasive natural resource policy problems (Wargo 1996). In addition, policy scientist Bill Ascher examined fourteen natural resource cases in developing countries. He found that people dismiss problems as “politics,” believing if only we had better science, less corrupt politicians, or less domination of powerful interest groups problems would disappear (Ascher 1999). Labeling problems as “politics” without understanding the specific social and political interactions does little to resolve the problems (Ascher 1999).

Ascher identified in greater detail these problems of “politics” and found several institutional barriers to resolving natural resource problems. These problems included unclear land-use jurisdictions, ambiguity in scientific judgment, and lack of transparency in the government, and difficulties in resolving intragovernmental (and perhaps intragency) conflicts (Ascher 1999). The point is that if the problems are political, we must address them as such rather than hoping a better scientific understanding of problems will lead to resolutions. Addressing natural resource issues as political problems provides the opportunity to open the political discussion and shed light on public fictions and political realities. This dissertation treats bison management as a political problem.

Second, it is important to appraise and evaluate current decision processes in the field to learn from them. This study serves as an appraisal of bison management in Greater Yellowstone. Brunner and Clark recommend open and continuous appraisal of on-the-ground management strategies to improve natural resource management (Brunner and Clark 1997). Their recommendation is part of a larger strategy to take a practice-based approach to natural resources management. They suggest innovating new solutions, diffusing ones that work, and adapting them to different contexts. Learning can only occur, however, with appraisal of practices. This dissertation appraises existing practices.

I am not claiming that this dissertation will “solve” the bison problem--only those working in the field can work through the details of formulating bison management policy. But an appraisal of bison management can find lessons of broader significance and offer procedural and practical suggestions to improve the situation. These lessons may prove significant not only for bison management, but also for other resource issues.

Third, and related to the second contribution, I aim to expand the search for solutions in bison management beyond bison and brucellosis. Solutions to the problem include such factors as states' rights and power struggles among different agencies, market influences on the ranching industry, and the rising influence of the courts in natural resource cases. The following chapters demonstrate one use of policy sciences to examine social and political factors such as decisions-making processes, values, and myths in a real-world case.

Chapter two describes the theory and methods of the policy sciences in greater detail. Chapter three discusses the bureaucratic structure of governance that dominates natural resources management often fails to find and secure common interest. A number

of factors complicate the search for finding effective means to resolve conflicts, which are discussed in detail in chapters four through six. Chapter four discusses different value demands have led to power balancing processes among diverse interest groups, political gridlock, and court battles in which special interests dominate over common interests. Chapter five focuses on the fundamental clashes in worldviews--in agency mandates, in community goals, and in the cultural outlooks of Western residents--that contribute to persistent divisiveness. Chapter six discusses the marriage of bureaucracy and science; decision-makers often turn to scientists for policy decisions, but science cannot resolve the clash of world views that arise in policy debates. Finally, chapter seven discusses possible alternative to address these factors.

Works Cited

- Anonymous (1998). "The Lubrecht Conversations." Chronicle of Community 3(Autumn): 5-16.
- Ascher, W. (1999). Why Government's Waste Natural Resources: Policy Failures in Developing Countries. Baltimore: The John's Hopkins University Press.
- Baden, J. A. and D. Leal, Eds. (1990). The Yellowstone Primer: Land and Resource Management in the Greater Yellowstone Ecosystem. San Francisco: Pacific Research Institute for Public Policy.
- Brewer, G. D. (1995). Environmental challenges: Interdisciplinary opportunities and new ways of doing business, Stockholm, Sweden: Mistra Lecture, Royal Institute of Technology.

- Brunner, R. D., C. Colburn, C. Cromley, R. Klein, B. Olson (2001). Finding Common Ground: Governance and Natural Resources in the American West. Boulder, CO, Manuscript. Submitted for publication to Yale University Press, 2001.
- Brunner, R. D. and T. W. Clark (1997). "A practice-based approach to ecosystem management." Conservation Biology 11(1): 48-58.
- Decker, D. J., T. L. Brown, et al. (1992). Toward a Comprehensive Paradigm of Wildlife Management: Integrating the Human and Biological Dimensions. American Fish and Wildlife Policy: The Human Dimension. W. R. Mangun, ed. Carbondale: Southern Illinois University Press. pp. 33-54.
- Heberlein, T. A. (1988). "Improving interdisciplinary research: Integrating the social and natural sciences." Society and Natural Resources 7: 595-597.
- Katz, B. and J. Bradley (1999). "Divided we Sprawl." Atlantic Monthly December 1999: 26-42.
- Keiter, R. B. and M. S. Boyce (1991). The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage. New Haven, CT: Yale University Press.
- Keiter, R. B. (1997). "Greater Yellowstone's Bison: Unraveling of an early American Wildlife Conservation Achievement." Journal of Wildlife Management 61(1): 1-11.
- Keiter, R. B. and P. H. Froelicher (1993). "Bison, brucellosis, and law in the Greater Yellowstone ecosystem," Land and Water Law Review. 28: 1-75.
- Lasswell, H. D. and A. Kaplan (1950). Power and Society: A Framework for Political Inquiry. New Haven: Yale University Press.
- Leopold, A. (1942). "Land-use and Democracy." Audubon XLIV(Sept.-Oct.): 258-265.

- Ludwig, D., R. Hilbon, et al. (1993). "Uncertainty, resource exploitation and conservation: Lessons from history." Science **260**: 17, 36.
- Maguire, L. A. (1994). Science, Values, and Uncertainty: A Critique of the Wildlands Project. Environmental Policy and Biodiversity. R. E. Grumbine, ed. Washington, D.C.: Island Press. pp. 267-272.
- Miller, B., R. Reading, et al. (1994). "A model for improving endangered species recovery programs." Environmental Management **18**(5): 637-645.
- National Park Service, State of Montana, et al. (1998). Draft Environmental Impact Statement for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park. Denver, CO, National Park Service, State of Montana, U.S.F.S., U.S. Animal & Plant Health Inspection Service.
- Ostrom, E., J. Burger, et al. (1999). "Revisiting the commons: Local lessons, global challenge." Science **284**(April 9): 278-282.
- Peacock, Doug. (1997). "The Yellowstone Massacre." Audubon June: 40 (16pp).
- Sharma, B. D. (1996). On sustainability. This Sacred Earth. R. S. Gottlieb, ed. New York, London: Routledge. pp. 558-564.
- U.S. Department of Interior, U.S. Department of Agriculture. Record of Decision for Final Environmental Impact Statement and Bison Management Plan for the State of Montana and Yellowstone National Park. (December 20, 2000).
- Wargo, J. (1996). Out Children's Toxic Legacy: How Science and Law Fail to Protect us from Pesticides. New Haven: Yale University Press.
- Wilshusen, P.R. (2000) Local Participation in Conservation and Development Projects: Ends, Means, and Power Dynamics. Foundations of Natural Resources Policy and

Management. T.W. Clark, A.R. Willard, and C.M. Cromley, eds. New Haven, CT:
Yale University Press. Pp. 288-326.

Chapter 2

Theory and Methods

I conducted my research and analysis using the policy sciences framework. The “policy sciences” (also called the New Haven School of Jurisprudence), developed by Harold Lasswell and Myres McDougal provide methods to study public problems and to develop alternatives to resolve those problems (Parsons 1995, Ascher 1986). They “tend toward *contextuality* in place of *fragmentation* and toward *problem-oriented* not *problem-blind* perspectives” (Lasswell 1971: 8). This framework allowed me to integrate and analyze data I gathered using a variety of qualitative methods. The policy sciences, combined with context-sensitive data gathering techniques, facilitate the link between academic research and practice by allowing for the study of real-world policy problems and for analysis that can lead to possible alternatives and lessons of broader significance (Lasswell 1971, Lasswell and McDougal 1992).

Below I list briefly some of the many branches of studies in public policy. My point in doing so is not to complete a literature review of the massive literature on policy analysis or to assess the utility of each of these methods (others have already done this, as, for example, Parsons 1995, Schneider and Ingram 1997), but rather to explain my rationale for using the policy sciences. I then describe the major components of a policy sciences approach and address some concerns that arise over policy sciences. Finally, I describe briefly the qualitative field methods used to gather data.

The study of public policy

Many schools of thought and approaches exist to study public policy. Often, these fields use specialized methods or one dominant explanatory theory (Ascher 1986, Brunner 1985, Brunner 1991, Schneider and Ingram 1997). For example, much contemporary policy analysis uses microeconomic and statistical tools, methods based in rational choice (or public choice) and welfare economic theory (Dryzek 1990, Lindblom 1979). These approaches arise from the utilitarian philosophies of Mill and Bentham (Parsons 1995). Other approaches include social structure (founded in sociology), information processing (founded in psychology, decision science, artificial intelligence, and organizational behavior), management, political philosophy, comparative politics, political process,¹ pluralism, and critical theory (Parsons 1995, Schneider and Ingram 1997).

It is not worthwhile for the purposes of this dissertation to compare and contrast the policy sciences approach with each of these methods. It is enough to state that each policy field provides methodological and theoretical tools potentially useful in policy analysis, but most “reinvent” or selectively elaborate aspects of the founding theory of policy analysis, the policy sciences (Ascher 1986, Brunner 1991b). Schneider and Ingram (1997: ix-x), for example, attempt to develop a framework by integrating policy theories and contexts, arguing that “just as botanists have a language to describe the common characteristics of deserts, wheat fields, and alpine meadows, policy analysts need a language to describe the common characteristics of criminal justice, natural resources, and social welfare policies,” what they call the “elements of public policy.”

It is worth contrasting the concept of instrumental rationality as conceived in many strains of policy analysis with rationality as conceived in policy sciences. Such a contrast addresses misunderstandings of the policy sciences that arise from a failure to make the distinction. Schneider and Ingram (1997), for example, criticize the policy sciences for depending on instrumental rationality.

Rational choice theory² was developed as a method of scientific inquiry. It emerged from Enlightenment concepts that assume people behave as if they were objectively rational, as if they can apply an objective set of standards to all individuals and situations (Dryzek 1990). Within the world of instrumental rationality lives “economic man,” a calculating and self-interested being (Parsons 1995). Instrumental rationality requires *complete* knowledge of the consequences of a choice, attaching feelings to *future* consequences, and choosing among *all* possible alternatives (Simon 1976).

In contrast, the policy sciences were developed as a way to identify and solve public problems. As a problem-oriented discipline, the concept of rationality in the policy sciences recognizes that people are only capable of bounded rationality because knowledge of consequences is never complete, values can never be fully anticipated, and all possible alternatives cannot be evaluated. Furthermore, individual membership in or employment by organizations constrain choices. People face limitations in their abilities to perform based on their unconscious skills, habits, and reflexes; their abilities to make

¹ Political process includes six approaches, including the stagist approach, the pluralist-elitist approach, Neo-Marxists approaches, sub-systems approaches, and policy discourse approaches (drawing on theorists including Foucault and Habermas) (Parsons 1995).

² Rational choice theory is not one unified theory, but rather different rational choice theorists adhere to different philosophical underpinnings, including segmented universalism (rational choice theory applies to only certain aspects of policy), partial universalism (rational choice theory “explains some but not all behavior in all domains”), and family of theory (“rational choice theory” actually consists of a number of theories with different, competing, assumptions which result in different predictions) (Green and Shapiro 1994: 192).

correct decisions because of values and the discrepancy between personal and organizational goals influencing a decision; and their are limits to their abilities to acquire appropriate knowledge and skills to perform their jobs (Simon 1976).

While we will always be subject to bounded rationality, conceptual tools in an integrative theory can help reduce our limitations by guiding the focus of attention³ (Simon 1976, Lasswell and McDougal 1992). Rational decisions are ones that clarify and secure the common interest. Determining a policy's ability to meet the common interest requires procedural, substantive, and experiential criteria.

Some who study public policy also distinguish between descriptive and prescriptive study of public policy (Hogwood and Gunn 1984, 1988). The policy sciences are concerned both with knowledge of (descriptive) and knowledge in (prescriptive) the policy process. The policy sciences are also prescriptive in the sense that Lasswell and McDougal recommend seeking human dignity and common interest as the preferred goals of a problem-oriented approach.

Below, I will describe the elements of policy as elucidated in the policy sciences:

1) contextual, 2) problem-oriented, and 3) multi-method.

Policy sciences

Policy sciences “move away from fragmentation” by being “contextual, problem-oriented, [and] multi-method” (Lasswell 1971: xiii). Lasswell and McDougal sought to integrate other disciplines into a unified theory and method of inquiry that can provide insight into policy processes and lead to effective solutions (Lasswell 1966). Knowledge

³ Simon proclaims that “the need for administrative theory resides in the fact that there are practical limits to human rationality” (Simon 1976: 240).

integration improves our ability to affect political problems and work towards human dignity (Brunner 1985, Dryzek 1990, Marvick 1980). Thus, a policy sciences viewpoint is not defined by disciplinary boundaries, but draws on appropriate disciplines to understand problems and policies (Wildavsky 1986). Influenced by the behavioralist movement in the social sciences, examining human nature using multiple methods remains central to policy sciences' inquiries (Ascher 1986, Easton 1950). Integration also means applying existing theory to practical policy problems, rather than creating new theory.

What is the policy sciences theory? Merriam's dictionary defines "theory" as "abstract thought," and defines "abstract" as "a belief, policy, or procedure proposed or followed as the basis of action." Theory, then, is a set of conceptual beliefs, policies, or procedures that guide action. Theory in the policy sciences fits this definition: it provides a procedure to follow for systematic data collection and analysis as well as "principles of content" to assess proposed policies and courses of actions (Brunner 1985: 608).

Policy sciences central theory consists of functional terms, definitions, rules, statements, propositions, and postulates. *Functional terms* "foster the comparative study of conventional systems" and are the basis of the analytic framework in the policy sciences (described in greater detail below) (Lasswell and McDougal 1992: 883). They serve as a classification system for components of society and decision making, much like taxonomical, biological, and genetic terms provide a language for comparisons among living entities in the natural world. *Definitions and rules* provide a common frame of reference to make communication possible through words (Lasswell and McDougal 1992). *Propositions* are statements verifiable by data and include hypotheses, laws, and hypotheses-schema (propositions not related yet to a specific context). *Postulates* are

assumptions made about the world based on observation. For example, the foundation of Lasswell's central theory postulates that "living forms are predisposed to complete acts in ways that are perceived to leave the actor better off than if he had completed them differently" (Lasswell 1971: 16). The idea resembles the tested hypothesis in human ecology expressed as the "principle of least effort" (Lasswell and McDougal 1992: 84).

Lasswell viewed contextuality as "the fundamental criterion of a general theory" (Lasswell and McDougal 1992: 1379). The idea of discerning context by mapping social and decision processes using *functional terms* arose in part from the functionalist tradition in the social sciences, particularly anthropology (Lasswell and McDougal 1992). The functionalist approach insists on placing elements of society, such as myths or stories, in their social, physical, and political setting to understand their meaning. Contextuality differs from the functionalist tradition in that contextuality--unlike functionalism--provides a common set of categories with which to make comparisons. Lasswell espoused the need for such functional categories because "the possibility of arriving at valid comparisons of the significance of 'similar' patterns is gravely compromised" without a map of functional categories to make comparisons across cases (Lasswell and McDougal 1992: 388).

Inherent human limitations prohibit complete examination of all details of a situation, but the policy sciences provide procedures to bring "relevant content to the focus of attention" (Lasswell and McDougal 1992: 1522). The policy sciences framework of functional terms to map social and decision process allow for cross-case comparisons because it "acts as a prod and a guide to the focus of attention" or "an inventory to the most relevant variables" when studying the details of specific cases (Lasswell and

McDougal, 1992: 386; 1379). The categories in the framework: 1) serve as heuristic guides; 2) make no predictions about context, and 3) are abstract formulations that can be applied to concrete situations. Constructing a contextual map in a given policy setting (for a given policy problem) can be aided by the use of *hypotheses-schema*, *postulates*, and other *propositions* in the policy sciences and other fields.

The categories derive their meaning only by their application to operational contexts (Lasswell 1971). As the abstract classification “animal” in the category kingdom has no meaning without references to specific animals, terms in the policy sciences take on meaning when specific contexts are identified and studied. Lasswell and McDougal (1992: 335) asserted that “the legal process is part of the process of decision which in turn is part of the social process as a whole.” A “problem” exists within a social and political (decision-making) context. Therefore, to understand the nature of a problem, one seeks to find trends and conditioning factors in the social and decision-making processes. Therefore, the components of the framework include problem definition, social process, decision process, and observational standpoint. These components are outlined below.

Problem definition

According to Parsons, “public policy focuses on what Dewey (1927) once expressed as ‘the public and its problems.’ It is concerned with how issues and problems come to be defined and constructed and how they are placed on the political and policy agenda” (Parsons 1995: xv). Understanding how government officials and other participants understand and define a problem, then, is vital in understanding policy decisions and processes.

One pertinent observation is that while definitions of problems can be observed and verified or replaced by others, “problems” are essentially subjective. Walter Lippmann, writing about public opinion, observed that “for the most part we do not first see, and then define, we define first and then see” (Lippman 1922: 81). Charles Lindblom wrote that “we do not discover a problem ‘out there;’ we make a choice about how we want to formulate a problem,” and that choice changes as policy debates and prescriptions change (Lindblom and Cohen 1979: 50). Another author describes problem definition as “what we choose to identify as public issues and how we think and talk about these concerns” (Rocheft and Cobb 1990: vii.).

Problem definitions occur and are debated throughout the decision-making process, and affect the focus of attention in a policy debate (Weiss 1989). They direct the evidence considered, the stakeholders included in or excluded from discussion, the solutions debated, and the implementation of plans (Weiss 1989, Rocheft and Cobb 1990, Yaffee 1994). Some problem definitions are more effective than others, and “actions based on poor problem definitions can complicate matters” (Scheuer and Clark 1995: 1). Narrowly defined technical framing of a problem often leads to exclusive decision-making, while appeals to ideals such as justice and democracy generally increase participation (Rocheft and Cobb 1990).

Problem orientation in the policy sciences consists of clarifying goals, describing trends and conditions that lead to or away from the realization of goals, projecting what is likely to happen given current trends and conditions, and inventing alternatives to help achieve goals (Lasswell and McDougal 1992). Lasswell and McDougal also call these the five intellectual tasks, and postulated their use should work toward achieving human

dignity and clarifying and securing the common interest (Lasswell and McDougal 1992). Problem orientation is not linear, for “no step is necessarily taken finally,” and one moves between consideration of the whole and the parts (Lasswell and McDougal 1992: 1099).

The clarification of goals can be multilevel, and does not imply one common set of shared goals for all participants. For example, for international agreements, primary goals clarify shared expectations about authoritative relationships in the agreement. Where contradictions or gaps appear, a secondary goal consists of supplementing the agreement with community policies and party objectives. A tertiary goal consists of applying overriding community policies to police the agreement (Moore 1968).

Understanding problems also requires mapping trends and conditions in the social and decision making processes. Discussions of trends should not be “in terms of isolated tidbits of doctrine and practice,” but rather should include discussion of claims made by participants about decisions, appraisal of responses to claimants by decision makers, the factors conditioning the decision, the short and long term consequences of decisions, the flow of decision, and a description of policies in value-institutional terms (Lasswell and McDougal 1992: 36).

Projection of alternative futures entails the use of “developmental constructs” that project possible futures based on “conscious, explicit, comprehensive, and realistic” expectations (Lasswell and McDougal 1992: 37-38). Development of alternatives should be creative⁴ and can prescribe new policy, institutional structures, or procedures (Lasswell and McDougal 1992). Opportunities for innovation should be sought to meet goals. Alternatives should be evaluated based on their ability to meet goals in an

integrative fashion, minimizing losses and maximizing gains. The policy framework provides guidance on how to study these processes using categories for social and decision process mapping.

Social process

Law and policy arise through social behavior and interactions (Batt and Short 1992-3). Therefore, theories “that fail to place law in the setting of society are inadequate to the ultimate task of science, which is to identify and describe conditioning factors” (Lasswell and McDougal 1992: 876). Studying social process involves understanding practices. Practices result from both perspectives (attitudes) and operations (behavior). Institutions refer to stable patterns of practices. Myth refers to all perspectives, and techniques to all operations. Social change occurs as participants seek certain outcomes (values) through practices (institutions) that control resources. A complete study of policy and social change requires understanding words and deeds, perspectives and operations (Lasswell and McDougal 1992 : 346-7; 1381).

Social process consists of participants with certain perspectives, controlling base values, interacting in given situations, using strategies to influence decisions (outcomes), and the short-term effects of social interactions on values, and longer-term outcomes of interactions, which can be expressed in terms of institutional innovation, continuation, and rejection. Within each category of inquiry, subcategories exist that may help to identify and explain social interactions. Participants may be individuals, organized or unorganized groups, and value shapers and sharers. Perspectives consist of expectations,

⁴ Creativity can be encouraged by expanding and contracting the focus of attention, alternating between intensive concentration and inattention, free association, and experimenting with random combinations (Lasswell and McDougal 1992: 38).

identities, and demands. On any level, understanding perspectives involves identifying predominant myths, or “all relatively stable and coherent patterns of perspective” (doctrine, formula, and miranda) (Lasswell and McDougal 1992, Lasswell 1971: 25).

Situations include ecological or spatial characterizations, temporal dimensions, organized and unorganized, value inclusive or exclusive, and crisis or intercrisis. Strategies include ones dealing with signs—communicative strategies (diplomacy, or messages among elites, and propaganda, or messages among nonelites) and ones dealing with other resources—collaborative strategies (military, or weapons used as resources, and economics, or resources used for nonviolent tactics). Strategies are persuasive or coercive (Lasswell 1971).

Base values can be used to characterize all participants in any social process category. Ultimately, for Lasswell “the recurring task is to clarify how values are probably being allocated” (Marvick 1980: 225). Eight base values exist in the policy framework, including wealth, power, respect, enlightenment, skill, affection, well-being, and rectitude. Lasswell explains base values as follows:

Man seeks to maximize ‘valued outcomes’ by adopting ‘institutional practices’ that also affect the ‘resource environment.’ We adopt eight categories of reference to outcome events, which will be illustrated presently. Why eight categories? The answer is that it is convenient to think in terms of a short list, and to use a list that roughly approximates the categories by which data are obtained and processed in the historical and social sciences (Lasswell and Lerner 1965: 8).

In other words, people receive certain values such as enlightenment by reading the news, or may be deprived of enlightenment through censorship. The institutions that may provide enlightenment include research universities or the mass media. A person may be indulged in well-being if they live in a safe neighborhood with good medical care, or may be deprived if they live in a crime-ridden area. Hospitals are among the institutions that shape well-being.

Lasswell alludes above to a common criticism of the policy sciences: the use of eight value categories in a world of many cultures with varied value systems and institutions. Lasswell explains that eight categories allow for comparison across cases. A list too highly detailed would become unwieldy, and social sciences exist to study the categories selected.⁵ The categories allow for flexibility in application. For example, families in different societies may serve as institutions of affection, wealth, power, well-being, or any other value or combination of values.

Laswell conceived of the “base values” in relation to what people expect and demand. It is useful to think of the influence of various myths on demands and expectations about wealth, power, well-being, moral standards, enlightenment, respect, skill, and affection (or loyalty). Doty points out that subgroups can support different “mythic models, leading to the presence of more than one norm for human fulfillment (making money, ruling a kingdom, attaining enlightenment)” (Doty 1986: 29). Through symbols and signs, myths “provide a vocabulary appropriate to the consideration of the common policies of the public politic” (Lasswell, Lerner et al. 1952: 2).

⁵ E.g., power by political science; enlightenment by journalism and others; wealth by economists; well-being by epidemiologists, doctors, psychiatrists, and others; skill by professional societies; affection and respect by anthropologists and sociologists; rectitude by ethics and religion (Lasswell and McDougal 1992)

Lasswell perceived of base values as distributed among value shapers and sharers (Lasswell and McDougal 1992). For example, teachers, researchers, and librarians are value shapers in enlightenment, and a students, viewers, or readers represent value sharers. Producers are value shapers in wealth, and consumers represent value sharers.

Decision process

The policy sciences contain a distinction between ordinary and constitutive decisions. Ordinary decision processes deal with the distribution of power in a body politic, or the policy outcomes of a social process (Lasswell 1971: 25, Lasswell and McDougal 1992: 358). Constitutive policy deals with decisions about who should make decisions and how. Understanding constitutive policy decisions requires inquiry into participants, their perspectives, base values, strategies, situations, policy outcomes, and long-term effects.

Adequate inquiry into the decision process requires understanding the most significant variables in the social process affecting it (Lasswell and McDougal 1992). Providing relevant variables (factors) with “visibility” can changes the focus of attention in decision-making and can change the “scope and depth” of decisions made (Lasswell and McDougal 1992: 878). The greatest impact of research, the most significant contribution to new knowledge, arises from bringing focus to relevant factors (Lasswell and McDougal 1992).

Lasswell proposes seven functions in decision making, which can be assessed using a set of criteria.⁶ The criteria put forth by Lasswell are “a working sketch of

⁶ Other scholars have proposed models similar to Lasswell's. For example, Simon (1976) proposed intelligence, design, and choice. Hogwood and Gunn (1984) propose agenda setting, issue filtration, defining issues, forecasting, objective and priority setting, analyzing

possibilities” dependent on a given context, not absolutes to be “employed in a pedantic fashion” (Lasswell 1971: 85). One can use the social process categories to characterize each function in greater depth. Mapping the decision process allows an analyst to identify where problems might lie.

The decision functions and criteria for judging them are as follows: *Intelligence* consists of gathering, processing, and disseminating information. Adequate intelligence operations should complete the five intellectual tasks and should be dependable, comprehensive, selective, creative, and available. *Promotion* consists of adding intensity to demands. Promotional activities should be rational, integrative, comprehensive, and effective. *Prescription* involves clarifying expectations about norms, contingencies, and sanctions through formal and informal rules. The prescriptive function includes initiating the development of a prescription, exploring contextual facts and potential policies, formulating and characterizing the policy, and communicating authoritative expectations about the policy (including content, authority, and control). One can assess prescription according to the criteria of effectiveness (establishing a “stability in expectations about policy, authority, and control” (Lasswell and McDougal 1992: 207)), rationality (meeting common rather than special interests and balancing between inclusive and exclusive interests), and comprehensiveness. *Invocation* consists of initially applying a prescription, preliminary exploration of facts and policies, and characterizing a situation. Invocation should be timely (prompt, available, and open), dependable in its characterization of facts, rational, non-provocative, and effective in leading to application. *Application* consists of relating community prescriptions to particular situations. Application includes

options, implementation, monitoring, and control of policy, evaluation and review, and policy termination. W. Jenkins proposes initiation.

initiation, exploring potentially relevant facts and policies, characterizing facts and policies, enforcing rules, and review of the application. Application should be rational (conform to common interests), uniform (contextual, unbiased, and free of special interests), effective, and constructive. *Termination* means withdrawing the authority of a prescription. It includes initiation, exploring facts and policies, canceling prescriptions, and amelioration to minimize losses. Termination should be timely, comprehensive and dependable in its exploration of facts and policies, balanced, and ameliorative. *Appraisal* assesses past decisions in relation to meeting goals. Appraisal includes gathering information about past decisions, evaluating past performance, and disseminating findings and recommendations. It should be dependable (realistic), continuous, independent, unbiased, and contextual (Lasswell and McDougal 1992, Brunner 1997).

Many conceive of the decision process as a rational, linear stage model of policy processes (e.g., Lindblom and Cohen 1979). However, many functions and many decision processes occur simultaneously (Brunner 1997). Or decisions may result without action in all functions. Lasswell calls the conglomerate of functions a policy system, because “investigation shows their interconnectedness” (Lasswell and McDougal 1992: 359). The notion of functions in a decision process provides a heuristic device to map and appraise the decision-making process. It serves a practical purpose because the map “points to the not-always-obvious observation that the opinions of some publics may be more influential at one or more points in the making of a decision than at others” (Robinson 1964: 398)

initiation, consideration, decision, implementation, evaluation, and termination (Parsons 1995).

Observational standpoint

Policy sciences also promote self-orientation of policy and legal professionals. Self-orientation, of clarifying one's observational standpoint, means becoming aware of one's personal goals and articulating the methods used. Some view Lasswell as radical in his promotion of observational standpoint; much research calls for the researcher to claim an objective, neutral stance (Marvick 1980). Andrew Willard (pers. comm.) has pointed out that clarifying one's own standpoint moves the researcher closer to the goal of objectivity than denying biases and predispositions; self-awareness allows researchers to check their biases and bring them under conscious control.

Observational standpoint involves degrees of "control, complexity, and duration" (Lasswell and McDougal 1992: 898). Control refers to the influence of the researcher on a study. The interviewer and participant are more active, and the spectator and collector are more passive. Observational standpoints may also be simple--available with little training—or complex--requiring training. A professional conversation is considered simple, and a more formalized prolonged psychoanalytic interview is considered more. Duration refers to the length of a study.

Multiple methods

The policy sciences encourage the use of multiple methods to complete the five intellectual tasks and map social and decision processes. In other words, policy researchers can and should use appropriate disciplines and methods to understand problems and policies in their given contexts (Wildavsky 1986). All methods contain limitations, and their tendency to focus attention on certain areas of a policy problem

creates blind spots. Multiple methods can help to reduce blind spots and “move away from fragmentation” (Lasswell 1971: xiii). Multiple methods resembles the concept of triangulation, which can include triangulation of data (using data from a variety of sources), investigators (collaboration), theories (using multiple theories to interpret data), methodologies (using a number of methods to investigate one problem), and disciplines (to expand the use of methods and understanding of content) (Janesick 1994). The methods and approaches outlined by Lasswell and McDougal (1992) include case studies, correlational studies, experiments, and prototypes, although other methods may also be used. Researchers must identify their observational standpoint, or the methods used in the research.

Use of the policy sciences in natural resource policy research

Natural resource policy deals with complex and dynamic systems, both social and ecological. Improving natural resource policy will require investigation into and appreciation of the dynamic and complex nature of these systems. While many approaches exist to study policy, the characteristics of the policy sciences make it suitable for understanding these contexts, complex policy problems, and possible methods of improving natural resource management. According to Ascher, “the policy sciences’ multidisciplinary approach is sensitive to the broad social matrix in which policies are formulated and applied” (Ascher 1986: 99). It “emphasizes context,” is “sensitive to dynamic processes,” and contains an “empirical focus on human behavior” (Ascher 1986: 99). It also seeks to pursue “verifiable knowledge” rather than “general laws” (Ascher 1986: 99). The epistemology of the policy sciences is “not the criterion of ‘scientific

inquiry, but rather a means of improving systematic, empirical inquiry on behalf of larger aims” (Brunner and Ascher 1992: 77).

Precedents exists for applying the policy sciences to understand the interplay of social, political, and ecological factors (e.g., Batt and Short 1992-3, Brewer and Clark 1994, Brewer 1995, Brunner 1991a, Brunner and Clark 1996, Clark 1992, Clark 1993, Clark 1997, Clark and Brunner 1996, Healy and Ascher 1995, Primm and Clark 1996, McDougal and Schneider 1975: 81). For example, John Batt and David Short (1992-93) analyze the jurisprudence of the Rio Declaration on Environment and Development using the policy sciences (New Haven School of Jurisprudence). Seeking both to understand the implications of the Rio Declaration on human dignity and to teach practitioners a use of the policy sciences, they focus their analysis on the inputs into and outcomes of the Rio Declaration according to the eight value categories outlined in the policy sciences.

Clark and Brunner (1996) focus on the decision process to asses partnerships used to meet the goals of endangered species conservation. They assert that “an improved understanding of the decision process--and how to evaluate and improve its critical function--can maximize the possibilities for successful recovery and minimize the vulnerability” (Clark and Brunner 1996: 1). They assess decision processes related to two species--the eastern barred bandicoot and the black-footed ferret--as case studies. They then outline the basics of understanding decision process and relate it to endangered species management. They conclude that understanding how decision processes work, how to monitor them, and how to intervene to improve the process can help to improve the effectiveness of partnerships.

McDougal and Schneider (1975) integrate problem orientation, social process, and decision process in a comprehensive manner to discuss the protection of both the environment and the world public order. They begin with a statement of the problem in terms of the world as one ecological unit, rising societal demands to protect the environment, and the current global process of authoritative constitutive decision making. Clarification of community policies--both inclusive and exclusive public order interests--and community statements of goals follow. The authors discuss a number of relevant trends in relation to the goals, including claims about allocation of resources and claims about global constitutive processes. They then discuss the decision functions, and end with appraisal and recommendations relating to community goals and each decision function.

These many applications of the policy sciences demonstrate the versatility of their use given different theoretical and practical goals. While the policy sciences offers a framework with which to analyze given policy situations and make comparisons across cases, the contextual details of a case and research goals dictate their specific use.

Criticisms

Criticisms based on misinterpretation or partial understanding

As Ronald Brunner (pers. comm.) has pointed out, “the general pattern of reaction [to the policy sciences] is the selective diffusion, restriction, and partial incorporation of the policy sciences.” In other words many criticisms result from rejection of the whole by misunderstanding the parts or from a partial understanding of the policy sciences. This

misunderstanding often leads many to equate policy sciences with other modes of policy analysis based on quite different precepts.

For example, Falk accuses the policy sciences of touting science as a path to unconditional truth and claims that McDougal and Lasswell's "invocation of science is misleading" because the chaos, uncertainty, complexity, and indeterminacy in science cannot inform policy (Falk 1990: 2003). Some interpret the task of projection in the policy sciences as "a search for the social atom, for the irreducible unit upon which a mechanistic, quantitative, and predictive science of politics can be built" (Rustow 1966: 692). However, as an integrative "scientific" theory, "science" in the policy sciences carries a different meaning than conventional definitions. First, unlike conventional science that posits an objective researcher, policy sciences calls for statements based on self-observation, for clarifying one's own standpoint. Second, policy sciences "aims at improved works of explanation, not 'reductionism'" (Lasswell and McDougal 1992: 874). Third, the policy sciences "most important contribution is not to prediction but to freedom of choice" (Lasswell and McDougal 1992: 875). Rather than aiming to use only complicated mathematical, predictive models, policy sciences allows analysts "to identify and describe" a number of conditioning factors based on multiple perspectives (Lasswell and McDougal 1992: 876). Fourth, "new discoveries" in policy sciences arise from applying existing theory to new contexts rather than creating new theories (Lasswell and McDougal 1992: 869).

Criticisms from within political science or other specialized fields also emerge because the policy sciences more interdisciplinary approach often leaves it falling short of the criteria of specific disciplines (Rogers 1994, Eulau 1968). Davies attests that

“Lasswell was at last listened to, but with ears that were sensitive to only a narrow range of his ideas” (Davies 1973: 20). Such partial incorporation of Lasswell’s ideas can lead to rejection of the policy analysis as proposed by the policy sciences as a whole.

According to Eulau criticisms originally arose less from opposition to Lasswell’s ideas as from a threat to the established order. He hypothesizes that Lasswell was perceived as more of a threat than his colleagues in the behavioral revolution in political science at the University of Chicago. The behavioral revolution itself, Eulau points out, was threatening because “its incorporation would mean the end of the ancestral order” (Eulau 1968: 1). Many criticisms thus arise from a misunderstanding of the policy sciences, a misunderstanding that originated during Lasswell’s life and endure past his death, for “the most widely accepted characterization of Lasswellian policy sciences remains a technocratic one” (Dryzek 1990: 113).

Language, meta-language, style, and complexity

Lasswell’s language and style, as well as the meta-language of the policy sciences (the analytic framework), many assert, make the policy sciences inaccessible. Marvick, otherwise complementary of the policy sciences, says that Lasswell was more effective when he “used his own terms and distinctions” rather than “his later conceptual paraphernalia.” Marvick (1980: 222) also criticizes Lasswell’s writing style, claiming that “the combination of terseness and prolixity . . . makes his message sporadically unclear, and the elliptical, self-consciously tentative way in which he handles the task of inquiry itself.” Another criticism is that Lasswell is difficult to read because he fails to identify trends in his own thinking, limiting the ability of readers to fully realize the implications

of his thoughts (Easton 1950). This limitation clouds the ability to discern Lasswell's contribution to policy sciences, Easton says. I have five responses to these criticisms.

First, attempting to read and understand Lasswell's writings, especially his later writings, would most likely lead any student to agree to the difficulty of the policy sciences. However, the response to this difficulty rests in large part on the expectations of a student or reader. Students in many fields--literature, policy, sociology, physics, and psychology, for example--expect that they will require words of interpretation and guidance to understand fundamental concepts of a field's founders and revolutionary thinkers. It is a common practice among students, for example, to use cliff notes for great works of literature.

The policy sciences is no different than other foundational works in disciplinary fields in respect to the initial difficulty of understanding its tenants. The policy sciences are a colossal undertaking on the part of the developers and students, and the nature of the subject makes the reading difficult. Integrating as many disciplines as Lasswell and McDougal did in the policy sciences--the "eclectic" nature of their "philosophical underpinnings" (Moore 1968: 664)--inevitably leads to confusion over at least parts of the jurisprudence and requires time and effort to understand.

Second, the objectives of the policy sciences--carrying out the five intellectual tasks for problem orientation and mapping social and decision process--require a meta-language (Moore 1968). Attempting to accomplish the goals set forth by the policy sciences without a metalanguage is like trying "to multiply 867 by 493 using Roman numerals" (Moore 1968: 676). Thus, rather than being a weakness, "the great strength of the McDougal-Lasswell system is its ability to clarify what are otherwise real intellectual

difficulties in thinking about law and legal problems, to stimulate creativity by getting outside traditional modes of thought about law, to successfully utilize inter-disciplinary techniques, and to assist legal research by arming it with a variety of analytic techniques” (Moore 1968: 674). Schneider and Ingram (1997) also espouse the need for a metalanguage to compare different policy situations to the need for a metalanguage in fields such as botany to compare alpine fields to plains or other environments.

Third, the policy sciences convey a profession. Other professions have specialized languages (e.g. computer programming, medicine, architecture, etc.). It takes years of professional training to become proficient in and use these languages among other professionals in the same field. It takes even more training and practical experience to “translate” the language into common terms for the client (or patient, or other recipient of services). The policy sciences as a profession, with its specialized language and professional-client relationship, is like other professions and requires the same rigor of learning and experience in practice.

Fourth, the policy sciences’ focus on application to problems in given contexts make any work about the policy framework difficult to read and comprehend in the abstract. They begin to make sense only through application. One would not expect a student to become a doctor by merely reading medical texts. Likewise, one cannot gain the skills necessary to use the policy sciences without applying the theory. So I would argue that the difficulty in reading Lasswell is not an insurmountable obstacle. One must develop a strategy for learning. In the policy sciences that strategy must include a combination of reading and application.

Understanding the philosophical underpinnings of Lasswell would also be helpful, as Easton points out. It might be useful to begin with some of Lasswell's earlier works in which philosophical underpinnings of the policy sciences are more transparent and in which not all aspects of the framework are presented. In addition, Lasswell and McDougal's *Jurisprudence for a Free Society* contain ample references to indicate the range of influences on the development of the policy sciences. One could also look to a few key works written by practitioners of the policy sciences, including (Ascher 1986, Easton 1950, Marvick 1977, Marvick 1980, and Moore 1968).⁷

Empirical applications

A related criticism involves the difficulty of applying the framework. For example, while highly respectful of Lasswell's intellect, Jones criticizes Lasswell's *Pre-View of Policy Sciences*, calling it too large an endeavor, a refusal "to acknowledge our limitations as roadblocks" to the accomplishment of the comprehensive tasks set forth (Jones 1973: 1363). Lasswell calls for thinking of which only Lasswell is capable, Jones argues. Jones questions where Lasswell's policy scientists will come from and what they will do, saying that lack of discussion of these issues "detracts somewhat from this volume" (Jones 1973: 1364).⁸ Marvick says the difficulty of framework makes application to empirical situations "in sustained and revealing works" concerning today's challenges almost nonexistent (Marvick 1980: 226-227).

⁷ Andrew Willard has pointed out that many writings about Lasswell contain factual errors. However, the works can still help to put the development of Lasswell's ideas in a larger academic and world revolutionary context. As English teachers recommend the use of cliff notes only as a supplement to understanding a work itself, policy texts providing interpretations and commentary should be used to augment understanding (Parsons 1995).

⁸ In favor of the book, Jones says it "develops a strategy of rational problem solving" in the five intellectual tasks (Jones 1973: 1364). It also points out the difficulty and complexity of reaching an applied social science. Jones complements Lasswell's discussion of professional training and the idea of a continuing decision seminar as a model for graduate training. The audience, Jones says, must be in the future and the concepts halved and quartered (Jones 1973).

The responses to this criticism are similar to the ones to the criticism of the meta-language itself. I would argue that a challenging framework does not make it an inadequate one. Rather, complex problems require complex thinking. Policy sciences requires knowledge integration. As such, it makes the mastery of theory and action in a multidisciplinary sense more challenging, but not impossible. Others argue that using the policy sciences for simpler problems is overkill. The response is to be contextual; use the policy sciences for tasks requiring comprehensive methods, for resolution of problems, for understanding contexts. Another response is to limit the use of the meta-language to audiences previously exposed to the policy sciences, unless an explicit attempt is being made to teach the language and methods (Moore 1968).

Another argument is that the policy sciences may work in theory but not practice. Andrew Willard (pers. comm.) has pointed out that one difficulty in assessing the impacts of the policy sciences is that many policy science professionals are primarily practitioners. They often do not “write-up” and publish their use of the policy sciences. It is perhaps a shortcoming that in a field promoting assessment, practitioners do not carry out more such activities for wide dispersal. However, Moore cites four major works conducted using the policy sciences that provide “substantially greater insight into the range of problems within their compass than the usual treatises” (Moore 1968: 681). Additionally, the policy sciences has been successfully applied to understand and move toward resolving natural resource issues (e.g., Batt and Short 1992-3, Brewer and Clark 1994, Brewer 1995, Brunner 1991a, Brunner and Clark 1996, Clark 1992, Clark 1993, Clark 1997, Clark and Brunner 1996, Healy and Ascher 1995, Primm and Clark 1996,

McDougal and Schneider 1975: 81). Other known applications include investigations addressing problems in “a psychiatric hospital, public services for handicapped children, social development at the community level, defense analysis, income redistribution at the national level, public order of the world community, . . . global political transformations.” social capital, endangered species conservation, global climate change, elections, and international incidents among others (Brunner 1985: 608).

Elitism and inability to achieve human dignity

Falk sees the role in constructing a jurisprudence for a free society as limited. He claims that the theory and framework “too fully embodies the modernist legacy of the Enlightenment, with its particular turn toward universal science and reason, a meta-narrative of society and humanity that implicitly and operationally situates the West at the center” (Falk 1990: 2007) It excludes perspectives of constituencies such as women, non-westerners, the poor, and indigenous peoples, Falk argues. Worse, he says, it ignores the possibility for suffering and victimization within a system of public order, and that the appeal to power elites and existing power structures to promote human dignity ignores existing structures of exploitation, privilege, and unevenness. Furthermore, Falk claims, “to posit a comprehensive framework of the McDougal and Lasswell variety is to suppress difference, to suppose that rational value categories can achieve objective knowledge” (Falk 1990: 2002).

However, the categories are empirically empty. They can take on different meanings in different contexts. Moore compares the analytic system to a computer, that would work “equally well should someone postulate a public order of human indignity

rather than the public order of human dignity” (Moore 1968: 676). The issue is also addressed by proceeding from the highest order of abstraction to more concrete circumstances in particular contexts (Moore 1968). Furthermore, the policy sciences seeks to identify not only those involved, but also those excluded from policy making and policy decisions. In addition, the policy sciences includes alternatives such as continuing decision seminars that promote dialogue. It seeks to educate its citizens to be self-aware by such means as a social planetarium (Parsons 1995).

Within given contexts, exclusion may be necessary even with methods designed with a goal of inclusiveness. For example, in the decision seminar run by Norchi and Willard, they consciously excluded groups such as women to allow the seminar to occur at all (Willard and Norchi 1993). While this made the process exclusive, it was necessary given the context and the explicit recognition of members excluded allows those assessing the process to determine for themselves the effectiveness of the process.

Lasswell’s own words indicate his views on empirical application of the policy scientists. In his memorial service, W. Michael Reisman reminded attendees that Lasswell “derided the ivory towerists, engaged in [what he called] ‘a compulsive neurotic ritual of collecting, ordering, condensing, and expelling data’” (Reisman 1979: 13). He instead promoted empirical learning and the application of theory aimed at resolving problems rather than the generation of new theory only.

Like any method, the policy sciences (and policy scientists) have limitations. They take time and effort to learn and apply. And they are not for all types of research. They rely on ideological and technical information gathered using other theories, disciplines and methods. Without information about conditioning factors gathered through the

specialized knowledge in other fields, policy analysts would be limited in their analysis. However, it is a proven method for problem solving and contextual mapping to work toward inventing policy alternatives.

Qualitative Data Collection Methods Used

Scholars and practitioners using the policy sciences theory and framework can employ almost any method to provide information about a social and decision-making context, and to determine trends and conditions affecting policy. Both technical and ideological information can both provide insight into policy problems. Ideological information deals with “facts about the thoughts, feelings, and conduct of human beings. Other facts are technical” (Lasswell 1966: 123). To gather information about ideological factors, both words and deeds (actions) must be studied--by such methods as archival and document analysis, participant observation, and interviews.

Qualitative data gathering compliments the policy sciences rigorous analytic approach and theory. The qualitative and policy sciences approaches include a concern with social and decision making processes, contextuality, multiple sources of information, understanding that complex interactions among material and social and symbolic factors affect outcomes, integrative and interdisciplinary analysis, and observational standpoint (meanings change “between different observers”) (Dey 1993: 39, Janesick 1994). An underlying concern with “how actors define situations, and explain the motives which govern their actions” is common to both, as well (Dey 1993: 36).⁹ Meaning must be “related to the positions and perspectives of different observers”

⁹ While the policy sciences elaborates this concept in much greater detail--using the concept of base values to classify motivations and the assets used by people to gain certain other values--the two are similar in their emphasis on understanding individual perspectives.

(Dey 1993). The analysis following qualitative data gathering, like policy sciences analyses, is not meant to result in abstract theories, although it is important to be theoretical and systematic in analysis (Dey 1993).

Lasswell and McDougal stressed the need for multiple “vantage points” to understand factors affecting decision (Lasswell and McDougal 1992: 37). Likewise, qualitative methods recognizes that researchers must triangulate information from words and behavior, because people are often unable to rationally explain their intentions (Dey 1993). Both qualitative research and the policy sciences also emphasize the need to recognize the role of the researcher at every stage of research--question formation, data gathering, analysis, and writing (Janesick 1994, Morse 1994).

The naturalistic approach is one qualitative approach with much in common with the policy sciences. The main goal of naturalistic research “is to investigate human behavior in its natural and unique contexts and settings by avoiding the artificial constraints of control and manipulation” (Isaac and Michael 1995: 218). Furthermore, “because of its dependence on human perception and multiple realities, it is not concerned at arriving at a final unified system of knowledge” (Isaac and Michael 1995:218). Among the principles of naturalistic studies are examining human behavior within a real context; relying on human observation; adapting to multiple realities; recognizing intuitive knowledge; identifying conditions, interactions, and values; approaching research in a grounded, emergent fashion--as opposed to approaching it with a previous explanatory theory; recognizing researcher-subject interactions; reporting information in a case study format “because it is the most adaptable to emergent multiple realities;” interpreting data in an idiographic (particular) fashion rather than in a

nomothetic fashion (seeking “lawlike generalizations”); regarding findings as tentative and part of a larger combination of factors; and allowing a study’s boundaries to emerge in the course of the research (Isaac and Michael 1995: 219-221).

The bison issue was examined as an intrinsic, instrumental, and critical case study guided by the principles of naturalistic research outlined above as well as the policy sciences principles of contextuality, multiple-methods, problem-orientation, and observational standpoint. Case studies are “the best way to gain familiarity with the decision process in any culture” (Lasswell and McDougal 1992: 887). Intrinsic case studies reveal the story in the case as well as “issues, contexts, and interpretations” intrinsic to the case (Stake 1994: 242). Instrumental case studies seek to “facilitate our understanding of something else,” through an in-depth study of the case (Stake 1994:237). Issues of external concern that arose in the bison include the role of science in policy, the role of myths in policy—including the political implications of Yellowstone National Park’s natural regulation policy, the changing social fabric of the West, and needs in graduate and continuing education.

A critical case sampling method uses cases that “can make a point quite dramatically and are particularly important in the scheme of things” (Isaac and Michael 1995: 224). The bison case offers the opportunity to make dramatic and important points for a number of reasons. First, it has been an on-going issue since the park’s inception in 1872. Second, the Environmental Impact Statement (EIS) process offered an opportunity to directly assess the political feasibility of management options using public input in the form of letters, hearings, and meetings. Third, people often express their perspectives most clearly when evaluating specific and highly controversial incidents such as the

killing of 1,084 bison at the border of the well-known and idealized Yellowstone National Park in 1996-97 (Reisman and Willard 1988).

Actual data collection in qualitative analysis depends mostly on participant observation, interviews, and document analysis (Janesick 1994). To gather data to investigate the bison cases, I used interviews (Fontana and Frey 1994), participant observation (Adler and Adler 1994), review of material culture (Hodder 1994), and review of archival materials (Barzun and Graff 1992). Material culture and archival material-- which contain data on ideological factors--include such varied sources as academic papers, government documents, newspapers, interest group propaganda, billboards, internet web sites, "speeches, news conferences, news releases, magazine articles, photographic stills, newsreels, film shorts, feature films, leaflets, books, cartoons, charts and tables, broadcasts, plays, rumors, maps, exhibits, demonstrations, letters, telephone messages" (Lasswell 1966: 126). With the exception of plays and feature films, I used all of these sources.

A multiple methods approach aids in triangulation of methods and data. Janesick (1994) describes four types of triangulation, including data triangulation, investigator triangulation, theory triangulation, methodological triangulation, and interdisciplinary triangulation. I used data triangulation ("using a variety of data sources"), methodological triangulation ("the use of multiple methods to study a single problem"), and interdisciplinary triangulation (to "broaden our understanding of method and substance") (Janesick 1994: 214-215). Triangulation helps to increase the reliability, richness, and diversity of data (Freudenberger 1997: 11).

Works Cited

- Adler, P. A. and P. Adler (1994). Observational techniques. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 377-392.
- Ascher, W. (1986). "The evolution of the policy sciences: Understanding the rise and avoiding the fall." Journal of Policy Analysis and Management 5(2): 365-373.
- Barzun, J. and H. F. Graff (1992). The Modern Researcher. New York: Harcourt Brach Jovanovich College Publishers.
- Batt, J. and D. C. Short (1992-3). "The jurisprudence of the 1992 Rio Declaration on environment and development: A law, science, and policy explication of certain aspects of the United Nations Conference on Environment and Development." Journal of Natural Resources & Environmental Law 8: 229-292.
- Brewer, G. D. (1995). Environmental challenges: Interdisciplinary opportunities and new ways of doing business, Stockholm, Sweden: Mistra Lecture, Royal Institute of Technology.
- Brewer, G. D. and T. W. Clark (1994). A policy sciences perspective: Improving implementation. Endangered Species Recovery: Finding the Lessons, Improving the Process. T. W. Clark, R. P. Reading and A. L. Clarke, eds. Washington, D.C.: Island Press. pp. 391-413.
- Brunner, R. D. (1985). Policy sciences. The Social Science Encyclopedia. A. Kuper and J. Kuper, eds. London: Routledge & Kegan Paul. pp. 607-08.
- Brunner, R. D. (1991a). "Global climate change: Defining the policy problem." Policy Sciences 24: 291-311.

- Brunner, R. D. (1991b). "The policy movement as a policy problem." Policy Sciences **24**: 65-98.
- Brunner, R. D. (1997). "Introduction to the policy sciences." Policy Sciences **30**: 191-215.
- Brunner, R. D. and W. Ascher (1992). "Science and Social Responsibility." Policy Sciences **25**: 295-331.
- Brunner, R. D. and T. W. Clark (1996). "Making partnerships work in endangered species conservation: An introduction to decision process." Endangered Species UPDATE **13**(9): 1-5.
- Clark, T. W. (1992). "Practicing natural resource management with a policy orientation." Renewable Natural Resources **16**: 423-433.
- Clark, T. W. (1993). "Creating and using knowledge for species and ecosystem conservation: Science, organizations, and policy." Perspectives in Biology and Medicine **36**: 497-525.
- Clark, T. W. (1997). Conservation biologists in the policy process: Learning to be effective and practical. Principals of Conservation Biology. G. K. Meffee and C. R. Carroll. Sunderland, Mass., Sinauer Associates, Inc. pp. 575-597.
- Clark, T. W. and R. D. Brunner (1996). "Making partnerships work in endangered species conservation: An introduction to the decision process." Endangered Species UPDATE **13**(9): 1-5.
- Davies, J. C. (1973). Where from and where to? Handbook of Political Psychology. J. N. Knutson. San Francisco, Jossey-Bass, Inc. pp. 1-27.

- Dey, I. (1993). Qualitative Data Analysis: A User-Friendly Guide for Social Scientists. New York, Routledge.
- Doty, W.G. (1986). Mythography: The Study of Myths and Symbols. Alabama, University of Alabama Press.
- Dryzek, J. S. (1990). Discursive Democracy: Politics, Policy, and Political Science. New York, Cambridge University Press.
- Easton, D. (1950). "Harold Lasswell: Policy scientist for a democratic society." Journal of Politics 12': 450-477.
- Eulau, H. (1968). "The maddening methods of Harold D. Lasswell: Some Philosophical Underpinnings." Journal of Politics 30: 3-24.
- Falk, R. (1990). "Casting the spell: The New Haven School of international law." The Yale Law Journal 104: 1991-2008.
- Fontana, A. and J. H. Frey (1994). Interviewing. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 361-376.
- Freudenberger, K. S. (1997). Rapid Rural Appraisal; Participatory Appraisal: Notes to accompany an introductory course. New Haven, CT: Yale University.
- Green, D. P. and I. Shapiro (1994). Pathologies of Rational Choice Theory: A Critique of Applications in Political Science. New Haven: Yale University Press.
- Healy, R. G. and W. Ascher (1995). "Knowledge in the policy process: Incorporating new environmental information in natural resource policy making." Policy Sciences 28(1): 1-19.

- Hodder, I. (1994). The interpretation of documents and material culture. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 393-402.
- Hogwood, B. W. and L. A. Gunn (1984, 1988). Policy Analysis for the Real World. New York, Oxford University Press.
- Isaac, S. and W. B. Michael (1995). Handbook in Research and Evaluation. San Diego: Educational and Industrial Testing Services.
- Janesick, V. J. (1994). The dance of qualitative research design: Metaphor, methodology, and meaning. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 209-219.
- Jones, C. O. (1973). "A pre-view of policy sciences review." The American Political Science Review 67(4): 1363-1364.
- Lasswell, H. D. (1966). The Analysis of Political Behaviour: An Empirical Approach. Hamden, CT: Archon Books.
- Lasswell, H. D. (1971). A Pre-View of Policy Sciences. New York: American Elsevier.
- Lasswell, H. D. and D. Lerner, Eds. (1965). World Revolutionary Elites: Studies in Coercive Ideological Movements. Cambridge, MA: The M.I.T. Press.
- Lasswell, H. D., D. Lerner, et al. (1952). The Comparative Study of Symbols: An Introduction. The Prestige Press: A Comparative Study of Political Symbols. I. d. S. Pool. Cambridge, MA: The M.I.T. Press. pp. 1-61.
- Lasswell, H. D. and M. S. McDougal (1992). Jurisprudence for a Free Society: Studies in Law, Science and Policy. New Haven: Yale University Press.

- Lindblom, C. E. (1979). Still Muddling, Not Yet Through. Public Administration Journal. Nov./Dec.: 517-526.
- Lindblom, C. E. and D. K. Cohen (1979). Usable Knowledge: Social Science and Social Problem Solving. New Haven: Yale University Press.
- Lippman, W. (1922). Public Opinion. New Brunswick, Transaction Publishers.
- Marvick, D. (1977). Introduction: Context, Problem, and Methods. Harold D. Lasswell on Political Sociology. D. Marvick. Chicago and London: University of Chicago Press. pp. 1-72.
- Marvick, D. (1980). "The work of Harold D. Lasswell: His approach, concerns, and influence." Political Behavior 2(3): 219-229.
- McDougal, M. S. and J. Schneider (1975). "The protection of the environment and world public order." Annals of the New York Academy of Sciences 261: 81-114.
- Moore, J. N. (1968). "Prolegomenon to the jurisprudence of Myres McDougal and Harold Lasswell." Virginia Law Review 54: 662-688.
- Morse, J. M. (1994). Designing funded qualitative research. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 220-235.
- Parsons, W. (1995). Public Policy: An Introduction to the Theory and Practice of Policy Analysis. Lyme: Edward Elgar.
- Primm, S. A. and T. W. Clark (1996). "The Greater Yellowstone policy debate: What is the policy problem?" Policy Sciences 29: 137-166.

- Reisman, M. (1979). Remarks by Michael Reisman. Harold Dwight Lasswell: In Commemoration and Continuing Commitment. New Haven, Yale Law School, Policy Sciences Center: The Ogden Foundation. pp. 13-21.
- Reisman, W. M. and A. R. Willard, Eds. (1988). International Incidents: The Law That Counts in World Politics. Princeton, NJ: Princeton University Press.
- Robinson, J. A. (1964). "Public opinion in Lasswell's Future of Political Science." Public Opinion Quarterly 28: 395-403.
- Rocheftort, D. A. and R. W. Cobb (1990). Problem Definition: An emerging perspective. The Politics of Problem Definitions: Shaping the Policy Agenda. D. A. Rocheftort and R. W. Cobb, eds. Lawrence, University of Kansas Press. pp. 1-31.
- Rogers, E. M. (1994). A History of Communication Study: A Biographical Approach. New York: The Free Press.
- Rustow, D. A. (1966). "The study of elites: Who's who, when, and how." World Politics 18(4): 690-717.
- Scheuer, J. L. and T. W. Clark (1995). "Conserving biological diversity in Hawaii: What is the policy problem?" Pacific Conservation Biology.
- Schneider, A. L. and H. Ingram (1997). Policy Design for Democracy. Lawrence: University Press of Kansas.
- Simon, H. A. (1976). Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization. New York: The Free Press.
- Stake, R. E. (1994). Case studies. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications. pp. 237-247.

- Weiss, J. A. (1989). "The powers of problem definition: The case of government paperwork." Policy Sciences 22: 97-121.
- Wildavsky, A. (1986). Speaking the Truth to Power: The Art and Craft of Policy Analysis. Boston: Little, Brown.
- Willard, A. R. and C. H. Norchi (1993). "The decision seminar as an instrument of power and enlightenment." Political Psychology 14(4): 207-238.
- Yaffee, S. L. (1994). The Wisdom of the Spotted Owl: Policy Lessons for a New Century. Washington, D.C.: Island Press.

Chapter 3

Bison Management in Greater Yellowstone

Introduction

As discussed in chapter one, the words engraved over the grand arch at the northern entrance of Yellowstone--“for the benefit and enjoyment of the people”--express the ideal that Yellowstone and its unique natural resources should be managed in the common interest, the interest of all the people. Bison management illustrates the difficulty of making this ideal a political reality. This chapter presents bison management in Greater Yellowstone as a problem of politics and governance, taking the common interest as the appropriate criterion for assessment. It begins with an overview of the historical context, describes and appraises the policy process that has failed to solve the problem, and then considers a number of factors that in part account for policy failures. These factors, as discussed in this and chapters four through six, include a fragmented structure of governance for managing bison; conflicting values and myths that surface in debates over bison management; and the failure of scientific management to resolve problems that are fundamentally social and political. This chapter concludes with policy recommendations for bison management that are in the common interest. The dissertation concludes with recommendations to improve natural resource management more generally.

Historical Context

The ideal of managing national parks in the common interest has remained

unchanged over the past century; at least it has not been directly challenged. But policies that attempt to secure the common interest have changed to compensate for the unintended consequences of past management policies, and because of external factors. These external factors include success in the control of brucellosis in livestock, the rise of environmentalism, and advances in the science of ecology. This section outlines the historical evolution of Park management policies, and other policies, as they pertain to contemporary bison management.

Approximately 40 to 75 million bison once roamed the United States, but the population was reduced to a few hundred animals by the late 1880s (Dary 1989). While many factors contributed to the demise, buffalo hunting and demand for buffalo products figured prominently (Barsness 1985, Dary 1989, Geist 1996). Some historians also allege that U.S. Army officials tried to exterminate Indians by destroying their subsistence base, the bison (Smits 1994). Once it became apparent that buffalo might go extinct, some states passed legislation--usually too late--to prevent further hunting of buffalo. People nationwide owned domesticated bison, but one of the last wild herds lived in the area that became Yellowstone National Park. Although officials established the Park to protect the area's unique geothermal features, they soon began to recognize the Park's potential as a wildlife sanctuary. By 1883 they prohibited hunting in Park borders but did little to enforce the prohibition. Poaching continued within Park borders (Meagher 1978). Public pressure to protect Yellowstone's bison increased in 1894 after national publicity about the arrest of a bison poacher. Congress passed H.R. 6442, or the Lacey Act, "to protect the birds and animals in Yellowstone National Park, and to punish crimes..." (quoted in Schullery 1995: 108). Fines for violating the act were \$1000 or 2 years in jail.

Thus the nation decided to protect the remnant wild herd, numbering only 200 in 1895 (Haines 1977). Protecting Yellowstone's bison remains an appropriate interest of great emotional significance for many Americans. Bison symbolize one of the country's first conservation success stories, in the country's first national park and the gemstone of the National Park system. Native Americans also identify their own troubled history with the near extinction of bison, which provided subsistence and still remain a strong component of many tribal cultures. They feel their cultural survival depends on the survival of wild buffalo. About the significance of the bison, a tribal elder from South Dakota, Rosalie Little Thunder, says she "can only compare [it] to the god of today; money"(Little-Thunder 1997). Bison also remind conservationists and other Americans of the potential for special interest groups--including buffalo hunters, poachers, the railroad, possibly the army, and others who prevailed in the nineteenth century--to destroy a natural resource. As noted above, this interest in protecting wild bison in Yellowstone can be realized through practical alternatives that do not compromise other valid and appropriate interests, especially the interest in protecting livestock from brucellosis.

Early management of Yellowstone bison was part of a policy that sought to protect "desirable" animals--mainly herbivores such as bison and elk--from poachers, predators, and winter mortality through intensive management techniques (Bishop, Schullery et al. 1997). Officials purchased domestic bison and established a captive herd in 1902 while continuing to protect the wild bison (Haines 1977). Managers fed bison, separated calves, castrated bulls, and sponsored roundups and stampedes for tourists (Sellars 1997). The corralled herd increased from 21 to 44 by 1905, and to 147 by 1911 (Haines 1977, Barness 1985). Managers began to set target populations to maintain the

maximum number of ungulates given range conditions. The techniques used to maintain a target bison population included shooting, live shipment to Indian reservations and zoos, and capture and slaughter (Meagher 1985). These intensive techniques were adapted from ranch and range management techniques developed for cattle. They kept bison inside the Park.

However, from the 1930s to the 1960s, the Park gradually shifted policy away from intensive management techniques. Ecologists came to understand that protecting Park wildlife required protecting the natural processes of which they are a part, rather than managing intensively for single species including bison. This reflected and reinforced a larger evolution in which managers and the public began to see scientific expertise as a necessary part of the search for any “sound” natural resource policies. Advocates of scientific management claimed it was an alternative to the politics of special interests. Since then science has become more influential in the management of natural resources, including bison, but not all of the influence has been so constructive. On occasion science has been misused, for example, to delay decisions on the pretext that more scientific studies would resolve policy issues; to justify rather than to inform prior political positions; and to devalue local knowledge based on trial-and-error experience as complementary to scientific knowledge in informing policy decisions.

Meanwhile, as policy gradually shifted within the Park, events outside would eventually complicate debates over managing the Park’s resources. In 1916, a committee formed within the U.S. Livestock Sanitary Association to address brucellosis in livestock, and continues today as the Brucellosis Committee of the United States Animal Health Association (USAHA), a professional association of veterinarians. In 1934, federal and

state governments became involved, forming the Cooperative State-Federal National Brucellosis Eradication Program to rid livestock of brucellosis. Working together, the U.S. Department of Agriculture, state livestock departments, and the livestock industry have made progress in eradicating brucellosis from domestic cows, where it can cause abortions, infertility, reduced milk production, and a retained placenta -- and in doing so, devastate ranchers economically (Nicoletti and Gilsdorf 1997). Protecting the livestock industry from brucellosis is a valid interest that is also an appropriate interest within the strong agrarian tradition, shared by many Americans, that values ranching and farming as part of our cultural heritage, particularly in the West.

However, by 1960, with brucellosis infecting fewer domestic herds, the Brucellosis Committee of the USAHA began to view brucellosis in bison and other wildlife as threats to eradication efforts (Frye and Hillman 1997). This brought into conflict the interest in protecting the livestock industry from brucellosis and the interest in protecting wild Yellowstone bison from domestication. In an early response to the concerns of the veterinarians and allied interests, Yellowstone Park officials in 1962 began capturing bison, testing them for brucellosis, and sending positive reactors to slaughter. However, the program was terminated in 1964. Park researchers claimed it could never end because only 75% of bison could be captured. Capture also changes the wild behavior of bison. Furthermore, removing all positive reactors would reduce herds to dangerously low numbers and eliminate the genes of dominant females who teach historical habitat use patterns (Meagher 1972, Meagher 1974). Budgetary constraints also influenced the program's termination (Frye and Hillman 1997). In short, it was decided at that time that an extensive and expensive capture and testing program in the Park would

not eliminate brucellosis but would threaten the wild bison herd.

By 1966, public pressure and a changing ecological understanding of wildlife led to the Park's natural regulation policy. This policy mandates that managers depend more upon natural conditions, such as winter starvation, than human actions to control wildlife populations. By 1967, the new natural regulation policy, the increasing role of science in management, and strong public opposition to wildlife population control in the Park--in particular to the slaughter of thousands of elk--led to the termination of all human reductions of wildlife populations in the Park (Yellowstone National Park, 1996a: 2, Bishop, Schullery et al. 1997). The bison herd numbered 397 at that time, and stayed within Park borders (Bishop, Schullery, et al. 1997). There was little initial increase in the bison population, but by 1968, bison began moving toward Park borders. A border control policy and other attempts to deter the migrations, including cattle guards and fences, failed to end the migrations in the 1970s and early 1980s. Debate continues over explanations for the migrations: Increasing populations due to the natural regulation policy, herd memory, and easy-to-travel snowmobile trails are among the possibilities. Whatever the explanations, the migrations seemed inevitable without a return to intensive, ranch-like control of Park bison.

The gradual return to more intensive management techniques began about 1985, when APHIS granted Montana and Wyoming a brucellosis-free status. This assures buyers that cattle from the states are disease-free, subjecting them to fewer costly regulations and increasing their marketability in interstate and international commerce. The livestock industry began to demand that Yellowstone and Grand Teton National Parks eradicate brucellosis from bison to maintain the brucellosis-free status (Schullery

1986). (Grand Teton, adjacent to Yellowstone National Park on its southern border, also contains a herd of brucellosis-infected bison.) Yellowstone officials initially did little to control migrations or brucellosis in bison, arguing that the risk of transmission to cattle is too small to warrant handling the wild animals: There were (and are) no documented cases of the transmission of brucellosis from bison to cattle in the wild. Livestock interests, frustrated by Yellowstone's refusal to meet their demands, turned to the state veterinarian and to the Montana Department of Fish, Wildlife, and Parks (DFWP). At the request of the state veterinarian, state game wardens from DFWP shot 88 bison that wandered into Montana in the winter of 1984-85 (Anonymous 1989, Robbins 1985). These management actions were the first direct and intensive control of Park bison by state agencies, and they set the stage for policies to manage border crossings in the future. While methods have varied, all policies recommended or applied by agency officials since then have involved killing bison.

The Decision-Making Process

In 1985, the first attempt to develop a plan for bison management by the Park and DFWP failed because of interagency conflicts (Anonymous 1985b). DFWP responded to bison migrations like a game agency, one that manages wildlife in part by killing game animals with public hunts and other methods. As a state agency, it is responsive to the interests of ranchers. The Park, in contrast, seeks to protect Park resources. As a federal agency, it is accountable in principle to national officials and ultimately the national public. The different mandates of agencies with some jurisdiction over bison management make coordination among them difficult. Agency officials are often loyal to their own

agencies, through personal preference or through inducement or threats from superiors, even amidst interagency coordination efforts. Thus far, no agency-mandated policy has served the common interest.

The difficulty of finding common-interest solutions through interagency coordination alone shows up in a recurring pattern: Bison exiting Yellowstone National Park are killed indiscriminately or after testing for brucellosis, under written or unwritten public policy. In response to the killing, members of the public protest in various ways, including appeals to legislators or others, the filing of lawsuits, the development of citizens' alternatives to official policy, or even acts of civil disobedience. In response to public protests, public officials make superficial changes in policy, setting the stage for repetition of the pattern. The result is heightened frustrations all around, which motivate repetition of the pattern -- so long as participants are unable to effect significant changes in the public or private policies that sustain the pattern.

Thus in 1985, after the killing of bison in the winter of 1984-85, the Montana state legislature responded to public protests and to pressure from hunting groups by designating bison a game animal. Under this superficial change in public policy, hunters joined officials from DFWP in killing 57 bison outside the Park in the winter of 1985-86 (Robbins 1986). The public protested once again. Few considered shootings by hunters an improvement over shootings by officials; in either case, the outcome for bison was the same. Some considered hunting bison no more sporting than shooting a couch; neither normally tries to evade or attack the threat represented by the hunter. The Fund for Animals, an animal rights group, sued the Park for allowing bison to migrate into Montana to be shot. The Fund lost (Anonymous 1985a).

After the killing of bison in the winter of 1988-89, public protests erupted again. Many readers will recall televised images of Yellowstone in flames the summer of 1988, and the resulting “ghost forests” (Kesselheim 1985). The flames subsided when rain came in fall, but only after burning about 1 million of the Park’s 2.2 million acres (Varley and Schullery 1991). The massive fires, a drought, and a harsh winter made it difficult for bison and other ungulates to find forage the following winter (Grogan 1989). Few animals died in the flames, but officials from the Montana DFWP and hunters killed 579 of 900 bison from the Park’s northern herd that crossed the border in search of food (Bertelson 1989, Kingham 1989). This generated more complaints to Montana Governor Stan Stephens than any other issue (Ekey 1990). People compared the hunt to a firing squad and to the slaughter of buffalo in the nineteenth century (Begley 1989). A National Wildlife Federation employee said the killing shows “the livestock industry flexing its muscle,” suggesting that the balance of power was tipping in favor of livestock interests (quoted in Morrison 1990).

By 1989, the principal state and federal agencies were all frustrated with a situation that served none of their primary interests. Moreover, the Montana DFWP and Department of Livestock (DOL), the National Park Service, the U.S. Forest Service, and APHIS could no longer avoid each other. So they sought to reach an enduring solution to bison management problems through development of a long-term plan (Montana Fish Wildlife and Parks; U.S. Department of Interior: Yellowstone National Park; U.S. Department of Agriculture: Gallatin National Forest, 1990). Officials from the Park and DFWP developed the first Interim Plan and Environmental Assessment (EA) in 1990 and released it to the public for comment in 1991. The agencies received 319 public responses

(Brown 1990, Associated Press 1991). Despite public concern over bison killings during the previous five winters, the plan called for public hunts, state sharpshooters, and capturing calves. The plan allowed Park officials to help kill bison outside the Park, reflecting pressure from livestock groups and state officials on Park officials to accept responsibility for protecting livestock by controlling bison. Park officials believed that helping Montana outside the Park was better than killing bison inside the Park, and that such a strategy might reduce demands to control the herd inside the Park. They were less able or less willing to argue, as they did in the 1970s and 1980s, that the risk of transmitting brucellosis from wildlife to cattle was minimal.

Frustrated by the performance of agencies on this issue, a Bison Management Citizen's Working Group was organized in Bozeman, Montana in 1990 under the leadership of Leroy Ellig, a retired regional supervisor for DFWP. The Group included landowners, ranchers, hunters, conservationists, and retired agency personnel, with agency officials and a tribal member serving as advisors and consultants.¹ They did more than critique the current Interim Plan of the agencies. They developed an alternative to protect wild bison and livestock through risk management measures that included separation of bison and cattle in time and space and vaccination of cattle. After all Group

¹ The group submitted the proposal with a letter to Yellowstone National Park Superintendent Bob Barbee. Signatories to the letter included John Ragsdale, a local rancher; Jim Richard of the Montana Wildlife Federation; Kara Ricketts of the Greater Yellowstone Association of Conservation Districts; Michael Scott of the Wilderness Society; Jeanne-Marie Souvigny of the Greater Yellowstone Coalition; Leroy Ellig, the retired Fish, Wildlife, and Parks regional supervisor who initiated the group; Edward Francis, a local landowner and member of the Royal Teton Ranch; and Robert S. Gibson, retired forest supervisor.

members signed off on the plan, the Group submitted it to the agencies, which treated it as just another response to the Interim Plan, and not as a step toward a common-interest alternative to the Interim Plan.² Consequently, state and Park officials continued killing bison under a revised 1992 Interim Plan. However, the Montana state legislature outlawed the public hunt of bison due to bad publicity. This was another superficial change in public policy that failed to address the underlying political or structural problems. Meanwhile, by 1994, the bison population peaked at 4,200 animals, the highest since the nineteenth century (Yellowstone National Park 1996).

At the same time, livestock and veterinary interests refocused on bison management and asserted their influence. USAHA, the professional veterinary association that includes the Montana and many other state veterinarians as members, issued five brucellosis resolutions in 1995 (Alley 1995). One resolution stated the expectation that brucellosis in and overpopulation of bison and elk threaten cattle. Together with the Western States Livestock Health Association composed of 17 Western state veterinarians, USAHA pressured APHIS to downgrade the status of states that allowed wild bison exposed to brucellosis to roam (Alley 1995). USAHA is respected enough to be highly influential, even though it is not an official policy-making body. Subsequently, APHIS threatened to revoke Montana's status without a scientific or legal basis. The Montana state legislature also changed the primary authority for managing bison from the DFWP to the DOL--an agency with a mandate to "protect the health and

² Author's notes from the *Where the Buffalo Roam: Finding Common Ground* symposium, Cody, Wyoming, August 8-9, 1997.

well-being of the livestock industry and economic well-being of ranchers”³ and without previous experience or responsibility in wildlife management. Thus the perspectives of livestock management became more influential in the management of wild bison that roam outside the Park and into Montana.

In 1995, Montana Governor Marc Racicot sued APHIS and the National Park Service out of frustration over the increased attention on brucellosis, pressure from state veterinarians outside the region, unresolved conflicts in federal policies, and threats from APHIS to revoke Montana’s brucellosis-free status (Yellowstone National Park 1996). He alleged Montana was harmed because the Park failed to prevent bison migrations into Montana and because APHIS threatened to downgrade Montana’s brucellosis-free status based only on the presence of diseased wild bison in the state. This lawsuit resulted in a Settlement Agreement in November of 1995, signed by Racicot, assistant secretaries of the U.S. Departments of Agriculture and Interior, the Gallatin National Forest Supervisor, and the vice-president of the Royal Teton Ranch, a private landowner adjacent to the Park and an intervenor for Montana (Settlement Agreement 1995).

The agreement prevented APHIS from downgrading Montana’s status if the state complied with the Interim Plan (Yellowstone National Park 1996). The agencies were directed to follow a revision of the 1992 Interim Plan, developed as an Environmental Assessment (EA).⁴ The agencies had to revise the EA and the Interim Plan to protect

³ This account of the DOL is based on an interview with Arnold Gertonson, September 24, 1998.

⁴ An Environmental Assessment, a cursory analysis of the potential environmental and social effects of a proposed government action, is often completed to determine the necessity of completing a full Environmental Impact Statement.

livestock through “additional bison management,” to limit bison mortality, and to allow themselves more time to prepare an EIS for a long-term plan.⁵ In effect, this formalized the policy, initiated in 1984-85, of controlling bison that leave the Park by lethal means. The agreement specified that the National Park Service, the U.S. Forest Service, and the state of Montana co-lead an EIS in cooperation with APHIS. It also gave DOL the power to decide which bison can enter Montana. In effect, this consolidated control over the development and implementation of policy.

In December 1995, the agencies released a draft EA and Interim Plan (Yellowstone National Park 1996). It directed the agencies “to provide spatial and seasonal separation of bison and domestic cattle in order to maintain Montana’s brucellosis class-free status, while permitting the bison herd within the park to fluctuate, to the maximum extent possible, in response to natural ecological processes” (National Park Service and State of Montana 1996: 1). The agencies received 260 comments from state and federal agencies, Native American tribes, organizations, and individuals (National Park Service and State of Montana 1996). A member of the 1991 Bison Citizen’s Group remarked that “a lot of politics and positioning has occurred...and are driving...interests apart” (Souvigney 1997). Much of the controversy centered on the allowance of capture facilities inside Park boundaries for the first time, indicating the Park’s acceptance of more responsibility for protecting livestock through control of bison, and changes in the Park’s conception of allowable (or perhaps necessary) actions under its own natural regulation policy. Respondents complained that the low risk of brucellosis

⁵ *Settlement Agreement.*

transmission did not warrant capture facilities and test and slaughter for bison, and that approval of a capture facility within Park boundaries grants DOL authority within the Park (Angell 1999a). Furthermore, blood tests for brucellosis in live bison cannot distinguish between infection and resistance to brucellosis. Tissue samples, which can be taken only from dead bison, are necessary to determine if an animal is infected. Respondents also complained that the Plan omitted consideration of tribes, did not provide adequate compensation for agricultural interests, and used capture and slaughter of wildlife in all alternatives. Despite public opposition, the National Park Service approved the Plan in 1996 (Finley and Mak 1996).

Like the Fund for Animals in 1991 and Governor Racicot in 1995, organizations that felt excluded from the decision-making process sought to change policy decisions through the courts. In particular, they sued to halt the application of the 1996 Interim Plan.⁶ They argued that a slaughtering program *inside the Park* violates the National Park Service Organic Act which requires protection of Park wildlife. They also argued that it

⁶ The plaintiffs included the Intertribal Bison Cooperative, Defenders of Wildlife, the Greater Yellowstone Coalition, the Jackson Hole Alliance for Responsible Planning (now Jackson Hole Conservation Alliance), and David A. Ritchie. Defendants included Bruce Babbitt as Secretary of Interior, Dennis Galvin as Acting Deputy Director of the National Park Service, Michael Finley as Superintendent of Yellowstone National Park, Daniel Glickman as Secretary of Agriculture, Michael Dombeck as Chief of the U.S. Forest Service, Terry Medley as Administrator of APHIS, Marc Racicot as Governor of Montana, Laurence Peterson as Executive Officer of the Montana Department of Livestock, Patrick J. Graham as Director of Montana Fish, Wildlife, and Parks, and the Montana State Department of Fish, Wildlife, and Parks. Two separate lawsuits were filed, both to initiate an injunction against killing bison until the completion of an EIS. Both lawsuits were lost by the plaintiffs, and the two cases were combined for the judge to rule on the merits of the cases (Interview with Jeanne-Marie Souvigney, May 10, 1999, Bozeman, MT).

could have negative environmental consequences, thereby violating NEPA. Judge Lovell heard the case and ruled in favor of the defendants. This was not surprising, because he presided over the 1995 Settlement Agreement directing the agencies to follow the Interim Plan. The plaintiffs appealed the ruling. In May, 1999, the 9th Circuit Court of Appeals issued a one-sentence judgment upholding Lovell's "reasonable" ruling (Angell 1999b).

Tension over bison management peaked in the winter of 1996-97. That year, bison faced the most severe snow and ice conditions in the Park since 1943, forcing them to migrate to lower elevations outside the Park for forage (Peacock 1997). State and park officials shot 1,084 bison between November 1996 and April 1997 (National Park Service, State of Montana et al. 1998). A capture facility was operated *within* the Park near the northern entrance. Another 300-400 bison died in the Park from the harsh winter conditions. Some management actions that winter deviated from the 1996 Interim Plan. Heavy snows prevented the use of a proposed trapping facility outside Yellowstone's western boundary, so the DOL established a shoot-to-kill policy there. On the northern boundary, the 1996 Interim Plan proposed capturing and sending to slaughter all bison approaching the border. As increasing numbers of bison approached the border, the Park began testing bison and sending only test-positive bison to slaughter, in order to minimize bison deaths (National Park Service, State of Montana et al. 1998). These deviations from written policy underscore the DOL's interest in killing bison to protect ranchers, and the Park's interest in minimizing lethal control of bison.

These events provoked a national public outcry. Thousands of newspapers, magazines, and television and radio stations covered the shootings, reporting bloody scenes at the capture facilities and the sale of stacks of bison heads, hides, and meat

(Anonymous 1997a). People once again compared the killings to the nineteenth century slaughter. Citizens, livestock interests, conservation groups, and others wrote letters to the Park. State veterinarians in Alabama and Oregon placed restrictions on cattle from states around Yellowstone. The national publicity complicated the issue by involving members of more agencies and higher-level officials.

Top officials felt they needed to provide at least an appearance of making changes. Meetings occurred among officials in Washington, D.C., including Interior Secretary Bruce Babbitt and Agriculture Secretary Dan Glickman (Anonymous 1997b, Sahagun 1997, Wilkinson 1997d). Montana Governor Racicot met with President Clinton. Senior administration officials, including Secretary Babbitt, discussed the issue with Montana's Congressional delegation (Anonymous 1997b). Proposals from these talks met with criticism from all sides. In addition, the White House Council on Environmental Quality (CEQ) initiated meetings, dubbed "the federal family" meetings, to coordinate officials from the Washington offices of the National Park Service, the U.S. Forest Service, and APHIS. All of this once again was restricted to interactions among agency officials.

Frustrated by the agencies' handling of the issue and believing their interests were not being addressed, a group of ranchers, conservationists, and hunters in Jackson Hole, Wyoming⁷ wrote a letter to the Clinton administration in January 1997, in the midst of the crisis. They requested that APHIS stop threatening to downgrade the state's brucellosis-

⁷ In Jackson Hole, Wyoming, cattle and wild bison intermingle in Grand Teton National Park, adjacent to Yellowstone National Park on its southern border.

free status. They noted that ranchers in Jackson Hole had been running cattle next to bison for over thirty years with no outbreaks of brucellosis. They concluded that the risk of transmission is low and that cattle vaccination combined with separation of cattle and bison makes the risk almost zero. The real risk, they said, “are the proposals originating from and/or driven by APHIS and the unfounded premise that brucellosis poses a real threat to man and beast” (Jackson Area Ranchers, Camenzind et al. 1997). They urged the officials to “recognize the common ground which exists” and to “concentrate your management efforts on non-lethal and non-invasive methods of minimizing that already insignificant risk of disease transmission rather than concentrating on the eradication of brucellosis via the lethal and costly methods now being proposed” (Jackson Area Ranchers, Camenzind et al. 1997). APHIS’s most direct response was to force Wyoming ranchers to submit to a station review of their brucellosis control measures. The review involved thousands of dollars in brucellosis-testing costs for Wyoming ranchers. However, in February 1997, APHIS did respond positively to pressure from other federal agencies and the federal family meetings. It acknowledged that a state’s brucellosis-free status cannot be revoked unless there is an uncontrolled outbreak of brucellosis. In other words, the mere presence of bison with brucellosis was no longer adequate grounds for APHIS to threaten or penalize a state’s livestock industry. Nevertheless, Montana officials continued to haze, shoot, or capture and slaughter virtually all bison crossing into Montana (Peacock 1997).

In February 1998, APHIS scientists developed a definition of low-risk bison in response to public pressure, the federal family meetings, and a request from DOL director Larry Peterson. The definition, accepted by all federal agencies, identifies as low-risk

those bison that cannot emit birthing materials containing the organism that causes brucellosis.⁸ The low-risk definition also endorses temporal separation of bison and cattle, because transmission can only occur if they come into contact (McMillion 1998, Smith and Roffe 1992, Thorne 1998). The U.S. Forest Service altered cattle grazing allotments to give the Montana state veterinarian authority to prevent cattle from entering allotments until 30-60 days after bison return to the Park for the summer, minimizing the potential for contact. These alternatives, according to Patrick Collins, Director of Legislative and Public Affairs at APHIS, “protect Montana...and minimize the need for lethal control of bison” (Collins 1999). Nevertheless, Montana state veterinarian Arnold Gertonson wrote to APHIS and to other state veterinarians rejecting the definition (Gertonson 1998a, Gertonson 1998b) because other states could still place sanctions on Montana cattle, even with a brucellosis-free status for Montana (McMillion 1999). In response to Gertonson, APHIS officials reported they had pressured veterinarians from other states to lift sanctions on Montana cattle, sanctions which had no scientific or legal basis.

On June 5, 1998, Yellowstone National Park, the state of Montana, and the U.S. Forest Service finally released the Draft EIS and Interagency Bison Management Plan for public comment (Fay 1998). Most of the strategies de-emphasize risk management in favor of handling and manipulating bison rather than cattle, and moving towards zero-tolerance for test-positive bison. For example, all alternatives call for more research and

⁸ Low-risk animals include bulls, yearlings, calves, and cows that have live calves and which passed all birth membranes. (R. M. Nervig and Carl Bausch, “Letter to Joan Arnoldi regarding Low Risk Bison,” October 17, 1997. This letter can be found on p. 369 of the 1998 Draft EIS.)

the development of a vaccine for female bison to reach the objective of “the eventual elimination of brucellosis in bison”; however, vaccination for cattle is only encouraged in each of the seven alternatives (National Park Service, State of Montana et al. 1998, Table 9: 113). All alternatives include boundary control by agencies and capture and testing, with provisions to slaughter infected animals and to give uninfected animals to tribes or put them on public lands. All but one of the seven proposed alternatives would establish Special Management Areas where the bison exit north and west of the Park, with varying degrees of tolerance for bison. The agencies propose to keep the bison population between 1,700 and 2,500 animals, to increase killings as the number approaches 2,500, and to minimize lethal strategies as the number approaches 1,700. These numbers are not explicitly justified by scientific studies or by practical experience. The preferred alternative also provides for limited public hunting.

The interagency agreement on the Draft EIS and the long-term plan was only temporary, however. By December 1999, the federal agencies wanted to revise them to “allow for tolerance of bison outside the Park as opposed to unnecessary killing of bison” (Under Secretary for Marketing and Regulatory Programs of the Department of Agriculture, Under Secretary for Natural Resources and Environment of the Department of Agriculture et al. 1999: 1). They also wanted to withdraw from the 1992 Memorandum of Understanding (MOU) that formalized interagency negotiations on a long-term bison management plan, and to proceed without Montana in issuing a Final EIS. In justification for this action, the federal agencies cited Montana’s “unreasonable objections” (Under Secretary for Marketing and Regulatory Programs of the Department of Agriculture, Under Secretary for Natural Resources and Environment of the Department of

Agriculture et al. 1999: 1) to the federal proposal. Once again the agencies returned to Judge Lovell's court to settle the dispute. While federal agencies retain legal authority to terminate the MOU, they nevertheless agreed to meet a request by Judge Lovell and continued negotiations for seven more months. They finally produced a Record of Decision and Joint Management Plan one year later, signed by officials from the U.S. Forest Service, the Department of Interior, the U.S. Animal and Plant Health Inspection Service, and the State of Montana (Anonymous 2000; U.S. Department of Interior and U.S. Department of Agriculture 2000). The agencies state that the plan "is not intended to be a brucellosis eradication plan," but it "sets forth actions to address brucellosis within the bison herd" (U.S. Department of Interior and U.S. Department of Agriculture 2000: 21). The plan requires hazing, capture, testing, and lethal control of bison, sets herd limits for bison, and requires vaccination of cattle grazing next to Yellowstone's borders. It also sets a longer-term goal of vaccinating the Yellowstone bison herd against brucellosis using a remote delivery system.

Policy Appraisals

Looking back over roughly a decade and a half of bison management in greater Yellowstone, it is difficult to argue that the common interest has been served. Few of those directly involved have been satisfied with the decisions of the courts or agency officials. There have been repeated public protests, acts of civil disobedience, and demonstrations, including a Native American spiritual journey to Yellowstone in honor of

the buffalo. There have been at least twelve lawsuits.⁹ Over 47,000 of the 67,000 public comments on the Draft EIS supported a Citizen's Plan to Save Yellowstone Bison over the agencies' alternatives. Four other non-official plans were proposed, in addition to the Citizen's Plan: Plan B from the Alliance for the Wild Rockies; the Bison Alternative from the Fund for Animals; the U.S. Animal Health Association Alternative; and Alternative 8 from the Fort Belknap Indian Community Tribal Government (Greystone 1999). And while a Record of Decision (ROD) has been reached among agencies, public controversy over the Joint Management Plan outlined in the ROD continues. These are among the major indicators of widespread frustration with bison management in Greater Yellowstone. Consider some of the details.

Conservationists and others argue that intensive management techniques prescribed in the 2000 Joint Management Plan--hazing, baiting, capturing, testing, and slaughtering bison--are not suitable for managing a "wild, free-roaming herd" (Greystone 1999). Moreover, the goal of maintaining a wild herd is incompatible with the goal of

⁹ These lawsuits include one filed in 1985 by the Fund For Animals (the Fund) to force the Park to prevent bison migrations; one in 1989 by the Parker Land & Cattle Company seeking compensation from the Park for allowing wildlife infected with brucellosis to wander out of Park boundaries and infect its herds (a claim never proved); one in 1990 by the Fund to prevent the killing of bison that migrate out of the Park and an appeal; another in 1991 by the Fund to halt the killing; one in 1993 by the Fund against the U.S. Department of Agriculture for failing to assess the environmental impacts of using bison in a brucellosis transmission study; one in 1995 filed by the State of Montana against the Park and APHIS; one in 1996 and another in 1997 by a group of conservation and tribal organizations to halt the implementation of the Interim Plan; one in 1996 by the National Wildlife Federation to obtain information about brucellosis control from APHIS; one in 1997 by the Fund to halt the implementation of the Jackson Bison Management Plan; and one in 1998 by the state of Wyoming to allow wardens from the Wyoming Game and Fish Department to vaccinate elk and bison on the National Elk Refuge.

eradicating brucellosis from wildlife through these intensive techniques. Blood tests are unreliable because a test-positive result may indicate either resistance to brucellosis or infection by it. No safe, effective vaccine currently exists to protect test-negative bison from contracting brucellosis. And not all bison or the thousands of elk in the area can be rounded up for testing and vaccination. Intensive management techniques also fail to meet the goal of protecting the livestock industry. Among other things, they maintain the perception that brucellosis in bison is reason enough for other states and countries to impose sanctions on Montana cattle, rather than focusing attention on the industry's success in eradicating the disease from cattle in the state. The intensive management techniques divert resources from more serious threats to the livestock industry.

These intensive techniques are employed despite evidence that the risk of transmission remains minimal, even with increased bison migrations. Only one study shows brucellosis transmission from bison to cattle, but it was conducted in an artificial, highly controlled setting (Davis, Templeton et al. 1990). Many dispute the relevance of the study and argue that there have been no documented cases of brucellosis transmission from bison to cattle in the wild. Ranchers in Jackson Hole cite the thirty years they have grazed cattle near bison, with no outbreaks of brucellosis, as evidence of minimal risk. As further evidence of minimal risk, others cite no outbreaks of brucellosis after the intermingling of cattle and bison outside the Park following the fires of 1988 (Souvigney 1999). The only known method of transmission is through birthing materials. Yet the DOL plans to continue to capture, test, and kill bull bison and other bison that cannot possibly emit birthing materials. Additionally, bison migrate out of the Park in large numbers mostly in the winter, when snow covers forage in the Park. The majority of

ranchers do not graze their cattle outside the Park in the winter.

The economic stakes involved in transmission are rather small, although this too is disputed. Only about fourteen ranchers graze about 2000 head of cattle near Park borders. About 45% of those 2000 head graze on public land, generating total revenue of only \$5000 per year for the U.S. Forest Service. Service (American Buffalo Foundation, Defenders of Wildlife et al. 1998). Hope Sieck, associate program director the Greater Yellowstone Coalition, expressed concern over the millions of dollars expended for these few cattle and little revenue (Farquhar 2001). Despite such concerns, the high expenditures are likely to continue under the 2000 Joint Management Plan. The counter argument is that brucellosis can decrease the marketability of all cattle in Greater Yellowstone. Therefore, claimed former state veterinarian Clarence Siroky, “any discussion of brucellosis...must include the total inventory and economic value as well as the value of infrastructure of the cattle industry in Idaho, Montana, and Wyoming (Siroky 1996). The total inventory was valued at \$773 million (Hagenbarth, Rath et al. 1997). While maintaining the economic health of the livestock industry is a valid interest of ranchers, it is not necessary to eradicate brucellosis from bison to do so. More important than the “correct” numbers, the dispute signals a lack of trust among participants, an inability to reconcile their differences, and the intense threat ranchers feel to their livelihood -- all of which intensify debate and complicate the search for their common interest.

Livestock and other interests argue that important underlying issues are left out of the Draft EIS and final Record of Decision. The Park’s policy of natural regulation is one of them. A Montana rancher said, “I’m not a proponent of culling but they at least need to

address it and work with the surrounding states if they don't want to cull in the Park" (Severin 1998). Hagenbarth Livestock stated, "the 'natural regulation' management policy practiced by YNP does not exempt them from their responsibility of being a good neighbor" (Greystone 1999). Clarence Siroky, the Montana state veterinarian, said, "the impact upon Montana, Wyoming and Idaho was never figured as part of the 'natural' equation" (Satchell 1996). Wyoming Governor Jim Geringer and Agriculture Director Rob Micheli see overpopulation of wildlife and failure to vaccinate them as problems (Urbigkit 1997). DOL officials feel the "laissez-faire [natural regulation] philosophy" results in populations of bison and elk that are too high (Hutchinson 1997). Native American groups also argue that the idea of self-regulated wildlife populations diminishes the importance of hunting by the Bannock, Nez Perce, and other tribes for centuries in and around the Park (Holt 1999). "Natural" processes of regulation included humans (Wells-Norlin 1999). Supporters of natural regulation point out that the policy does not prohibit culling outside the Park. Whether or not one believes the natural regulation policy to be ecologically sound, it is controversial.

These persistent controversies are costly in various ways. DOL's involvement in bison management, including hazing, testing, and slaughtering, cost it about \$95,000 through mid-February 1999 of that fiscal year. This is a substantial fraction of DOL's annual expenditures. The U. S. Department of Agriculture also approved \$225,000 in federal funds to operate the capture facility.¹⁰ The Park Service has paid for personnel to

¹⁰ The DOL spent \$162,425 in FY 1998, and \$369,648 in FY 1996 and 1997. These figures are contained in Robert S. Tallerico, Letter from Robert S. Tallerico, Associate Fiscal Analyst to Rep. Bob Raney regarding bison control funding, Montana Legislative Branch, October 5, 1998, and George H.

assist in killing bison, to operate a capture facility in Park borders, and for preparation of the Draft EIS. Under the 2000 Joint Management Plan, it plans to continue paying for such intensive management techniques as capture and testing. The station review by APHIS in Wyoming cost ranchers thousands of dollars for testing. Lawsuits filed by livestock groups, states, conservation groups, tribes, animal rights groups, landowners, and agencies were all expensive, and they continue to contribute to the polarized atmosphere. The controversies also drain another precious resource, human energy. Personnel burnout and turnover, high levels of frustration, and feelings of powerlessness and mistrust among nearly all participants are among the results of the contentious atmosphere. Less obvious long-term costs should be considered as well. For example, mistrust will make it more difficult to find common-interest solutions to problems within and outside bison management in the future.

Mistrust and narrow identifications among agency officials may have been ameliorated somewhat by interagency efforts such as the Greater Yellowstone Interagency Brucellosis Committee, the “federal family” meetings in Washington, and repeated interagency EAs and EISs (Philo 1998). However, these interagency efforts give an appearance of coordination that is misleading. Agency officials often remain loyal to agency mandates that contribute more to gridlock than to finding common ground. In addition, different agencies continue to pursue their own policies in bison management, with the Montana DOL and state veterinarian holding predominant power. DOL

Harris, “Bison Fiscal Report FY 1999 to Date: Montana Department of Livestock,” Centralized Services Division, February 16, 1999.

continues to operate under its own definition of the risk of transmission, and to haze, shoot, or capture and test all bison that roam into Montana. The Park made some concessions to intensive management within its borders, but continues to prefer its natural regulation policy. APHIS has made some concessions on the definition of risk and on sanctions. But on the whole, it is difficult to see enough movement toward common ground to justify the interagency efforts. Meanwhile, members of the public who expect to influence bison management through the interagency EIS process have been disappointed if not alienated. The EIS process involves citizens in principle, but in practice the agencies seldom incorporate citizen input from the official public comment period into official management alternatives. The expectation has developed that lawsuits are an inherent part of the EIS process, no matter what the official decisions. This expectation, based on experience, reduces the incentive to incorporate citizen input.

Formal assessments have done little to improve the decision-making process in bison management because they have focused on technical or scientific issues, and given little attention to the political issues. Interior Secretary Babbitt commissioned a study of brucellosis by the National Research Council (NRC) in 1997. U.S. Senator Alan Cranston commissioned a study of the transmission of brucellosis from bison and elk to cattle by the U.S. General Accounting Office (GAO) in 1992. In 1997, the Subcommittee on National Parks, Historic Preservation and Recreation of the Senate Committee on Energy and Natural Resources commissioned a similar study from the GAO, which in turn called for more studies (U.S. General Accounting Office 1992). While such studies add information, any side in the political controversy typically can and often does use them selectively to reinforce its own prior policy positions, and not to reconsider them. For

example, the NRC study in 1997 concluded that “neither sufficient information nor technical capability is available to implement a brucellosis eradication program in the [Greater Yellowstone Area]” (Cheville and McCullough 1998: 7). Two pages later, it also concluded that “it is likely that brucellosis can be eliminated from (Yellowstone National Park) without loss of large numbers of bison or loss of genetic diversity” (Cheville and McCullough 1998: 9). Calls for more scientific studies continue. But the state of Montana found existing knowledge adequate to pressure APHIS into withdrawing threats to downgrade the state’s brucellosis-free status; and later APHIS found existing knowledge adequate to urge other states to withdraw sanctions from Montana’s cattle. These were political accomplishments, not scientific ones, demonstrating the subordination of science to politics.

Some small success should not be overlooked. As noted above, Montana officials and later APHIS officials have helped protect the Montana livestock industry by reducing the threat to downgrade the state’s brucellosis-free status and reducing the threat of sanctions imposed by other states. Ranchers have succeeded in protecting their herds from brucellosis, amidst various government actions and inaction. The lack of transmission of brucellosis in Jackson Hole, despite intermingling of bison to cattle, indicates the effectiveness of prudent ranching practices, including vaccination. It also indicates the limited potential for transmission, especially in winter. Moreover, citizens groups have invested some time and other resources in finding common ground, especially the 1991 Bison Management Citizen’s Working Group in Bozeman and the coalition of ranchers, conservationists, and hunters in Jackson Hole in 1997. In addition, the 1998 Citizen’s Plan to Save Yellowstone Bison was endorsed over the interagency

alternatives in a super-majority of public responses to the Draft EIS

Structures of Governance

Fragmented structures of governance in large part account for the failure to clarify and secure the common interest through a long-term bison management policy. Officials tend to serve their own agency's specialized mandates, policies, and other interests as if these were the equivalent of the common interest. If they do not, they may be subject to penalties. Consequently, each agency with partial jurisdiction over bison management tends to come into conflict with the other agencies and with various interest groups in the private sector. Interactions among them are loosely organized through the EA and EIS processes established by National Environmental Policy Act (NEPA). However, the political power necessary to force an integration of these various interests into policy that advances the common interest either does not exist or has not been used to any significant extent in a decade and a half.¹¹ Thus Montana does not accept APHIS's definition of low-risk bison; the federal government has not imposed it on Montana; and no government has banished critical interest groups from the arena. This section reviews the major agencies and groups involved in the fragmented structure of governance, including various attempts to coordinate them. It begins with Montana, turns to the federal family of agencies in Washington, and concludes with groups in the private sector.

The DOL and allied veterinarians hold predominant power over bison management in the state of Montana. The Montana Board of Livestock formulates policy

¹¹ This state of affairs has been called "collective administrative anarchy" in Arnold Rogow and Harold Lasswell, *Power, Corruption, and Rectitude* (Englewood Cliffs, NJ: Prentice-Hall, 1963), p. 23.

for the DOL, directs its operations, and hires both the executive director of the DOL and the state veterinarian. The seven-member Board is appointed by the governor, and includes producers of livestock, swine, dairy cattle, sheep, and game. Veterinarians act as advisers to the Board of Livestock, the DOL, and ranchers, much as conservationists rely on natural scientists as advisers (Campbell 1998). Veterinarians have experienced “a high degree of frustration.” according to former Montana state veterinarian Clarence Siroky, because “their authority does not extend to within park boundaries, the source of infection” (Siroky 1996). Greater Yellowstone “represents the last foci of brucellosis in the intermountain region” and “the State Veterinarians and the livestock industries in all 50 states are committed to eradication of brucellosis” (Siroky 1996). Veterinarians in other states have threatened sanctions against Montana cattle and encouraged APHIS to revoke the state’s brucellosis--free status. Montana rationalizes its zero-tolerance for infected bison as necessary to avoid such sanctions. Montana also refuses to approve bison management proposals that are unacceptable to the state veterinarians and the USAHA.

Whatever the intent of Montana officials, it should not be assumed that the policies of Montana veterinarians and the DOL do in fact “protect the health and well-being of the livestock industry and economic well-being of ranchers” as mandated. Whatever else a policy to eradicate brucellosis from bison may do, it harms the Montana livestock industry by focusing attention on the brucellosis issue and inflating the perception of risk among potential buyers outside the state. It also costs the Montana ranchers who fund the DOL about \$100,000 annually. Moreover, it should not be assumed that progress of the policy to eradicate brucellosis from cattle can be

extrapolated to wildlife. The eradication of brucellosis from wildlife is a different matter biologically, given the lack of an effective vaccine for bison and the presence of brucellosis in tens of thousands of elk as well as bison (Cheville and McCullough 1998). It is also a different matter politically so long as citizens in large numbers do not regard elk, bison, and other wildlife as livestock, and protest their killing in large numbers.

The Greater Yellowstone Interagency Brucellosis Committee (GYIBC) was created in 1990 after a task force of cattlemen, sportsmen, and representatives of state agencies “recognized that eradication of brucellosis in the GYA was desirable” and recommended it (Greater Yellowstone Interagency Brucellosis Committee 1997). Missing from task force discussions were conservationists, federal agencies, tribal representatives, and landowners. The goal was “to fulfill the needs of state agencies relative to brucellosis in wildlife” (Greater Yellowstone Interagency Brucellosis Committee 1997: 1). Evidently, the needs of other groups, public and private, with respect to related issues were relatively insignificant to the task force, if considered at all. In 1995, the governors of Wyoming, Idaho, and Montana and U.S. Secretaries of Interior and Agriculture signed the Memorandum of Understanding that established the GYIBC.

All agencies that have some jurisdiction in bison management now have voting representatives on the GYIBC Executive Committee. Included are the directors of the state wildlife agencies of Montana, Wyoming, and Idaho; state veterinarians or directors of agriculture for the three states; the Wyoming State Director of the Bureau of Land Management; one regional forester from the U.S. Forest Service; the Region 6 Director of the U.S. Fish and Wildlife Service; the Director of the Rocky Mountain Region of the National Park Service; and a designated representative of APHIS. Non-voting members

include representatives of the National Biological Service and Agricultural Research Service.¹² The GYIBC's official goal is the eradication of brucellosis from greater Yellowstone by the year 2010. Taken seriously, the official goal presumes that the necessary technology, funds, and political support now lacking will become available. The GYIBC was originally conceived as a means of coordinating the planning and implementation of policies relevant to the official goal. Instead it has become a means of coordinating information on brucellosis and keeping member agencies informed of related issues that may arise.¹³

GYIBC's policy is to leave its meetings open to the public, but to exclude representatives of the public from the Committee itself. The agencies have concluded that the Federal Advisory Committee Act (FACA) prohibits a public representative (Terrell 1998). Most meetings include an opportunity for members of the public to make comments. However, the comment period occurs at the end of meetings, when many GYIBC members are leaving and attention is dwindling. The effective exclusion of citizens was evident during a GYIBC meeting in May, 1999. The governors of Montana, Wyoming, and Idaho and Assistant Secretary of Interior Don Berry attended to discuss future strategies and possibly expanding the role of the GYIBC to include policy recommendations and implementation. Members of the public also attended, but were

¹² This information can be found in Jim Geringer, Phillip E. Batt, et al., *Memorandum of Understanding Creating the Greater Yellowstone Interagency Brucellosis Committee* (Wyoming, Idaho, Montana: U.S. Department of Interior, U.S. Department of Agriculture, 1995).

¹³ From author's notes at the GYIBC meeting, September 17, 1998, Gardiner, MT.

prevented from asking questions or making comments before the officials left.¹⁴

The GYIBC has not moved the policy process much closer to finding common-interest solutions. This is not surprising in view of the rather exclusive membership, official goal, lack of resources, and policy regarding public participation, as well as policy differences among its members. As its name implies, the GYIBC institutionalizes brucellosis as the main problem if not the only one, and suggests that only the agencies are authorized or otherwise competent to find a solution. Thus the GYIBC helps institutionalize conflict with groups in the private sector who perceive problems besides brucellosis and solutions that address underlying issues, and have enough at stake to participate. These groups include, ironically, the ranchers and others in Jackson Hole who considered the threat of over-regulation the problem, and advocated the vaccination of cattle and their separation from wildlife as low intensity management solutions that had already worked.

At the federal level, the White House Council on Environmental Quality became involved to coordinate the “federal family” after the shooting of more than a thousand bison in 1997. Weekly meetings occurred for several years among federal officials and scientists in the Washington offices of APHIS and the U.S. Forest Service, both in the Department of Agriculture, and the National Park Service in the Department of Interior. The meetings gave the agencies an “opportunity to talk about ways to get away from the 30 years of bad history” on this issue (Collins 1999). The federal family meetings have led to changes in APHIS. APHIS veterinarians maintain a “disease control perspective”

¹⁴ Author's notes, GYIBC meeting, May 19, 1999, Jackson, Wyoming.

(Collins 1999) and were once viewed as villains in this issue. Partially as a result of the federal family meetings, APHIS withdrew threats of sanctions in the absence of a brucellosis outbreak, and developed the low-risk definition for bison. Also in part as a result of these meetings, the USFS altered grazing allotments to allow for temporal separation of cattle and bison. However, the USFS maintains a low-key role in the process because it is mandated to maintain habitat, not to manage wildlife (Cherry 1999). As discussed above, the federal policy changes have resulted in little change in practice because Montana rejects them and maintains control over bison management in Greater Yellowstone.

Similarly, other efforts to coordinate have made little difference in practice. Officials involved in bison management in Washington circulate interoffice memos and meet and converse informally (Berkley 1999). Western governors and members of Congress pressure federal officials, typically on behalf of livestock interests in their states. Top officials such as Governor Racicot and President Clinton and Secretaries of the Interior and Agriculture met sporadically. Insofar as such efforts take place behind closed doors, they make it difficult for outsiders to determine who might be held accountable for the lack of coordination. Finally, as noted above, the EIS process has done more to polarize the issues between public agencies and private interest groups than to move policy closer to a common-interest solution. Frustrated by interagency bison management alternatives, and effectively excluded from the structures through which those alternatives are devised, private interest groups seek other means to make a difference in bison management policy. Lawsuits are an obvious choice, since there are plausible grounds in law for almost any interest group with enough funds to challenge

official decisions. Whatever the courts may decide in the particular case, they exclude non-litigants who nevertheless have an important stake in the issue, and they provide little room for integrating or balancing the competing claims of litigants. In one case, as noted above, the court assumed authority and considerable control to oversee the revision and implementation of Interim Plans. Interest groups and officials have also appealed to legislators, state and federal, for legislation on the issue. For example, in 1995, the Montana state legislature transferred to the DOL authority over bison that are exposed to brucellosis and enter Montana (Montana State Legislature 1995). Also in 1995, Senator Burns of Montana introduced a bill to require the National Park Service to eradicate brucellosis from Yellowstone bison. The bill proposed testing, culling, vaccination, and relocation of bison as well as keeping their numbers below the “optimum population” (U.S. Congress 1995). The bill was not passed. Livestock groups in particular have been able to secure some of their interests through legislatures or the courts, but this is not equivalent to securing the common interest.

The Bison Management Citizen’s Working Group in Bozeman was an attempt to clarify and secure the common interest in 1991. It is worth recapping here the structure and outcome of this and other community groups’ efforts to contrast it with the agency-led initiatives described above. The Group included a local rancher, a member of the Montana Wildlife Federation, a member of the Greater Yellowstone Association of Conservation Districts (a now-defunct livestock group), members of the Wilderness Society and the Greater Yellowstone Coalition, retired employees from the Montana DFWP and the USFS, and a local landowner. Agency officials from DFWP, APHIS, Yellowstone National Park, and the USFS served as technical advisors; a member of a

tribal organization was also consulted. The Group attempted to be inclusive of the interests involved, which is consistent with the procedural test of the common interest. However, the group's ground rules excluded any party that demanded zero-tolerance for any bison outside the Park or zero-tolerance for any lethal control of bison. In other words, extreme positions were not tolerated. Animal rights groups elected not to join the group under these ground rules. The Group met once a week from March to May in 1991 to develop a plan for bison management, with the intent of "satisfying diverse interests and management perspectives" (Ragsdale, Richard et al. 1991).

The members were able to work through their policy differences to agree on a plan for submission to agency officials. When all members signed off on the plan, the plan passed the substantive test of the common interest. The objectives of the plan were "to maintain a self-sustaining population of wild bison within Yellowstone; to protect local livestock by reducing the potential for transmission of *Brucella abortus* [the organism causing brucellosis]; and to reduce the potential for bison-human conflict and property damage caused by bison outside the park" (Souvigney 1997). The plan called for tolerance of bison on land outside the Park, but allowed for trapping, testing, and transportation of migrating brucellosis-free bison to tribal lands, other public lands, and back into the Park. It left some flexibility for the agencies to work out the details. The plan addressed the demands of participants to protect ranchers, bison, and landowners, but not the zero-tolerance demands of non-participants. The plan remains a good start toward a common interest solution, one that minimizes the potential for transmission of brucellosis while protecting the wildness of the Yellowstone bison and allowing for control of any bison that cause property damage or endanger human safety. But the plan

cannot pass the practical test of the common interest unless it is implemented by the agencies.

Citizens in Jackson Hole also attempted to clarify and secure the common interest in 1997. They included Jackson area ranchers, the Executive Directors of the Jackson Hole Conservation Alliance and the Greater Yellowstone Coalition, and the President of the Wyoming Wildlife Federation, a hunting organization. As previously noted, they drafted a letter together and sent it to President Clinton, Secretary of Interior Bruce Babbitt, Secretary of Agriculture Dan Glickman, and Governor Geringer of Wyoming. They wrote, “While we share your concern for protecting the ‘Brucellosis Free Status’ of Wyoming, we think it is secure now because there is no recent history of brucellosis transmission from wildlife to cattle in Teton, Park and Sublette counties and because the ranchers in this area protect their cattle through vaccinations.” They also wrote that the Wyoming Game and Fish Department has policies to keep elk off private cattle feedgrounds and would do the same for bison if the need arose, eliminating the potential for the transmission of disease. The letter recommended “non-lethal and non-invasive” techniques of control, but did not make detailed recommendations (beyond spatial separation and cattle vaccination), because the signatories believed the problem was adequately addressed through current management practices, at least in Wyoming. The techniques are less intensive than those recommended by the Citizen’s Working Group in Bozeman, but the objectives and techniques were otherwise similar. They acted in part to show that the Jackson community can resolve such issues without heavy-handed government intervention (Curlee 1998).

In a separate effort, citizens in Jackson also worked with area agencies to devise a

management plan for the bison herd in Jackson Hole, where circumstances are more challenging in some ways than in Montana.¹⁵ The Totem Studies Group formed about 1995 after citizens became frustrated with bison management in the area. The Group included unaffiliated citizens, conservationists, agency personnel, county commissioners, educators, Native Americans, members of the agricultural community, and scientists. Their goals included improving bison management in the common interest, and building relationships among community members (Curlee 1998). They engaged in face-to-face deliberations to overcome political differences within the EIS process. And they gained the support of agencies with the authority to implement a plan: Wyoming Game and Fish, the U.S. Fish and Wildlife Service in the National Elk Refuge, and the National Park Service in Grand Teton National Park. Portions of the Group's Jackson Hole Bison Management Plan were incorporated into the agency-led Environmental Assessment and Long-Term Plan. It called for risk management measures to prevent the transmission of brucellosis. Although participants in the Totem Studies Group recognized room for improvement in the Plan, they believed the working relationships and trust they had developed would allow adaptation and change as new needs and insights arose. Thus the Plan represented progress with respect to the procedural and substantive tests of the common interest, but not the practical test: The Fund for Animals successfully blocked implementation. The Group nevertheless helped change perceptions about citizen

¹⁵ Ranchers graze cattle next to bison in the Jackson Hole area, although they have not experienced infection in their herds. Jurisdiction is more complicated because bison migrate from Grand Teton National Park into the National Elk Refuge, which is administered by the U.S. Fish and Wildlife Service, in addition to national forest and private land. And finally, the elk in the refuge have a high rate of brucellosis infection because elk feeding grounds in Wyoming facilitate transmission of the disease among them.

participation within the U.S. Fish and Wildlife Service and Wyoming Game and Fish. For example, one official of Wyoming Game and Fish claimed his agency had a breakthrough when it recognized that early involvement by citizens can help agencies envision the common interest (Bohne 1998).

Private interest groups formed a coalition to develop the Citizen's Plan to Save Yellowstone Bison in Montana in 1998. The Citizen's Plan was submitted to the agencies during the NEPA process to provide an alternative to the interagency Draft EIS, to meet the demands of the coalition's sixteen conservation and tribal organizations and three businesses, and to protect Montana's cattle.¹⁶ The 1991 Citizen's Working Group and the 1998 coalition are not directly related, and the coalition was less inclusive. However, members of the coalition have cited the leadership abilities of Jeanne-Marie Souvigney, a member of the 1991 Citizen's Working Group, as one reason for the 1998 Plan (Catton 1999). Souvigney and others consulted with agency officials at all levels to develop the Plan. It received 47,599 endorsements in public comments on the interagency Draft EIS, in part due to efforts by the National Wildlife Federation and the Intertribal Bison Cooperative to promote it (Greystone 1999).¹⁷

¹⁶ The groups include: American Buffalo Foundation, Defenders of Wildlife, Gallatin Wildlife Association, Greater Yellowstone Coalition, Idaho Wildlife Federation, Intertribal Bison Cooperative, Jackson Hole Conservation Alliance, Montana Audubon, Montana River Action Network, Montana Wilderness Association, Montana Wildlife Federation, National Parks and Conservation Association, National Wildlife Federation, National Resources Defense Council, the Wilderness Society, Wyoming Wildlife Federation, Bench Ranch, Wyoming Wear, and Yellowstone Raft Company (Interview with Jeanne-Marie Souvigney, March 30, 1999).

¹⁷ Twenty-nine comments were also received opposing the plan.

The Citizen's Plan recommends Special Management Areas on public land where buffalo would roam with minimal intervention. It proposes a scientific determination of minimum and maximum herd size, using strategies such as live removal to tribal lands and a public hunt to manage the herd size. To ensure that only brucellosis-free animals would be relocated, the Plan recommends building a "pasture-type bison health certification facility" (American Buffalo Foundation, Defenders of Wildlife et al. 1998). It also recommends an interagency/tribal/public cooperative team composed of wildlife professionals to advise managers. It recommends changing the time or location of Forest Service grazing allotments to maintain separation of bison and cattle. The Plan would prohibit hazing or capture of bison on public lands absent of cattle, unless the herd's population exceeds the maximum. It recommends that Montana and other states accept the federal low-risk definition, addressing brucellosis in elk, encouraging ranchers near the Park to vaccinate their cattle, and making a land exchange outside of Yellowstone's northern border a priority.

The federal government is already implementing several of these alternatives. In August 1999, the federal government signed a land exchange deal with the Church Universal and Triumphant to secure 7,800 acres outside Yellowstone's northern boundary where bison migrate in search of winter forage. This land also provides habitat for elk, deer, antelope, bighorn sheep, wolves, and grizzly bears.¹⁸ The exchange allows for less lethal bison management options outside the Park. In addition, the Forest Service has

¹⁸ This information can be found on the Greater Yellowstone Coalition's web site. The address is <http://hosts2.in-tch.com/www.greateryellowstone.org/happened.html>.

already altered grazing allotments to allow the Montana state veterinarian to prohibit cattle from entering public land before bison return to the Park for the summer, thereby minimizing the risk of brucellosis transmission. Finally, APHIS has encouraged Montana to accept the federal low-risk definition. However, whether these changes make a difference will depend on the state of Montana, which retains control over the implementation of bison management policy in Montana. The indication from the Joint Management Plan in the Record of Decision is that not much will change in the coming years.

While the Citizen's Plan to Save Yellowstone Bison includes alternatives that may help achieve the goals of maintaining a free-roaming herd and protecting cattle, a number of important interest groups failed to sign off on it. Why? Attempts in 1998 to bring ranchers into the discussions failed, perhaps because the issue was so contentious and because major demands of livestock organizations, if not individual ranchers, were already being met (Souvigney 1999). Leaders of the livestock industry had little reason to come to the table. Since 1990-1991, when agencies began formal efforts to coordinate and the inclusive Citizen's Working Group formed in Bozeman, interests have polarized further and Montana has gained more control. The less inclusive 1998 Citizen's Plan was developed in a more contentious climate that tended to divide groups that were once closer together. However, no agency or interest group is monolithic. Within the agencies, conservation groups, livestock associations, tribes, hunting groups, and others are members still willing to meet with members of opposing groups in search of common ground. With more and better leadership they still might overcome the fragmented structure of governance and succeed.

Policy and Structural Alternatives

As previously noted, the goals of the Draft EIS are to “maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana” (National Park Service, State of Montana et al. 1998: i). This section recommends alternatives to meet these goals--first policy alternatives for minimizing the risk of brucellosis transmission to protect the livestock industry, then policy alternatives for protecting wild, free-ranging bison, and finally structural alternatives for governance. The structural alternatives have broader significance for natural resources policy in the American West.

Minimizing the risk of brucellosis transmission to protect the livestock industry is a valid and appropriate goal. It includes preventing other states from placing sanctions on Montana's cattle and preventing brucellosis from re-infecting Montana's cattle. The reduction of Montana's class-free status could cost the state's livestock industry as much as \$27 million for testing, according to an industry estimate (Hagenbarth, Rath et al. 1997). However, the attempt to eradicate brucellosis from wildlife will not assure Montana's class-free status or avoid sanctions. On the one hand, “total eradication of brucellosis as a goal is more a statement of principle than a workable program at present” (Cheville and McCullough 1998: 7). On the other hand, the attempt reinforces the perception that brucellosis in wildlife is a valid justification to impose sanctions. Given Montana's position in the fragmented structure of governance, it will take better leadership in Montana's state agencies and livestock industry to change the focus to risk management. The alternatives available include adoption of the federal definition of low-

risk bison, changes in Forest Service allotments to ensure separation of bison and cattle, and vaccination of cattle against brucellosis. Wyoming's experience is instructive. It has maintained its brucellosis-free status despite four outbreaks (Berger and Cain 1999). And the experience shows that containment depends upon how a producer handles an outbreak (Brady 1999a). For a state to lose its class-free status, an outbreak with undetermined origin must occur, it must be uncontrolled, and a second outbreak must occur (Gertonson 1999). APHIS officials cannot legally pull Montana's status if an outbreak occurs from infected bison, as long as it is handled appropriately. Better leadership could portray eradication of brucellosis from the state's *cattle* herds and management of the negligible risk of transmission as a success for Montana and its ranchers.

However, conflicts over the control of resources would remain even if brucellosis were completely eradicated. Many ranchers view bison migrations as another sign of their loss of control to an "environmental agenda." Livestock officials claim that before the passage of NEPA in 1969, "resource industries dominated the use of federal lands" (Hagenbarth, Rath et al. 1997: 158). Now the costs of grazing leases, restriction of private property rights, and multiple uses of national forests indicate a change in priorities on federal lands (Hagenbarth, Rath et al. 1997). Bison outside the Park also compete with cattle for forage. There is a feeling that "the economic importance of agriculture to rural counties in the western states is often not recognized" (Hagenbarth, Rath et al. 1997: 158). Few groups wish to see ranchers pushed off their land because of bison, but some believe that if Montana pushes for zero tolerance of bison, others will demand zero tolerance for ranchers on public land. A range war on public lands would likely result in loss of leasing rights for ranchers. Neither zero-tolerance for bison nor zero-tolerance for

grazing cattle on public lands is consistent with the common interest, but grazing by both bison and cattle can be accommodated.

Moreover, there are greater threats to the livestock industry than roaming bison. As of 1995, only four firms controlled 81 percent of the meatpacking industry (U.S. General Accounting Office 1997). This concentration of buying power enables the meatpacking industry to sustain artificially low prices paid to livestock producers. Large quantities of imported livestock, especially from Canada, are also of concern to producers (Anonymous 1999b). Discrepancies between U.S. and Canadian animal health inspection procedures--including brucellosis testing requirements on U.S. exports to Canada--are of particular concern (Peterson 1998). Finally, demand for beef products is declining. Ranchers' ability to absorb the costs of grazing leases, brucellosis vaccines and tests, and other costs of doing business in the West are related to the marketability of cattle and the prices paid for them.

To address more pressing threats to the industry, resources might be redirected from the eradication of brucellosis in wildlife toward risk management measures, and additional resources might be sought. For example, programs exist such as the U.S. Market Access Program or the Foreign Market Development Program which could be used to market U.S. beef as brucellosis-free (Hanrahan and Dunkley 1998). A portion of federal and state funds currently spent on an unworkable program to eradicate brucellosis from bison might be reserved to pay for additional testing, vaccination, and other costs associated with potential outbreaks. It would be cheaper to vaccinate the 2,000 head of cattle that might intermingle with bison than 100,000 head of wild bison and elk, especially since no safe, effective vaccine (or method of administering it) currently exists

for wildlife. The National Wildlife Federation also has offered to pay to vaccinate cattle around Yellowstone. Many ranchers near Yellowstone already do vaccinate cattle (Mead 1997). Vaccination of cattle is effective not only in preventing outbreaks of brucellosis, but also in giving control to those most directly affected by potential outbreaks--the ranchers.

Alternatives also exist to address the perceived risk of transmission, which is different from the actual risk. As previously noted, APHIS convinced other state veterinarians to lift unjustified sanctions against Montana cattle, and agreed to defend Montana against such sanctions in the future (Anonymous 1999a). APHIS has ensured in writing the continuation of these efforts. Under the Settlement Agreement, APHIS agreed not to downgrade the state's brucellosis-free status "based on the presence of bison migrating from YNP into Montana," if the state complies with the Interim Plan (Settlement Agreement 1995: 3). The Joint Management Plan also includes a statement that "implementation of the Joint Management Plan will not cause APHIS to downgrade Montana's brucellosis class-free status"(U.S. Department of Interior and U.S. Department of Agriculture 2000: 22). To further protect the class-free status of Montana cattle, APHIS could also provide written assurances that they will not pull Montana's status if a rancher handles an outbreak appropriately, and that APHIS will pressure other states to lift unjust sanctions.

Another major goal of bison management is to maintain a wild, free-roaming herd. The Park's natural regulation policy made some progress toward achieving this goal: Bison populations are up and bison are re-establishing their former ranges. However, maintaining the wildness of the herd will require attention to the unintended

consequences of the policy, including expansion of the political arena and the dispersion of control over bison management decisions beyond the Park Service. Some changes in the natural regulation policy are already occurring. The Park's practice of capturing and testing bison inside the Park and proposed population limits in the Draft EIS, for example, challenge the natural regulation policy (Hutchinson 1997). It is time to ask how these changes will affect the wildness of bison and how that wildness can be maintained while addressing the potential adverse consequences of natural regulation for other valid interests in the community. One zoologist suggests a need for an assessment of both ecological carrying capacity based on wildlife forage available, and "social carrying capacity" based on complaints arising from wildlife-human interaction but not necessarily measured (Camenzind 1998).

A recommendation to re-examine the natural regulation policy is not a recommendation to return to ranching in the Park. The public would not accept such a policy. A majority of the public accepts natural fluctuations in wildlife populations and differences in the standards appropriate for national parks and cattle ranges. Scientists support the idea of the Park as a baseline against which more intensively managed resources outside the Park can be compared (Ferrari 1999). However, assessments of the natural regulation policy have focused on its ecological effects inside the Park (Bishop, Schullery et al. 1997). Few assessments consider its social and political effects outside the Park. So establishing a population range might be appropriate now that bison populations have increased. Alternatives such as a Native American hunt and shipping calves to tribes and to other public lands are means to regulate bison populations that are consistent with current proposals. Some control of bison populations exercised within the Park might

sustain wildness better than capture of all bison that exit the Park. It might also return more control over bison management to the Park.

A reassessment of natural regulation might also address the misplaced faith in, and burden on, science to resolve policy differences over management policy. Many identify value conflicts as the root cause of “the problem” of policy differences, but then call for more science as the solution. But scientists apart from policy scientists are supposed to avoid policy differences in political arenas and values beyond science itself, and simply provide scientific information about physical, biological, and social phenomena. Thus while science can inform policy decisions, it cannot replace decision making (Ostrom, Burger et al. 1999). For example, management decisions must be made now, without a safe and effective vaccine for bison. But if and when such a vaccine is developed, it would still take many years of effort and great expense to eradicate brucellosis in bison, and policy differences would not disappear because administration of the vaccine would compromise wildness in the herd. Misplaced faith in science also devalues trial-and-error experience in the field. When separation of bison and cattle and vaccinations of cattle already have worked in the field, there is little to be gained by deferring decisions pending completion of more scientific studies. Often we know enough without further studies to make an informed policy decision, recognizing that new insights or experience may warrant changes in the policy.

To the extent that policy differences persist because of the fragmented structure of governance, structural alternatives are also in order. Some conservation groups and ranchers already agree that the NEPA process in bison management has become more contentious, and that discourse is needed to ameliorate or resolve differences among the

multiple interests involved. For example, a rancher leasing land outside the Park said “It’s politicized from the very beginning.... It’s who’s got the most pull.”¹⁹ Consequently, he argues, “there’s a need for informed public discourse” (Severin 1998). Some agency officials also seem interested in discussing the issues with citizens (Kovacs 1999). Thus from various different sides of the issue, there may be enough support for an initiative to institutionalize discourse on bison management among representatives of the multiple interest groups and agencies involved. The partial precedents to build upon include the initiatives taken by multiple interests in the Jackson area in the latter half of the 1990s, and by the Bison Management Citizen’s Working Group in Bozeman in 1991. While a Joint Management Plan has been established, many citizens are not satisfied with the plan. The plan calls for an adaptive management approach. It seems clear that adaptive management to the agencies refers to changes in policies based on advances in biophysical knowledge, but there is also opportunity for a new community-based initiative to monitor the implementation of the plan and continue to work with agencies to suggest changes. Agencies would have to consult with agency lawyers to avoid violations of the Federal Advisory Committee Act (FACA), which sets forth strict guidelines for citizen advisory groups, but FACA does not preclude citizens and agencies working together. Such collaboration can in the long run reduce perceived needs or desires to litigate. A “civic science” that allows for citizens and scientists to work together in monitoring, evaluating, and contributing knowledge to policy processes is needed to truly improve the decisions made about how to manage bison and other natural resources.

¹⁹ Interview with Brian Severin.

A new community-based initiative would have an opportunity to build upon the 1998 Citizen's Plan to Save Yellowstone Bison. Recall that it was endorsed over the interagency alternatives in a super-majority of public comments, and that it includes provisions consistent with those developed by earlier and more inclusive groups in Jackson and Bozeman. The discourse should include representatives of livestock, conservation, and tribal interests as well as landowner and agency perspectives. It might be facilitated by the Northern Lights Institute, which played an important role in the success of the Upper Clark Fork Steering Committee (Brunner, Colburn, et al. 2001) and other community-based initiatives.

Involving multiple interest groups in the development of policy alternatives through a community-based initiative could be an improvement in the long run—even from a narrow agency perspective—over soliciting and rejecting citizens' comments on exclusively interagency alternatives in the NEPA process. In a community-based initiative, officials could retain vital roles, in planning, promoting, and authorizing policy alternatives, and in implementing, evaluating, and eventually terminating them. Officials could also gain more access to the information and internal and external political support they need, and even take the lead in organizing the community. However, officials often lack the training and skills needed to coordinate across agency mandates, and to deal with increasing numbers of interest groups. Officials are more often prepared to proceed within the mandates and jurisdictions of their respective agencies. For the short run in bison management, these limitations may be overcome by reassigning exceptional agency personnel. (This is typically easier during or immediately after a crisis, such as the severe winter of 1996-97, when demands to do something are high.) For the longer run and

beyond bison management, it is time to rethink the traditional training and skills developed for the management of natural resources in the 20th century. New skills can be taught in workshops and in schools for natural resources professionals, in order to exploit the potential of community-based initiatives for finding common ground in the 21st century.

Conclusion

The bison case demonstrates the need for new structures for the governance of natural resources in the greater Yellowstone area. Since the Park's inception in 1872, the aspiration to manage Park resources in the common interest--for all the people--has not changed. But changes in Park policy have altered ecological conditions, increasing wildlife populations and migrations. As bison cross over Park boundaries, they have altered political conditions, drawing more interest groups with more diverse interests into bison management. Current structures of governance, largely agency-led and controlled, have failed to find policies that clarify and secure the common interest within these more complex conditions. The problem of bison management is not primarily one of brucellosis or science or economics, but rather one of politics and governance.

Alternative structures of governance such as community-based groups in Jackson and Montana led to the development of plans in the common interest. These plans call for risk management over the eradication of brucellosis. However, agencies have failed to capitalize on the plans and have continued largely on their own. The situation may seem intractable, but common-interest solutions are possible with better leadership willing to take some risks. Montana needs to back down from its demand for zero tolerance of

brucellosis in bison, if it wants to protect the livestock industry rather than merely to claim control over natural resources policy. Citizens may need to continue working with others who have opposing values to find common-interest solutions. Agencies need to be more open to such alternatives. Only through changes in the rigid structures and perspectives currently governing bison management can a wild, free-roaming herd of bison be secured and the livestock industry be protected over the long term.

Works Cited

- Alley, J. L. (1995). Brucellosis Committee Report. 1995 Reno United States Animal Health Association Meeting, Reno, NV.
- American Buffalo Foundation, Defenders of Wildlife, et al. (1998). The Citizen's Plan to Save Yellowstone Buffalo.
- Angell, J. (1999a). Interview. March 1, 1999, Bozeman, MT.
- Angell, J. (1999b). Interview. May 6, 1999, Bozeman, MT.
- Anonymous (1985a). "Judge won't block killing of wild bison." AM cycle. Dec. 3. From Lexis-Nexus.
- Anonymous (1985b). "Regional News, BC cycle." April 9, 1985. From Lexis-Nexus.
- Anonymous (1989). Shades of Buffalo Bill. Time. 133: 41(1).
- Anonymous (1997). "Emergency bison protection plan proposed." U.S. Newswire. Jan. 30: National Desk, Environment and Agriculture writers.
- Anonymous (1997a). "End to bison killing near park sought." The Fort Worth Star-Telegram. Feb. 28.
- Anonymous (1997b). "The great bison break-out." The Economist: 28.

- Anonymous (1999a). "Department of Livestock mulls more lenient bison policy." Casper Star Tribune. Jan. 10: B1.
- Anonymous (1999b). "Ranchers rush to halt 'unfair' Canadian stampede." Jackson Hole Daily. Oct. 13: 5.
- Anonymous (2000). "Mediator to enter bison dispute." Billings Gazette. Feb. 4: obtained from <http://www.wildrockies.org/Bufalo/press99/releas07.html>.
- Associated Press (1991). "Safe range proposed for bison roaming outside Yellowstone." Casper Star Tribune. July 30: B1.
- Barsness, L. (1985). Head, hides, & horns: The compleat buffalo book. Fort Worth, Texas: Christian University Press.
- Begley, S. (1989). A firing squad for buffalo: Montana-style hunting. Newsweek. 113: 51(1).
- Berger, J. and S. L. Cain (1999). "Reproductive synchrony in brucellosis-exposed bison in the southern Greater Yellowstone Ecosystem and in noninfected populations." Conservation Biology 13(2): 357-366.
- Berkley, J. (1999). Phone Interview. April 10.
- Bertelson, C. (1989). "Park's winter kill aids grizzly bears." St. Louis Post-Dispatch. May 14: 10A.
- Bishop, N., P. Schullery, et al. (1997). Yellowstone's Northern Range: Complexity and Change in a Wildland Ecosystem. Mammoth Hot Springs, WY: National Park Service.
- Bohne, J. (1998). Interview with Joe Bohne. June 26, Jackson, WY.
- Brady, J. R. (1999a). "A senseless slaughter in Montana." Post Register. Feb. 9.

- Brown, B. (1990). "Fund for Animals goes to court for bison." USA Today. Dec. 6: 9C.
- Brunner, R. D., C. Colburn, C. Cromley, B. Klein, B. Olson (2001). Finding Common Ground: Governance and Natural Resources in the American West. Boulder, CO, Manuscript.
- Camenzind, F. (1998). Interview. June 19, Jackson, WY.
- Campbell, J. (1998). Interview. October 1, 1998, Helena, MT.
- Catton, J. (1999). Interview. March 16, 1999, Bozeman, MT.
- Cherry, M. (1999). Interview. July 1, 1999. Bozeman, MT.
- Cheville, N. F. and D. R. McCullough (1998). Brucellosis in the Greater Yellowstone Area. Washington, D.C., National Academy Press.
- Collins, P. (1999). Interview. Feb. 10, Washington, D.C.
- Curlee, P. (1998). Interview. June 16, Jackson, WY.
- Dary, D. A. (1989). The Buffalo Book: The Full Saga of the American Animal. Athens: Swallow Press/ Ohio University Press.
- Davis, D. S., J. W. Templeton, et al. (1990). "Brucella abortus in captive bison. I. Serology, bacteriology, pathogenesis, and transmission to cattle." Journal of Wildlife Diseases 26(July): 360-71.
- Ekey, R. (1990). "Park rangers may shoot female bison: Concern about disease prompts Yellowstone plan." The Washington Post. Oct. 4: A3.
- Farquhar, B. (2000). "Montana pleased, greens glum over final bison plan." Casper Star Tribune. Dec. 21: A1.
- Fay, M. (1998). "Groups slam bison EIS for inadequacies." Bison Advocacy Project, Ecology Center, Wild Rockies InfoNet. June 30: .

Ferrari, M. (1999). Interview. May 26, 1999. Bozeman, MT.

Finley, M. and J. Mak. (1996). Finding of No Significant Impact: Interim Bison Management Plan. Aug. 5. Yellowstone National Park.

Frye, G. H. and B. R. Hillman (1997). National Cooperative Brucellosis Eradication Program. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area:

Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

Geist, V. (1996). Buffalo Nation: History and Legend of the North American Bison. Stillwater, MN: Voyageur Press, Inc.

Geringer, J., P. E. Batt, et al. (1995). Memorandum of Understanding creating the Greater Yellowstone Interagency Brucellosis Committee. July 1995. Wyoming, Idaho, Montana, U.S. Department of Interior, U.S. Department of Agriculture.

Gertonson, A. (1998c). Interview. Sept. 24, Helena, MT.

Gertonson, A. (1999). Testimony on H.R. 631.

Gertonson, A. A. (1998a). Letter from Montana state veterinarian Arnold A. Gertonson to Deputy Administrator Dr. Joan Arnoldi. February 19.

Gertonson, A. A. (1998b). Letter from Montana state veterinarian Arnold A. Gertonson to state veterinarians. February 19.

Greater Yellowstone Interagency Brucellosis Committee. (1997). Information Action Plan. May 2.

Greystone. (1999). Content Analysis of Public Comment for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park. March 1999. Department of Interior, National Park Service, Department of Agriculture, U.S.

- Forest Service and Animal and Plant Health Inspection Service, State of Montana.
- Grogan, D. (1989). "Montana hunters, confronting targets big, slow and unwary, take aim at Yellowstone's bison." People Weekly 31(Feb. 27): 110-111.
- Hagenbarth, J., D. Raths, et al. (1997). The cattle industries of the Greater Yellowstone Area. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.
- Haines, A. L. (1977). The Yellowstone Story: A History of Our First National Park. Boulder, Colorado Associated University Press.
- Hanrahan, C. E. and M. L. Dunkley. (1998). U.S. Agricultural Trade: Trends, Composition, Direction, and Policy. March 11, 1998. Congressional Research Service (CRS).
- Harris, G. H. (1999). Bison Fiscal Report FY 1999 to Date: Montana Department of Livestock. February 16, 1999. Centralized Services Division.
- Holt, J. (1999). Telephone Interview. March 5, 1999.
- Hutchinson, P. (1997). "Blood on the snow; Buffalo slaughter raises commotion." Denver Post. Feb. 23: A1.
- Jackson Area Ranchers, F. Camenzind, et al. (1997). Brucellosis Management in Wyoming: Letter to President Clinton, Secretaries Glickman, Babbitt, and Governor Geringer. Jan. 31.
- Kesselheim, A. (1985). "Life amid the ghost trees." Backpacker April: 45-50, 126.
- Kingham, D. (1989). "Many die or are killed by hunters when they seek food outside the park; Expanded winter range called vital to Yellowstone elk, bison." Los Angeles

- Times. April 2: 30.
- Kovacs, K. (1999). Interview. February 10, 1999, Washington, D.C.
- Little-Thunder, R. (1997). To Chris Kelley of the Church Universal and Triumphant;
Response to your bison e-mail. www.wildrockies.org/Bufalo/speak/rosalie2.html.
- McMillion, S. (1998). "Feds say 'low-risk' bison should be allowed to wander." Bozeman Chronicle. April 22.
- McMillion, S. (1999). "Racicot knocks federal official's bison comments." Bozeman Daily Chronicle. May 5, 1999: 3.
- Mead, B. (1997). Interview. July 18, 1997, Jackson, WY.
- Meagher, M. (1972). Brucellosis and the Yellowstone Bison. April 5. U.S. Department of the Interior, National Park Service.
- Meagher, M. (1974). "Yellowstone's bison: A unique wild heritage." National Parks & Conservation Magazine May: 9-14.
- Meagher, M. (1978). Bison. Big Game of North America: Ecology and Management, A Wildlife Management Book, Stackpole Books: 123-133.
- Meagher, M. (1985). "Yellowstone's free ranging bison." Naturalist 36(3): 20-27.
- Montana State Legislature. (1995). Senate Bill No. 312. April 10.
- Morrison, P. (1990). "Humble germ pits nature, ranchers in a 'range war'." Los Angeles Times. July 22: A1.
- National Park Service and State of Montana. (1996). Interim Bison Management Plan. Aug. 9.
- National Park Service, State of Montana, et al. (1998). Draft Environmental Impact Statement for the Interagency Bison Management Plan for the State of Montana and

- Yellowstone National Park. National Park Service, state of Montana, U.S.F.S., U.S. Animal & Plant Health Inspection Service.
- Nicoletti, P. and M. J. Gilsdorf (1997). Brucellosis-The disease in cattle. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.
- Ostrom, E., J. Burger, et al. (1999). "Revisiting the commons: Local lessons, global challenge." Science **284**(April 9): 278-282.
- Peacock, D. (1997). The Yellowstone massacre. Audubon. **June**: 40(16).
- Peterson, L. (1998). Memo re: Governor's Briefing Canadian Border Inequities. Sept. 25, 1998.
- Philo, M. (1998). Interview. Aug. 7. Bozeman, MT.
- Ragsdale, J., J. Richard, et al. (1991). Letter from Bison Management Citizens Working Group to Yellowstone National Park Superintendent Bob Barbee. May 15, 1991.
- Robbins, J. (1985). "After a 100-year hiatus, bison-hunting season is set to begin." The New York Times. Nov. 11: A12.
- Robbins, J. (1986). "Bison hunt is over but debate lives." New York Times. April 6, 1986: 31.
- Sahagun, L. (1997). "Yellowstone bison roam into deadly battle; Environment; Fear of disease has led to slaying of 733 animals. U.S. offers plan to slow the killing." Los Angeles Times. Jan. 31: A1.
- Satchell, M. (1996). A discouraging word for buffalo: Yellowstone's infected herd is facing roundup, blood tests, bullets--and the slaughterhouse. U.S. News & World

Report. 121: 61(3).

Schullery, P. (1986). "Drawing the lines in Yellowstone: The American bison as symbol and scourge." Orion 5(4): 33-45.

Schullery, P. (1995). Yellowstone's Ski Pioneers: Peril and Heroism on the Winter Trail. Worland, WY: High Plains Publishing Company.

Sellars, R. W. (1997). Preserving Nature in the National Parks: A History. New Haven: Yale University Press.

Settlement Agreement. (1995). Settlement Agreement. November 2, 1995. The Department of Interior, the Department of Agriculture, and the State of Montana.

Severin, B. (1998). Interview. September 25, 1998. Gardiner, MT.

Siroky, C. J. (1996). Prepared testimony by Clarence J. Siroky state veterinarian, Montana Department of Livestock before the Senate Energy and Natural Resources Committee Subcommittee on Parks, Historic Preservation, and Recreation Senate Hearing for Senate Bill 745. March 7. Congress.

Smith, B. and T. Roffe (1992). "A political disease brucellosis." Bugle Summer: 71-80.

Smits, D. D. (1994). "The frontier army and the destruction of the buffalo: 1855-1883." The Western Historical Quarterly 25(3): 312(27).

Souvigney, J.M. (1997). Comments of Jeanne-Marie Souvigney. Where the Buffalo Roam: Finding the Common Ground, Cody, WY, Buffalo Bill Historical Center.

Souvigney, J.M. (1999). Interview. May 10, Bozeman, MT.

Terrell, T. (1998). Interview. Sept. 17. Gardiner, MT.

Thorne, E. T. (1998). Presentation: Bovine brucellosis and bison, elk, and cattle in the Greater Yellowstone Area, AMK Ranch.

Under Secretary for Marketing and Regulatory Programs of the Department of Agriculture, Under Secretary for Natural Resources and Environment of the Department of Agriculture, et al. (1999). Letter to Governor Marc Racicot. Dec. 13. Washington, D.C.

U.S. Department of Interior, U.S. Department of Agriculture (2000). Record of Decision for Final Environmental Impact Statement and Bison Management Plan for the State of Montana and Yellowstone National Park. (December 20, 2000).

U.S. General Accounting Office. (1992). Many Issues Unresolved in the Yellowstone Bison-Cattle Brucellosis Conflict. GAO/RCED-93-2.

U.S. General Accounting Office. (1997). Packers' and Stockyards' Programs: USDA's Response to Studies on the Livestock Industry. April 1997. GAO/RCED-97-100.

U.S. Congress. (1995). Senate Bill No. 745. May 3.

Urbigkit, C. (1997). "Geringer warns states to avoid brucellosis disaster." Jackson Hole Guide. March 12.

Varley, J. D. and P. Schullery (1991). "The Yellowstone fires." Encyclopedia Britannica Yearbook of Science and the Future: 131-143.

Wells-Norlin, G. (1999). Interview. April 6, Bozeman, MT.

Wilkinson, T. (1997d). "Winter and Park Service pact threaten Yellowstone bison." Christian Science Monitor. Jan. 22: 3.

Yellowstone National Park. (1996). Wyoming Brucellosis Workshop Planning Summary of Information Yellowstone National Park. United States Department of Interior, National Park Service.

Chapter 4

The Value of Finding Common Interest

Even over a century ago, special interests influenced debates over bison management and natural resource management. A Western Congressman once said he could not “understand the sentiment which favors the retention of a few buffaloes to the development of mining interests amounting to millions of dollars” (quoted in Haines 1977: 314; Haines is quoting from the Congressional record, 49th Cong, 2nd sess. December 14, 1886: 150). More recently, John Munding, a former employee of Montana Fish, Wildlife, and Parks, articulated the problem well when he said, “bison management is a political issues and politics [are] about values” (Anonymous 1997).

As stated in chapter one, an interest is “a pattern of demands and its supporting expectations” (Lasswell and Kaplan 1950: 17). The *common interest* is the demands and expectations that community members share. In contrast, *special interests* benefit a few community members at the expense of the community as a whole. As discussed in chapter three, inadequate structures of governance to identify and integrate competing value demands have contributed to the endurance and intensity of the bison debate.

Finding common interest among many competing expectations and value demands requires identifying the interests involved in a debate, assessing which ones are valid and appropriate, and integrating or finding balance among competing interests. The common interest in bison management means finding management alternatives that are acceptable to participants with valid interests and that integrate the two major interests that conflict under current policies: Protecting the livestock industry by minimizing and

containing the risk of brucellosis transmission from bison to cattle, *and* protecting the wild, free-roaming bison herds in Yellowstone from intensive management measures that would reduce them to livestock. These goals are officially accepted in the final Record of Decision (ROD) (U.S. Department of Interior and U.S. Department of Agriculture 2000). They also receive wide support by interested participants, as evidenced by comments on the Draft Environmental Impact Statement (EIS) released by federal and state agencies in June of 1998. However, the management alternatives outlined in the ROD fall short of securing these goals and meeting the values of all participants, as detailed in chapter three --despite effective risk management alternatives that have met the unofficial test of practical experience in the Jackson area (National Park Service, State of Montana et al. 1998).

For example, Dave Ditloff, conservation director for the Montana Wildlife Federation and a co-signer of the Citizen's Plan to Save Yellowstone Bison, expressed disappointment that the federal agencies "bought-in" to Montana's "test and slaughter policy" (quoted in Farquhar 2000). Andrea Lococo, a staff member of the Fund for Animals, said that:

It is particularly troubling that after eight years of negotiation and seven months of mediation, we still will not have a herd of free-roaming, naturally regulated bison. Instead we will have a herd of bison that are treated more like domestic cattle than wildlife. This is certainly not what the general public had hoped for and I'm confident that the decision will be challenged (quoted in Farquhar 2000).

These statements provide evidence that the alternatives accepted by agencies in the ROD fails to integrate the many competing expectations and value demands made in the debate

over bison. The expectations and values of those advocating for a free-roaming herd of bison, at least, have not been met. Lococo indicated that the decision will be challenged. Her statement is evidence of the need to consider and integrate all valid value demands made in a debate. Without attention to these demands, lawsuits, fragmentation, and seemingly irresolvable conflict will endure.

Below, I describe the policy sciences' conception of values and how competing values have contributed to the duration and intensity of the debate over bison management. The discussion is necessarily selective; no one method or individual researcher can identify or articulate all value demands of all participants, his or her own included. This analysis is meant to illustrate the lesson that debates over natural resources contain deeper-seated goal and value conflicts. The continued conflict, even with the release of a ROD after at least ten years of planning and debate, is indicative of the failure to identify and integrate valid expectations and value demands. Protecting resources requires attention to these conflicts and the means to integrate interests.

Values and the policy sciences

Harold Lasswell and Myres McDougal, two founders of the policy movement, wrote, "the legal process is part of the process of decision which in turn is part of the social process as a whole" (Lasswell and McDougal 1992: 335). In other words, policy cannot be evaluated outside of its social context. The social context involves "people seeking values through institutions using resources" (Lasswell and McDougal 1992: 337). People make demands according to what they value, and societal institutions mediate the process of determining who will have his or her demands met. People's demands are based on their perception that a given choice will leave them better off than if they made

an alternative choice (Lasswell and McDougal 1992). In other words, people attempt to have the maximum number of their needs, desires, and demands met.

Although many people in the natural resources field call for sound science above all else to solve natural resource debates, many decisions are *not* based on “sound science” but *do* meet the common interest and are sound policies. The near-decimation of bison at the turn of the century illustrates this point. Some saw the slaughter of millions of bison as unfortunate but not regrettable. One former Texas buffalo hunter remarked:

May we not find some comfort, excuse, and consolation in the fact that removing the vast herds of buffalo paved the way and made it possible for the cowmen to step into the scene and almost over night build up a great industry which has played an important part in Texas history. So hats off to the old buffalo hunter that dared to brave the wild and woolly West. He cut loose from home ties and civilization and did his part to help rid the plains of Texas of roving bands of Indians and pave the way for the great cattle industry that was to follow (Guyer 1938: 69).

For some, like this buffalo hunter, the possibility of bison (and Indian cultures) going extinct was justified if it meant gaining land for cattle and ultimately, profit. For others, what happened to bison was appalling, and it inspired some of the country’s first conservationists (Barsness 1985). Advocates such as George Bird Grinnell wished to prevent domination of park resources, such as bison, by special interests such as railroads and grazing. It took little science to realize that continued hunting of bison inside or outside the park would wipe out the population. Conflict over the near extinction of bison

was a social problem that arose from conflicting value demands and conflicting human desires, not a problem of science.

As described above, finding common interest requires identifying the interests involved in a debate, assessing which ones are valid and appropriate, and finding effective structures of governance to integrate or find balance among competing interests. Below, I identify the significant values in the bison debate, describe the relationship of these values to a participant's other values and to the values of other participants. The task of finding effective structures of governance to integrate and find balance among competing values is described in greater detail in chapters three and seven.

Lasswell and McDougal classified human desires into eight *base values*. For the purposes of this chapter, I will focus on the use of these values as a heuristic to understand value demands, or preferred outcomes. These values include well-being, wealth, skill, enlightenment, power, respect, rectitude, and affection (Table 1) (Lasswell and Kaplan 1950). Those who accepted the possibility of bison extinction did so because it indulged some people in certain values. Buffalo products and decreased competition for forage indulged hunters and ranchers in *wealth*. Buffalo hunting allowed hunters to display *skill* and experience camaraderie (*affection*) with others in the escapades of the Wild West. The struggle between saving buffalo and letting them go extinct also involved issues of *power* and *rectitude*: those who thought it was morally irresponsible to let bison go extinct fought those who accepted it in political debates. Later attempts to secure the genetic integrity of the few remaining wild bison involved knowledge, or *enlightenment*. The attempted genocide of Indians also influenced

the killing of buffalo and vice versa; killing bison would destroy the subsistence base (*well-being*) of many tribes and therefore wipe out the culture of--if not the lives of individual members of--many tribes. Such actions caused a deprivation of all eight base values for tribal members and indulgence in values such as wealth and power for other groups.

The table below provides a more detailed explanation of each of the eight base values, the institutions through which these values are shaped and shared, and examples of indulgences or deprivations of these values:

TABLE 1. BASE VALUES

Value	Explanation	Examples of institutions specializing in the shaping and sharing of the value	Examples of Outcomes
Well-being	Safety, health, comfort	Hospitals, police forces	Medical care, safety
Wealth	Production and distribution of goods and services.	Trade unions, businesses	Sales, ownership, financial losses
Skill	Proficiency in a practice	Schools	Attainment of skills
Enlightenment	Knowledge	Media, schools, universities	News reports
Power	Making of decisions, authority, control	Governments, pressure groups	Victory or defeat in war, elections
Respect	Reciprocal honoring of freedom and choice	Honor societies	Memorials, awards
Rectitude	Moral codes	Churches	Acceptance as good
Affection	Loyalty, friendship, intimacy	Family, professional organizations	Circle of friends and peers

Adapted from (Lasswell and Kaplan 1950)

Lasswell explained that eight categories were chosen to provide a list short enough to be useful. These specific categories emerged from data obtained in the historical and social sciences (Lasswell and Lerner 1965).

Values can be thought of as assets, or units of exchange, in social interaction. Values, or assets, available to acquire other values are base values. A person can be value-indulged or value-deprived. Indulgence refers to an increase in influence of a value, and deprivation refers to a decrease. For example, losing an election is a deprivation of power. A candidate who loses cannot rely on the elected position of power to influence policy decisions. Receiving a Nobel Prize or entrance into an honor society are examples of indulgence in respect. Respect for recipients of such awards might allow them to influence policy decisions.

All eight base values are at stake in the bison debate. For example, animal rights activists argue against lethal control of bison on moral grounds (*rectitude*). Other groups justify their demands on scientific grounds, citing studies such as the National Academy of Science study on brucellosis (*enlightenment*) (Cheville and McCullough 1998). Below, I describe the role of the base values in the bison case.

Values in the bison debate

Power Struggles

Statements about power abound in commentary on bison management. Two journalists from Greater Yellowstone pointed out that “at issue was who determines the appropriate use of our public lands and who decides the fate of the nation’s wildlife” (Wilkinson and Peacock 1997: 5). Another journalist claimed, “as in the closing days of the frontier, it’s all about control” (Gorman 1997: 24). To others, “the bison kills are just another example of federal managers giving in too easily to private interests” (Anonymous 1997). In addition, 70,176 public comments submitted to agencies on the draft Environmental Impacts Statement

(EIS) referred to management authority, which represents the most comments made on any single issue in the EIS (Greystone 1999). Power issues help to explain why the bison controversy continues despite common interest solutions.

Power struggles exist among many participants. First, one of the most enduring power struggles involves state and federal officials. Yellowstone's scientific research director John Varley says, "there is no doubt in my mind that the agenda behind the bison policy is not eradication of brucellosis but to use Yellowstone as a means of expressing anger at the federal government" (quoted in Wilkinson 1997: 32). Whether or not a covert agenda exists, many government officials and residents of Western states resent federal rules that infringe on a state's right to govern itself. Montana Fish, Wildlife, and Parks biologist Keith Aune said, "We are a state that prefers to determine for ourselves what we will do, what our future will be" (Bury 2000). This attitude is clear even driving down the highway. Until 1999, the only restriction on speed in Montana was to be "reasonable and prudent." So in a state that likes to be autonomous and limit restrictions, attempts by the federal government to impose rules about how to handle bison that enter the state cause fierce controversy.

Second, tension between agriculturalists and environmentalists compounds the state and federal power struggle. U.S. Congressional representation clearly demonstrates a balance of power tipped in favor of extractive industries and agriculture. Montana, Wyoming, and Idaho--the three states directly involved in the brucellosis issue--have six senators and four House representatives. Only one of these Congressional members is a Democrat. This is significant because Congressional voting records show that Democrats are often (but not always) sympathetic to environmental issues and Republicans are often

(but not always) aligned with resource-extractive industries: According to the League of Conservation Voters National Environmental Scorecard (www.lcv.org), average scores on key environmental issues in the Republican-dominated Congress fell below 50%. Regionally, members of Congress from the Rocky Mountain and Southwest states scored the worst and the five out of six senators from Montana, Wyoming, and Idaho scored zero. All five are Republicans. So those in power often respond to the demands of ranchers and the livestock industry, out of respect, bonds of loyalty, campaign contributions, or empathy with the needs of industry. The sympathies and perspectives of individual members of Congress are more significant for policy outcomes than generalized party voting records. However, such generalized trends add to the feeling that extractive industries such as ranching dominate Western politics and can add to the feelings of mistrust between environmentalists and ranchers.

For example, in 1995 Republican Senator Conrad Burns of Montana introduced Senate Bill 745 to Congress for himself and other senators from the tri-state area. The bill would have required the National Park Service to eradicate brucellosis through testing, culling, vaccination, and relocation of Yellowstone's bison (United States Senate 1995). The bill also would require the park to consult with the Secretary of Agriculture, APHIS, and state veterinarians of Idaho, Montana, and Wyoming during vaccination and quarantine (United States Senate 1995). Finally, the bill required determining an "optimum population" size by independent *range* scientists and to maintaining the herd at 500 animals *below* that optimum (United States Senate 1995). The bill was not passed, but indicates the issues of state's rights, authority, and control at stake in this issue. It attempted to mandate control by state and federal agricultural rather than wildlife

agencies and control by range rather than wildlife specialists over wild bison in Yellowstone.

This bill is also indicative of the history of control over resources and Western Congressional delegates by extractive industries, a history that incites many environmentalists to oppose attempts at local control, especially on land owned by the federal government. They say, “there is no statutory suggestion that propinquity to the lands in question convey a greater than usual right, even to comment, much less to control. Nor should there be, for these are national lands” (Blumberg and Knuffke 1998: 43). In response, many agriculturalists perceive that “urban environmentalists have sought to employ the new federal power to override local values with their own environmental gospel” (Nelson 1997: 24) and that “federal power today is being deployed in the West in the name of a half-baked quasi-religion of ‘virtual nature’” (Nelson 1997: 56). The former president of the Wyoming Stockgrower’s Association stated that “the Wyoming Livestock Board must gain the confidence of the Governor and the surrounding state agencies, or the future of Wyoming’s livestock industry is going to be decided by others” (Flitner 1997). In other words, the power struggle between extractive industries and environmentalists intersect the power struggles between state and local authority and federal authority. State officials and state representatives in the U.S Congress are often seen as more sympathetic with agricultural interests and federal officials in natural resource agencies with environmental interests.

In addition, Western demographics are changing. Many people living in Montana did not grow up in the Rocky Mountain West. Surveys conducted in Greater Yellowstone found that people moving in tend to be young, educated, and relatively wealthy (Reading,

Clark et al. 1994). These “outsiders” bring different values to the region, ones often aligned with environmental protection and recreation. Such demographic shifts affect elections and lead to pressure on state and federal policy-makers and bureaucracies. The slow erosion of the political power of ranchers and other traditionally powerful groups in the West by “urban environmentalists” heightens tension and adds to the power struggle between state and federal officials and agencies.

The bison debate is also occurring amidst other heated natural resource debates, also affected by state and federal power struggles and shifting demographics. Policy outcomes such as the re-introduction of wolves to Yellowstone National Park and Idaho and subsequent reaction show some of the effects of demographic changes. Many state officials, including Montana Senator Conrad Burns (R), opposed the reintroduction. The American Farm Federation filed a lawsuit requesting the wolves be returned to Canada (Brooke 1996, Robbins 1995). Former Montana state veterinarian Clarence Siroky asked why, under the natural regulation policy, wolves can “be captured, recaptured, caged, recaged, vaccinated, and re-vaccinated and bison cannot?” (Siroky 1996). Many people feel the lawsuit filed by the governor of Montana against the federal government over bison management was influenced by wolf reintroduction; wolves and bison are two battles in a war over resources (Personal communication with an anonymous source).

Discrepancies between rules for governing livestock and wildlife also fuel debates over state and federal authority. Former state veterinarian Clarence Siroky said “if states must abide by the federal mandate to eradicate brucellosis then another federal government agency such as the Department of Interior should do likewise” (quoted in Peck 1997: 9). In 1995 state veterinarians and officials also expressed concern over

proposals to give power to the Secretary of Interior to appoint members of the Greater Yellowstone Interagency Brucellosis Committee (Egan 1995a). The three states each enacted laws “to protect the viability of the livestock industries of the states from brucellosis in wildlife” (Siroky 1996).¹

No consensus exists on how to handle such a situation. The 1996 bison interim management plan reported, “NPS authority over and responsibility for wildlife, including bison, is limited to the lands within Yellowstone National Park. Outside Yellowstone National Park, the State of Montana has wildlife management responsibilities” (Finely and Mak 1996: 2). The state granted authority to the Montana Department of Livestock (DOL), making bison the only wildlife species governed by agricultural agencies--the DOL and APHIS. Brucellosis--a disease affecting livestock and wildlife--and the roaming of bison outside the park has invited these outside interests to make demands on resources in the park.

The bison debate shows that rules about participation and process in natural resource issues have not been clarified. Such constitutive questions--questions about participation and process--evoke intense debate. Chapter seven will discuss in more detail possible alternatives to clarify and secure common interest in bison management and other resource issues.

¹ Idaho Code 36-106 grants authority to the Departments of Fish and Game and Agriculture to test game animals for disease. Idaho Code 25-618 requires Idaho officials to kill or remove brucellosis exposed or infected bison from the state. Montana Code 81-2-120 grants authority to Montana Department of Livestock and the Department of Fish, Wildlife, and Parks to destroy brucellosis exposed or infected bison that migrate into Montana. Wyoming Statutes 23-1-302 and 11-20-124 grants authority to Wyoming Game and Fish, which is responsible for managing wild bison, to take action against bison that pose a threat to domestic livestock or property, as determined by the Wyoming Livestock Board or someone it designates as a representative (Siroky 1996).

Economics (Wealth)

Larry Peterson, head of the Montana Department of Livestock, says elk pose less of a threat than bison to cattle because they experience lower infection rates, give birth in remote areas, and consume infectious birthing material as an anti-predator strategy (Hutchinson 1997). However, park officials argue that brucellosis infects approximately the same number of elk and bison because elk populations are larger (Hutchinson 1997). In addition, elk are the suspected culprits in the only cases in which wildlife could have possibly transmitted brucellosis to cattle.

Many view the discrepancy between bison and elk as evidence that the issue is not truly about brucellosis (Gorman 1997). They claim that the state ignores the role of elk in this issue because as a big-game species elk bring over \$100 million to the region annually during hunting season (Gorman 1997). State game agencies, outfitters and other businesses depend on these profits. In a lecture on brucellosis in wildlife, a state wildlife biologist said that “every dead elk is a wasted opportunity” to generate revenue (Thorne 1998). Elk may be treated differently not only for biological reasons, but also because of the revenue they generate for the state and powerful hunting organizations and businesses.

While the economics of elk management are often hushed in this debate, the economics of the ranching industry and tourism are in the forefront. Many conservation groups argue the economic base in Greater Yellowstone is becoming increasingly dependent on tourism and recreational activities such as dude ranching, hunting, and sightseeing (Power 1991). Visits to Yellowstone grew over 40% between 1990 and 1994 (Nellis and Glick n.d.). In addition, 96% of new jobs and 89% of growth in labor income

between 1969 and 1989 were created in construction, transportation and utilities, wholesale trade, the federal government and services (Rasker, Tirrell et al. 1992).

Agricultural interest groups argue only larger cities and gateway towns profit from this revenue. They offer Clark County, Idaho as an example. Recreation-generated revenue is 2% of the county total, while revenue for schools and road maintenance decreases with the restriction of timber, mining, and grazing (Hagenbarth, Rath et al. 1997). According to livestock industry officials, ranching contributes far more than tourism to a healthy Western economy. The livestock industry requires investment in land, equipment, and breeding stock, providing a tax base for local and state economies (\$11.3 billion in infrastructure based on animal unit values in 1993, with \$4 billion of that from the stock of 5.4 million cattle (Jensen 1997)). Cattle in Greater Yellowstone numbered 1,066,000 and were valued at \$773 million in 1993 (Hagenbarth, Rath et al. 1997). Therefore, they say, “any discussion of brucellosis in the GYA [Greater Yellowstone Area] must include the total inventory and economic value as well as the value of infrastructure of the cattle industry in Idaho, Montana, and Wyoming” (Siroky 1996).

Ranching income depends on the ability to move cattle in the national and international market, and many claim the threat of brucellosis impedes marketability of cattle (Hagenbarth et al. 1997, Siroky 1996). Patricia Jensen of the U.S. Department of Agriculture claims eradication of brucellosis can open up multi-million dollar overseas markets “overnight” (Jensen 1997: 97). In addition, ranchers in Montana, Wyoming, and Idaho also vaccinated over a million calves in 1993, “reflecting an economic burden of \$10 million,” or \$10 per animal (Hagenbarth, Rath et al. 1997: 156). Reduction of the

Class-Free status would lead to \$27 million in testing costs (Hagenbarth, Raths et al. 1997). As vaccination for brucellosis nationwide decreases, an undue burden will exist among ranchers in Greater Yellowstone (Hagenbarth, Raths et al. 1997). Jensen states, “this is a burden on the U.S. taxpayer that can be phased out once and for all by complete eradication of brucellosis” (Jensen 1997: 97).

As mentioned in chapter three, such figures seem to indicate an ominous threat to the livestock industry, but the actual risk of transmission remains minimal. Only 2000 head of cattle graze outside of Yellowstone, minimizing the potential impact on the industry. The federal government and the National Wildlife Federation have offered to pay for cattle vaccinations for these cattle. In addition, the fear that any outbreak of brucellosis from wildlife would jeopardize the entire industry may be unfounded. Outbreaks have occurred in Wyoming, and because the ranchers handled them according to APHIS regulations, the class-free status of the state was not affected. According to Patrick Collins, the public relations representative for APHIS, the industry would only be in jeopardy if the outbreak were uncontained, i.e. if it spread to other herds (Brady 1999a).

Whatever the truth of the numbers cited by agricultural or conservation interest groups regarding bison or elk, tourism or agriculture, arguments over economics point to four salient factors. First, addressing underlying social and political problems means working to resolve issues beneath the surface, whether they be made explicit or not. Second, the economy in the West is changing, which means a changing power base. Thus, what appear to be economic pressures are not necessarily relieved by money. For example, according to livestock officials, generating “tolerance of wildlife by the

livestock interest depends on the ability of management agencies to control numbers rather than just paying for wildlife damage” (Hagenbarth, Raths et al. 1997: 158). Third, there is a feeling that “the economic importance of agriculture to rural counties in the western states is often not recognized by the general public or federal agencies” (Hagenbarth, Raths et al. 1997: 156). This statement is more about respect than economics; the market values ranchers much less than ranchers value themselves and each other. The influence of the base value respect on this debate is discussed in more detail below.

Fourth, the ranching industry is in economic trouble, whatever the perceived or actual risk bison pose. Ranching magazines such as *Range* feature themes such as “the disappearing cowboy” (Range Magazine 1992), “what can they do to us now?” (Range Magazine 1997), “who’s endangered now?” (Range Magazine 1995), and “perseverance and hope” (Range Magazine 1997). These themes would likely not be used if times were prosperous for ranchers. In Colorado, an acre of agricultural land is converted to developed land every four minutes (Probst 1997). In addition, threats to the industry such as declining demand for beef, monopolies and price-fixing in the meatpacking industry, and international competition are difficult to combat. One representative of the livestock industry said such market issues are “the kind of stuff that makes grizzly bears look simple” (Campbell 1998). But when the viability of an industry remains so precarious, people who depend on the industry want to minimize additional threats. And bison can be taken care of with bullets. So threats from bison, bears, wolves, and other natural resources prove easier to combat than market pressures. Ways to address these points are discussed further in the alternatives section below.

Rectitude

Tensions exploded in the winter of 1996-97, when bison faced the most severe snow and ice conditions since 1943 (Peacock 1997a). The snow and ice made finding forage in the Park difficult for bison, so they exited the park to lower, warmer ground in search of food. State and park officials shot 1,084 bison as they left the park between November 14, 1996 and April 15, 1997 (National Park Service, State of Montana et al. 1998). Along with the death of approximately 450 bison from natural causes, the killings reduced the bison population in Yellowstone from 3,500 in the fall of 1996 to 2,000 in the early spring of 1997 (National Park Service, State of Montana et al. 1998). Many opposed the killings and related events based on what they believe is morally right. This is not surprising, because during times of discontent when ideological issues surface, rectitude and enlightenment are highly influential values (Lasswell and McDougal 1992).

Bison on the northern boundary of the park were held in capture facilities until they could be shipped to slaughter and subsequently suffered gorings, tramlings, and broken horns (Peacock 1997a). A national public outcry resulted, with thousands of newspaper and magazine articles and television and radio shows covering the events. Publicity focused on bloody scenes at the capture facilities, on images of bison being shot, and on the sale of stacks of bison heads for as much as \$500, calf hides for \$50, cow hides for \$150, and meat for \$1.30 a

pound (Anonymous 1997).² Letters were written to the park by the general public, livestock interests, conservation groups, and others. Activists staged a demonstration at the Federal Building in Bozeman, Montana to stop the killing (Peacock 1997a). The park even began holding disease-free animals in a paddock as “symbolic prisoners” (Sahagun 1997).

Some opposed the killings using scientific arguments, saying such massive killing could jeopardize the genetic integrity of the herd. However, many opposed the killings based on moral authority, or rectitude, alone. The killings invoked outrage because many believe it is immoral to treat wild animals in such ways. Even attempts to limit mortality by holding bison in pens and testing them upset many participants. One park ranger said, “to call captivity humane is an oxymoron” (quoted in Sahagun 1997). Injuries suffered by animals in pens included broken legs and necks and becoming disemboweled from getting caught on gate latches (Sahagun 1997). Profit by the state of Montana for the sale of wildlife owned by the public also upset many people.

Fewer bison have been leaving the park since 1996-97 because winters have been less severe, so many of these moral arguments decreased in intensity. However, arguments are still made to support different policy positions based on moral grounds. For example, Mike Clark of the Greater Yellowstone Coalition said, “Montana has a responsibility to protect the Yellowstone bison herd” (quoted in Anonymous 1997). And many animal rights groups argue that no lethal control of bison should be permissible because killing wild animals is not the “right thing” to do.

² The first five auctions grossed \$102,566 for the state of Montana (Peacock 1997a). Meat packers bought 10,726 pounds of meat at an auction in Livingston (Loomis and Bower 1997). The profits help pay for the operations (Loomis and Bower 1997). One slaughterhouse owner discovered only 2 out of 200 bison carried brucellosis (Peacock 1997a).

Knowledge and skill

Science involves the values of knowledge and skill. Debates over fundamental beliefs, paradigms, and myths even exist among scientists, who are held up by many to be objective and removed from politics. Wildlife biologists might place priority on maintaining the genetic integrity of the bison herd. Their knowledge and skill focus on understanding wildlife and maintaining healthy populations of wildlife and the habitats on which they depend. Many veterinarians place priority on disease eradication, even if it means killing an entire herd of wild animals. Eradicating brucellosis completely would demonstrate the skill and knowledge of veterinarians, because they focus on understanding animal diseases and maintaining healthy populations of domestic livestock. There is also controversy between scientists who work for the state of Montana and those who work for the federal government, which demonstrates the interplay of knowledge, skill, and power in this debate.

The differing outlooks of scientists, resource managers, and livestock officials contribute to debates over the park's natural regulation policy. For example, Department of Livestock officials stated the "laissez-faire philosophy" results in levels of bison and elk that are too high (Hutchinson 1997). Reporter and writer Alston Chase, a well-known opponent of the park's natural regulation policy, argues that because of the policy "rather than being rare, buffalo are so numerous that they've overpopulated their habitat" (Chase 1997b). Because of the prominence of scientific arguments in natural resource debates, the entirety of chapter six is devoted to a more elaborate discussion of the use of science in policy-making. The discussion of knowledge and skill in this section therefore remain brief.

Well-being

The human form of brucellosis is undulant fever (Smith and Roffe 1992).

Undulant fever rarely ends in fatality, but can cause a lifelong infection resulting in fluctuating body temperature and flu-like symptoms including chills, fever, joint and muscle aches, and appetite loss (Cheville and McCullough 1997, Smith and Roffe 1992, Thorne 1998). Clarence Siroky, the former state veterinarian of Montana, has undulant fever. Patricia Jensen of the U.S. Department of Agriculture claims that eradication of brucellosis will prevent the threat to veterinarians, farmers, and others of contracting undulant fever (Jensen 1997). Some participants also discuss the threat to hunters, citing two Montana elk hunters who contracted brucellosis from infected cow elk (Siroky 1996), and a case in which a hunter contracted undulant fever near Ennis, MT, after handling an elk fetus (Hagenbarth, Raths et al. 1997).

However, human infection today is rare, and is mostly an occupational and recreational hazard. In other words, infection occurs only among people exposed to infected tissue, such as hunters and veterinarians (Cheville and McCullough 1997).

Brucella melitensis, most prevalent in sheep and goats, causes most cases of undulant fever worldwide through infected milk, but pasteurization in this country destroys brucellosis-causing bacteria (Smith and Roffe 1992). Cooking infected meat also kills the bacteria (Smith and Roffe 1992).

Thus, the disease is not a major threat to humans. Over 6,300 cases were reported in the 1940s, while only 70 cases were reported in 1994 (Reynolds 1996). In addition, “ample contacts” have occurred between humans and bison in Yellowstone with no infection (Meyer and Meagher 1997). So brucellosis does not threaten the general public.

While some groups justify the need to control bison by invoking the desire to protect human health, human health has not been a major factor in this debate.

The interplay of values: Respect, affection, power, wealth, well-being, rectitude, knowledge, skill

Often, what appears at first to affect only one value outcome really affects many simultaneously. Therefore, this section discusses the interplay of values in the bison debate. For example, when ranchers lose their way of life, many not only lose money but also a sense of pride, respect, and loyalty. One rancher from Jess Valley, California, wrote:

The strength and stability America has gotten from the people who grew up on farms and ranchers is one of her greatest assets. . . . One of the greatest gifts in life was knowing closely some of these old ranch couples, the warmth and care that was part of their home, the consideration they had for one another having weathered so many hard pulls together through some of the most adverse conditions (Flournoy 1999: 26, 27).

This statement refers to the ways a life on the range involves many base values simultaneously. For example, knowing the warmth and care of a home life on the range involves affection. Consideration for one another involves respect. Pulling through adverse conditions takes skill and knowledge, as well as the help of friends and neighbors. Therefore, when ranchers discuss the threat of bison and brucellosis to the ranching industry, they refer to more than economic issues. Understanding their feelings of loss, and understanding the reactions of others to their claims, requires knowing a bit about the history of the West.

Miners were the first wave of white settlers in the West. Cattlemen arrived on the scene a bit later, first entering America during the late eighteenth century in California and Texas with the Spanish missions. By the close of the Civil War, cattle ranchers dominated settlement in the West (Wilkinson 1992). Cattle ranchers arrived on the open range of Western lands before sheep ranchers or homesteaders, and they believed that getting their first gave them rights to the land. In 1879, cattlemen drew up a resolution that began “Whereas, we the pioneers of this Sun River Valley, having established ourselves here at an early day and prior to all others . . .” (quoted in Tanner 1977: 112)).

When the General Homestead Act of 1862 was passed to provide land for sheepherders, “yeoman farmers,” and small family farms, the range became more crowded. This act allowed homesteaders to claim 160-acre parcels of land, enough for farming but not enough for ranching, which requires large tracts of land for free range grazing. Sheepherders and homesteaders challenged ranchers’ claims to the land. The arrival of homesteaders and shepherds upset ranchers, who desired exclusive control over the large areas of land required for open-range grazing (Tanner 1977).

While federal law and a Jeffersonian legacy favored the small farmer, ranchers maintained control in state legislatures, which allowed ranchers to control large tracts of public land. Usufruct rights--rights granted by use rather than deed--reigned large. Texas passed a law in 1886 that made it a felony for one rancher to drive cattle onto the “accustomed range” of another rancher, and other states passed similar laws (Wilkinson 1992: 87). But ranchers received only an “unwritten privilege” (Wilkinson 1992: 88). Law professor Charles Wilkinson attributes the failure to receive complete and deeded control to populism and public sentiment that resented federal donations of land to

railroads and acquisitions by capitalists of more than 20 million acres of public land (Wilkinson 1992).

Ranchers' control over the range, coupled with natural forces such as drought, led to damage from overgrazing. The Dust Bowl in the 1920s and the consequent ecological and social deprivations are discussed in countless academic works and in popular literature such as John Steinbeck's *The Grapes of Wrath*. It was not until the country suffered through the Dust Bowl that the federal government began to regulate public domain grazing. However, the regulation came in the form of the weak Taylor Grazing Act of 1934 (Wilkinson 1992). Local advisory boards composed of ranchers largely influenced its implementation, again providing evidence of the power, respect, and affection enjoyed by ranchers throughout most of the history of Western settlement (Wilkinson 1992).

The environmental decades of the 1970s and 1980s began to change these power dynamics. Power ranchers held over public domain diminished. Today, many in the livestock industry classify bison with other political pressures on the livestock industry, including increasing costs of grazing leases--which many ranchers claim forces the subdivision of land for commercial development; the restriction of private property rights; and the restriction of multiple uses in national forests under the Endangered Species Act. Before the passage in the National Environmental Policy Act (NEPA) in the 1970s, livestock officials claim, "natural resource industries dominated the use of federal lands" (Hagenbarth, Raths et al. 1997). Then demands by the environmental community to manage for preservation and minimal impact began to increase. So "agencies are steered away from grazing of federal lands" by issues including endangered and threatened

species, old growth forests, riparian management, desired future condition, and big game habitat (Hagenbarth, Rathes et al. 1997: 158).

The natural regulation policy, influenced by the rise of environmentalism, also indicates to the livestock industry that “federal agencies welcome the diseased wildlife migrating from the Park” (Hagenbarth, Rathes et al. 1997: 158). They feel Gallatin National Forest and Targhee National Forest policy regarding bison shows a “lack of concern for the livestock industry or human health” (Hagenbarth, Rathes et al. 1997: 159). And many feel the American public does not appreciate the food that ranching provides.

In addition, over the past two decades, three million Americans relocated to the rural Rocky Mountain West seeking to share in the culture that ranching helped to create (Probst 1997). Between 1990 and 1994, the Greater Yellowstone region alone saw a net population gain of 20,000, or about 7.1% (Nellis and Glick n.d.). In addition to influencing the development and enforcement of environmental laws, these outsiders change the community dynamics. Before “outsiders” moved in, ranchers often knew all of their surrounding neighbors. They could thus enforce their unwritten codes through social sanctions. If Jim down the road let his cows wander onto Bob’s property and eat his grass, for example, Bob might not lend Jim a needed piece of equipment or vote for him in an election. Social sanctions do not work as well among strangers who do not “need” each other. Ranchers must therefore use different strategies--appealing to state and federal agencies, for example--to enforce codes, and the results might not be as predictable or beneficial.

For example, changes in regulations and demographics lead to violation of the moral code often referred to as “being a good neighbor” that has shaped culture in the

West and the identity of “Westerners.” “Being a good neighbor” means you do not let pets, cattle, or wildlife, wander onto a neighbor’s property without compensation.

Rancher Tom Rafato said, “to me, it’s like Yellowstone Park is a big ranch and there’s other ranchers on private land outside the park. Both have been there a long time.” He says Yellowstone is not being “good neighbor” because they refuse to “manage the livestock” (Witkowsky and Arnold 1997). A rancher from Wisdom, Montana compared allowing wildlife out of the park to neighbors in a city who allow their pets into others’ yards to “leave their dirty work” (Potter 1997). These are all perceived violations of an unwritten moral code in the West. Unlike in the hypothetical example above with Jim and Bob, ranchers cannot just rely on unwritten sanctions to force the park to keep their bison inside park borders. This involves a loss of power, respect, affection, and skill.

There is also an irony in the situation that frustrates many Westerners whose families have lived on Western lands for generations. While some Westerners—Ted Turner, Meg Ryan, and Harrison Ford among them—prefer the isolation offered by wide-open Western landscapes, the “code” of neighborliness contributes to the charm and appeal of living in the West. Ranching helped to instill this code, but many non-ranching Westerners pride themselves on helping out neighbors and respecting fellow citizens by such gestures as waving to other drivers on lonely highways and dirt roads, even when those people are strangers. Yet, this code simultaneously causes political controversy over issues like bison management or wolf reintroduction. Many ranchers feel “outsiders” selectively apply the code to suit their own interests; they reap the rewards of small-town community support and friendliness while demanding that the wildlife is allowed to threaten cattle, compete with cattle for range, and even to “destroy” park resources by

overgrazing. This selective application seems hypocritical to many in the ranching community and deprives them of the respect they feel they deserve for establishing this code.

In addition, ranching has not only damaged the range but also helped to preserve it. Ranching, because it requires large tracts of land, helped protect the big-sky country and open-space that attracts so many environmentally-oriented people to the Rockies (Wilkinson 1992). In other words, many of the people who value the independent, “relaxed,” community-oriented atmosphere of the West that ranching helped to create are the same people who value conservation of resources and often demand an end to public-land grazing.

So ranching has had both positive and detrimental effects on natural areas. Likewise, efforts to preserve natural areas with such policies as natural regulation have had both positive and negative biophysical consequences. Laws and an awareness of the interconnectedness of natural communities have prevented the extinction of species such as bison, grizzly bears, and wolves. But wildlife populations have increased and subsequently change the condition of the fauna in the park, changes many consider environmentally detrimental. In addition, many of the “conservationists” moving in to appreciate and fight to protect natural areas are the same people buying houses on smaller lots, which contributes to development of Western lands and shrinking wildlife habitat. Thus, many ranchers feel deprived of respect in a natural and social environment they helped to create and maintain.

Changing power dynamics, changing laws, and the lack of respect ranchers and others feel affect demands ranchers make. One Montana rancher said, “I’m not a

proponent of culling but they at least need to address it and work with the surrounding states if they don't want to cull in the Park" (Severhen 1998). Former Montana state veterinarian Clarence Siroky said, "the impact upon Montana, Wyoming and Idaho was never figured as part of the 'natural' equation" (Satchell 1996). Wyoming Governor Jim Geringer and Agriculture Director Rob Micheli see overpopulation of and failure to vaccinate wildlife as problems because of the impact on surrounding states (Urbigkit 1997). These participants, it seems, desire increased consideration of the impact of park policies on their lands or lands they use (although these lands are often public lands outside the park).

Finally, an important part of this story is often left untold. When ranchers claim the right to dominate Western lands and norms because of their early arrival, they are foreshortening the history of the West. Before ranchers and before miners, Native Americans were the sole human inhabitants of Western lands. Many tribes view the nineteenth century slaughter of buffalo as congruous with the massacre of Native peoples (Rosalie Little Thunder, Interview, Feb. 23, 1999). The near annihilation of bison was the most destructive federal policy for many Native people (InterTribal Bison Cooperative 1998).

A number of tribal members also feel "buffalo are synonymous with life" (InterTribal Bison Cooperative 1998: 1). These tribes long depended on buffalo for subsistence, and the Lakota consider buffalo their elder brother (LaDuke 1998). Buffalo provided meat, skins for tipis, fur for robes, and material for needles, knife handles, and other tools and weapons. Buffalo also were and remain central to the spiritual lives of many tribes. The Ute, Lakota, and Shoshone tribes, for example, trace the origin of the

sun dance—a vital ceremony for many tribes—to an encounter between a Native ancestor and people of the Buffalo Nation (the people are buffalo) (Lawrence 1999).

The immense respect many tribes give to buffalo arises not only from the number of products buffalo provide and the rich mythology associated with buffalo, but also from the physical prowess of these creatures. They dig through snow several feet deep to reach forage using the muscles in the strong humps on their backs. These powers, along with other physical and spiritual elements, have instilled great respect by many Native Americans. Affection and respect for bison as relatives, as brothers and sisters, initially led many tribes to become involved in this issue.

Some native people blame themselves for the decimation of buffalo, because they feel white people destroyed buffalo to destroy tribes. Many tribes also feel deprived in respect because the notion of self-regulated populations of wildlife, as prescribed by natural regulation, diminishes the importance of hunting by tribes such as the Bannock and Nez Perce for centuries in and around the Park. (Holt 1999). “Natural” processes included humans (Wells-Norlin 1999). These feelings of deprivation in respect arise not only in bison management, but throughout the country in natural resource management. Many tribes feel that the idea of “presettlement” landscapes often used as a baseline in ecosystem restoration projects obscures the role Native people took in “creating and maintaining that landscape” (Conley 2000: 3). Thus, the way that Native involvement is handled in this issue may have implications on resource issues throughout the country.

Many tribes have formed coalitions with each other and others to increase their influence. One group that cooperated to write and then signed on to the Citizen’s Plan is the Intertribal Bison Cooperative (ITBC). The ITBC is a group of 47 American Indian

tribes working to influence bison policy (Holt 1999). The ITBC was one organization involved in the lawsuit alleging that the Interim Plan violates the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act (MEPA) (Angell 1997). Other tribal groups also formed and tribes have organized activities not affiliated with the ITBC. One People, One Nation (OPON), for example, is involved in field dressing buffalo shot by the DOL and helps distribute them to tribes nationwide, to provide food for impoverished reservations and therefore ensure the well-being of tribal members (Wells-Norlin 1999). Another group of Native Americans organized a spiritual walk honoring the buffalo, drawing on the base value of rectitude, believing that it is right to honor buffalo with such actions and power and appealing to sources of spiritual power (Little-Thunder 1999).

Tribal peoples have attained a certain amount of respect in this and other natural resource issues. Native peoples have worked to complicate their public images as either uncivilized and backward or as “noble savages” who should remain in a “pristine” static state like “pristine” natural areas. Their voices and needs are often respected in contemporary debates. For example, buffalo meat and buffalo skulls used in sacred ceremonies are being sent to tribes. The government’s preferred alternative contains plans to quarantine test-negative bison to repopulate tribal lands with the wild creatures. Some groups such as the Nez Perce want to reestablish ties they once had with the Yellowstone area and buffalo (Holt 1999), and there have been proposals to reinstate tribal hunts in the park to help regulate population numbers.

Many Native tribes feel re-establishing herds of buffalo will help to ensure the material and cultural survival of tribal (and non-tribal) peoples. With the loss of buffalo

came a loss of a way of life. Now, poverty abounds on many reservations. On the Navajo reservation, for example, only 22% of households have telephones, compared to 94% of the general U.S. population (Anonymous 2000). While resolving the bison issue will not directly bring needed utilities, jobs, and other resources to reservations, many tribal members feel the survival of tribal and non-tribal people depends on the survival of the buffalo (Little-Thunder 1999).

Some within and outside of tribal communities criticize proposals to restore buffalo herds on reservations, saying the tribes only want the animals for commercial gain. But there is another side that views commercialization of buffalo on reservations as analogous to the direct subsistence of buffalo meat and products a century ago. Before the arrival of whites, wealth was attained directly from the earth and from animal products. Now, wealth is attained by accumulating money, which can buy products such as cars and utilities necessary for survival in today's world. A tribal elder from South Dakota, Rosalie Little Thunder, said about the relationship between tribes and buffalo that she "can only compare their significance to the god of today; money" (Little-Thunder 1997). Commercialization of buffalo on reservations could re-establish that connection. Disagreements over this point exist among tribes, tribal members, and tribal coalitions, but they have in common a strong cultural and spiritual interest in buffalo and the survival of the Yellowstone herd.

The legacy of history thus lives on in current political debates. Although private lands in the West produce only about 17 per cent of America's livestock and federal public lands produce about 2 per cent, ranching influenced political life, cultural norms, and the myth of the West (Wilkinson 1992). Ranchers simultaneously contributed to the

independent nature and the family and community values so characteristic of the West. Native American communities are also beginning to make demands, pointing out that the ideal “pristine” state whites found when they arrived in the West was actually influenced by tribes. They are demanding to have a say again in the way resources are managed. What these factors mean for policy alternatives is discussed below and in chapter seven.

Alternatives

Biophysical and demographic changes occurring in the West mean finding common interest is complex. A larger diversity of interests are making demands on the region’s resources for economic security: ranchers need the land and open space to graze cattle and sheep; tourist operators and local businesses require healthy and visible wildlife herds and intact, spectacular scenery; outfitters need large wildlife populations to run hunting expeditions; real estate agents depend on the sustainability of resources to maintain high land and property values; Native Americans want to re-establish traditional connections with resources and the land.

The analysis of base values suggests a few alternatives. First, as discussed above, elk have not been central to this debate thus far partially for economic reasons: they provide income for outfitters, state game agencies, and others. It is likely that elk will not remain out of the spotlight much longer. If wealth generated by elk influenced the differing treatment of elk and bison thus far, finding solutions for elk management will require serious economic consideration. Those people who diminish the importance of brucellosis in elk justify their position using science. If economics motivate their position more than scientific information (consciously or subconsciously), this is important data

for finding common interest in elk management. Killing elk to prevent the spread of brucellosis might result in loss of revenue for outfitters and for state governments.

Alternatives to address brucellosis in elk should consider ways to ameliorate potential losses rather than merely chastise officials for treating elk differently. Since outfitters, hunting organizations, and state game agencies hold an enormous amount of power over natural resource issues, addressing their underlying values is not merely a matter of being considerate. It is a matter of appealing to the sources of power so that rational policy can be developed, policy that serves more interests than those held by organizations in power.

Likewise, ranchers and the state of Montana maintain an enormous amount of power in the bison case. Rather than dismissing the economic importance of ranching to the economy of the West, conservation groups might help themselves by suggesting ways for ranchers to boost their economic viability and diminish threats from market pressures. Conservationists could appeal to ranchers. For example, they might point out that by drawing attention to the issue of brucellosis in wildlife, the state of Montana and the federal government are missing an opportunity to declare success. While the risk posed by brucellosis-infected bison to the cattle industry must be addressed, brucellosis in cattle can be distinguished from brucellosis in bison to improve marketability. Other potential means to help ranchers address market pressures are discussed below and in chapter seven. When seeking to find common interest and protect resources, success will be gained only by finding ways to indulge participants in the values they seek without compromising larger community goals.

Recognizing that the economic arguments in the bison debate are also about respect and affection is also significant in developing policy alternatives. The influx of

people and uses of Western lands forces many ranches out of business. For many ranching families, this means losing a generations-old way of life. Ranching becomes too expensive and ranchers are often forced to sell to developers.

If ranchers feel their way of life and both direct and indirect contributions to America are not valued, policy alternatives should address these concerns. In addition, as Luther Probst, Executive Director of the Sonoran Institute said, “despite the West’s long history of conflict over land management practices, more and more people are recognizing that we *all* lose when a ranch dies” (Probst 1997: 7). Developers subdivide the land, which can threaten valuable wildlife habitat and the ecological sustainability of ecosystems. Water use increases. Fire suppression becomes necessary. Often, newcomers maintain a more distanced relationship with the land. Rather than fighting circular arguments □ agriculture, tourism, and other sectors all currently contribute to the economy of the West and affect resources in positive and negative ways □ a better strategy might be to cooperate to protect resources in the West and support a healthy Western economy.

For example, the Sonoran Institute, a non-profit organization founded by environmentalists and business leaders, promotes “a community-based approach to conservation too often missing in the United States” and works with local communities to protect the natural, economic, and social concerns important to local people throughout the West (The Sonoran Institute 1996: 1). They work with communities to measure change and deal with it. Options they and other groups use include giving ranchers power and respect in policy discussions, exploring land exchange options, and even helping them to address market issues. For example, a group of ranchers and environmentalists in

Livingston, Montana are working with the Corporation for the Northern Rockies to develop business and marketing strategies to promote profitable “green” wool products made from sheep raised without lethal predator control (The Sonoran Institute 1996). Such community-based initiatives are discussed in greater detail in chapter seven.

In addition, Native Americans might be indulged in respect by asking for their opinions on management, and a lot might be learned from their centuries of experience on Western lands. Natural regulation is already changing, with the lethal control of bison inside and outside of the park. Options such as distributing meat and bison carcasses to tribes are already being used. Other options might include allowing Native American hunts in the park to cull the herd. This may or may not be politically feasible, but such options are worth exploring.

For example, in other areas of the country Native Americans have become more directly involved in resource decisions on reservation and other federal lands. Groups such as the Indigenous People’s Restoration Network, the Tacoma Intertribal Project, and the Confederated Tribes of Warm Springs Reservation are combining ecological restoration and cultural renewal (Conley 2000). Some restoration approaches such as thinning overstocked lands and prescribed burns are standard practice, other efforts are unique and combine job creation, ecological restoration, and religious values. For example, the Tacoma Intertribal Project has restored the salmon ceremony to help restore the oak and pine savanna (Conley 2000).

There is also a pilot project on the Plumas National Forest in California that applies traditional American Indian stewardship practices to national forest management (Conley 2000). According to Farrell Cunningham, stewardship coordinator for the Maidu

group, the project is founded on the idea that “it wasn’t just a natural forest where human beings never did anything. It was a real forest, not just some vision of an ideal place” (Little 2000: 6). The project leaders also seek to demonstrate how traditional management can both create jobs and protect forest health (Little 2000). The project is planned in 10-year segments for 99 years.³

Understanding underlying value demands can also help to focus attention in policy debates. For example, while human health arguments have arisen at various points in this debate, they seem limited to given professions and sports (i.e., hunting). Determining that human health is not a major concern can direct resources elsewhere.

The message that we need to identify underlying value demands is relevant for all participants, not just policy makers. Instruments such as social surveys can be helpful to policy makers who wish to identify the values of the public. However, participants in policy debates often fail to clarify their own values and what they truly wish to gain. Processes developed to find common interest could begin with a standpoint clarification on the part of all participants. It is common practice to identify goals such as maintaining the economic health of the livestock industry. However, identifying goals such as building trust or a sense of community among diverse groups is equally important. Being clear on one’s own values and goals can facilitate the articulation of demands made and alternatives offered to get those demands met.

Conclusion

Placing the goals of sustainability, ecosystem health, and biodiversity in the context of finding common interest means finding common ground among many

³ For more information, contact Maidu Cultural Development Group, PO Box 426, Greenville, CA 95947, 530-284-6866; or Mt. Hough

competing interests and value demands. The analysis above begins to highlight the many underlying value demands in the bison case, but it is from one researcher's perspective. Finding common interest will require that participants work to clarify their own interests and values to find and secure common interest. The suggestions above, some of which are elaborated in chapter seven, are meant to be a beginning rather than a conclusion. The conclusion can only be reached when participants in the policy process find and secure their perception of the common interest.

Works cited

Angell, J. (1997). Interview. July 8. Bozeman, MT.

Anonymous (1997). Bison deal just politics, but maybe it's the best we can get. Bozeman Daily Chronicle, June 29.

Anonymous (1997). Conservationists file for emergency injunction to halt bison killing. U.S. Newswire. Helena: National Desk, Environment Writer.

Anonymous (1997). "The great bison break-out." The Economist Jan. 22: 28.

Anonymous (1997). Slaughter in the West. USA Today, Jan. 27: 15A.

Anonymous (2000). Numbers. Time, Dec. 13: 23.

Barsness, L. (1985). Head, hides, & horns: The compleat buffalo book. Fort Worth, Texas: Christinan University Press.

Blumberg, L. and D. Knuffke (1998). "Count us out: Why the Wilderness Society opposed the Quincy Library Group legislation." Chronicle of Community Winter: 41-44.

Brady, J. R. (1999). A senseless slaughter in Montana. Post Register, Feb. 9.

Ranger District, Plumas National Forest, 39696 Highway 70, Quincy, CA 95971, 530-283-0555.

- Brooke, J. (1996). Yellowstone wolves get an ally in tourist trade. The New York Times, Feb. 11: 20.
- Bury, C. (2000). Buffalo Wars.
http://abcnews.go.com/onair/nightline/transcripts/n1000209_trans.html, Nightline.
- Campbell, J. (1998). Interview. Oct. 1. Helena, MT.
- Chase, A. (1997). Bad news: Yellowstone bison plan is working. Anchorage Daily News, Feb. 19: 7D.
- Cheville, N. F. and D. R. McCullough (1997). Brucellosis in the Greater Yellowstone Area, National Academy of Sciences.
- Cheville, N. F. and D. R. McCullough (1998). Brucellosis in the Greater Yellowstone Area. Washington, D.C.: National Academy Press.
- Conley, A. (2000). "Indian perspectives on ecosystem restoration." Communities and Forests 4(1): 3.
- Egan, D. (1995). Bison plan sights in on infected animals. Idaho Falls Post Register, Jan. 5: A1.
- Farquhar, B. (2000). "Montana pleased, greens glum over final bison plan." Casper Star Tribune. Dec. 21: A1.
- Finley, M. and J. Mak (1996). Finding of No Significant Impact: Interim Bison Management Plan. Mammoth, Yellowstone National Park.
- Flitner, S. (1997). "Brucellosis-Who will take the lead?" Cow Country March 1997.
- Flournoy, R. (1999). "The price of Beef." Range Winter 1999: 23-27.
- Gorman, S. (1997). "Wild and free no more." Animals September/October: 20-24.

Greystone (1999). Content Analysis of Public Comment for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park. Greenwood Village, Colorado, Department of Interior, National Park Service, Department of Agriculture, U.S. Forest Service and Animal and Plant Health Inspection Service, State of Montana.

Guyer, J. S. (1938). Pioneer life in West Texas. Brownwood, TX.

Hagenbarth, J., D. Rath, et al. (1997). The cattle industries of the Greater Yellowstone Area. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

Holt, J. (1999). Telephone Interview. March 5.

Hutchinson, P. (1997). Blood on the snow; Buffalo slaughter raises commotion. Denver Post, Feb. 23: A1.

InterTribal Bison Cooperative (1998). Restoring the Buffalo to North America. Rapid City, SD, ITBC.

Jensen, P. (1997). U.S. Department of Agriculture perspectives on solving the Greater Yellowstone Area brucellosis problem. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

LaDuke, W. (1998). "Saving Yellowstone's Buffalo." Native Peoples 12(1): 50-54.

Lasswell, H. D. (1936). Politics: Who Gets What, When, and How. New York: McGraw-Hill.

- Lasswell, H. D. and A. Kaplan (1950). Power and Society: A Framework for Political Inquiry. New Haven: Yale University Press.
- Lasswell, H. D. and D. Lerner, Eds. (1965). World Revolutionary Elites: Studies in Coercive Ideological Movements. Cambridge, MA: The M.I.T. Press.
- Lasswell, H. D. and M. S. McDougal (1992). Jurisprudence for a Free Society: Studies in Law, Science and Policy. New Haven: Yale University Press.
- Lasswell, H. D. and M. S. McDougal (1992). Jurisprudence for a Free Society: Studies in Law, Science and Policy. New Haven: Yale University Press.
- Lawrence, E. A. (1999). "The symbolic role of animals in the Plains Indian sun dance." <http://arrs.envirolink.org/psyeta/sa/sal.1/lawrence.html>.
- Little, J. B. (2000). "Maidu pilot project advances Indian forest stewardship." Communities and Forests 4(1): 1, 6.
- Little-Thunder, R. (1997). To Chris Kelley of the Church Universal and Triumphant; Response to your bison e-mail, www.wildrockies.org/Bufalo/speak/rosalie2.html.
- Little-Thunder, R. (1999). Interview. Feb. 23. Livingston, MT.
- Loomis, B. and N. Bower (1997). Bison up for bid--proceeds will help pay cost of shooting buffalo after they wander out of Yellowstone. Idaho Falls Post Register, Feb. 17: A1.
- Meyer, M. E. and M. Meagher (1997). Brucella abortus infection in the free-ranging bison of Yellowstone National Park. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

- National Park Service, State of Montana, et al. (1998). Draft Environmental Impact Statement for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park. Denver, CO, National Park Service, state of Montana, U.S.F.S., U.S. Animal & Plant Health Inspection Service.
- Nellis, L. and D. Glick (n.d.). Tools for Managing Growth in the Greater Yellowstone Area. Bozeman, MT, Greater Yellowstone Coalition.
- Nelson, B. (1997). "Urban environmentalist vs. Rural America." Range Magazine **Fall 1997**: 24-25ff.
- Peacock, D. (1997a). The Yellowstone massacre. Audubon. **June**: 40(16).
- Peck, C. (1997). "Bison, brucellosis, and bureaucrats." Farmer-Stockman **Mid-Feb.**: 5-10.
- Potter, J. (1997). Feds are bad neighbors. USA Today, Feb. 6.: 12A.
- Power, T. M. (1991). "Ecosystem preservation and the economy in the Greater Yellowstone area." Conservation Biology **5**(3): 395-404.
- Probst, L. (1997). Preface: Ranching in a Changing West. Preserving Working Ranches in the West. M. C. Liz Rosan, Dan Dagget, Chris Elmendorf, eds. Tucson, Arizona: The Sonoran Institute. pp. 7-8.
- Range Magazine (1992). "The Disappearing Cowboy." Range Magazine **Summer 1992**: 48 pp.
- Range Magazine (1995). "Who's endangered now?" Range Magazine **Summer 1995**: 64 pp.
- Rasker, T., N. Tirrell, et al. (1992). The Wealth of Nature: New Economic Realities in the Yellowstone Region. Washington, D.C.: The Wilderness Society.

- Reading, R. P., T. W. Clark, et al. (1994). "Attitudes and knowledge of people living in the Greater Yellowstone Ecosystem." Society & Natural Resources 7(4): 349-365.
- Reynolds, J. J. (1996). Testimony of John J. Reynolds Deputy Director, National Park Service U.S. Department of the Interior Senate Energy Parks and Historic Preservation and Recreation National Parks Legislation. Washington, D.C., Congress.
- Robbins, J. (1995). With return of wolves to West, predatory habits bring back fear and anger. New York Times, Feb.6: 22.
- Sahagun, L. (1997). Yellowstone bison roam into deadly battle; Environment; Fear of disease has led to slaying of 733 animals. U.S. offers plan to slow the killing. Los Angeles Times. Jan. 31: A1.
- Satchell, M. (1996). A discouraging word for buffalo: Yellowstone's infected herd is facing roundup, blood tests, bullets--and the slaughterhouse. U.S. News & World Report. 121: 61(3).
- Severhen, B. (1998). Interview. Sept. 25, Gardiner, MT.
- Siroky, C. J. (1996). Prepared testimony by Clarence J. Siroky state veterinarian, Montana Department of Livestock before the Senate Energy and Natural Resources Committee Subcommittee on Parks, Historic Preservation, and Recreation Senate Hearing for Senate Bill 745. Washington, D.C., Congress.
- Smith, B. and T. Roffe (1992). "A political disease brucellosis." Bugle Summer: 71-80.
- Tanner, O. (1977). The Ranchers. Chicago: Time-Life Books.
- The Sonoran Institute (1996). The Sonoran Institute 1996 Annual Report: Partners in Community Stewardship. Tucson, AZ: The Sonoran Institute.

- Thorne, E. T. (1998). Presentation: Bovine brucellosis and bison, elk, and cattle in the Greater Yellowstone Area, AMK Ranch.
- United States Senate (1995). Senate Bill 745 to require the National Park Service to eradicate brucellosis afflicting the bison in Yellowstone National Park. 104th Congress, 1st session, Washington, D.C.
- U.S. Department of Interior, U.S. Department of Agriculture (2000). Record of Decision for Final Environmental Impact Statement and Bison Management Plan for the State of Montana and Yellowstone National Park. (December 20, 2000).
- Urbigkit, C. (1997). Geringer warns states to avoid brucellosis disaster. Jackson Hole Guide, March 12.
- Wells-Norlin, G. (1999). Interview. April 6, 1999. Bozeman, MT.
- Wilkinson, C. F. (1992). Crossing the Next Meridian. Washington, D.C., Island Press.
- Wilkinson, T. (1997). Yellowstone's bison war: a plan to combat disease threatens America's famous wild and free-ranging bison herd. National Parks. 71: 30(4).
- Wilkinson, T. and D. Peacock (1997). The Yellowstone massacre. Audubon. 99: 40(17).
- Witkowski, K. and E. Arnold (1997). All Things Considered: Yellowstone Bison. Missoula, MT: National Public Radio, Inc.

Chapter 5

The Meaning of Buffalo:

Myth and the policy process

“The ranching lifestyle,” according to the Montana Department of Livestock (DOL), “is a driving force in Montana culture, helping to define the ethic of neighborliness and a sense of community that give us good reason to call our state ‘the last best place’” (March 15, 2000, <http://www.liv.state.mt.us?Bsnpmflt.htm>). The statement appears in a section of DOL’s web site that discusses the debate over brucellosis and bison. It implies that brucellosis threatens not only ranchers, but also the “ethic of neighborliness” and the “sense of community” that define the West.

In the words of Yellowstone wildlife management specialist Wayne Brewster, the bison debate is “an engagement of opposing sides and ideologies” (Wilkinson 1997a: 31). People who advocate “zero-tolerance” for bison with brucellosis will likely never view bison policy the same as those who advocate maintaining a “wild and free-roaming herd.” Their views differ on how humans and nature relate.

Opposing views about how to manage (or not manage) nature are one factor that have allowed the debate over bison management to continue for decades. Recall there has never been a known case of transmission from bison to cattle in the wild and only fourteen ranchers graze cattle outside the Park, largely when no bison are present outside Park borders. Recall too that only females of calf bearing age can theoretically transmit the disease because it is carried only in birthing material, but all bulls and calves are also being tested and/or killed. Millions of dollars and other resources have

been expended to resolve this debate and thousands of bison have been killed. Harold Lasswell, credited with beginning the field of political psychology (Davies 1973; Purcell 1973), said, “whenever there is a striking lack of proportion between an act and the reasons alleged for it, there is a presumption that some unconscious impulses are involved in the act” (Lasswell 1977: 233).

This insight by Lasswell helps to explain why underlying social and political factors play a key role in the gridlock over bison management. Identifying the problem as a biophysical one such as brucellosis is common in natural resource management, as discussed in the introduction and in more detail in chapter six. However, the discrepancy between actual risk of transmission and the intensity of actions, including slaughtering male bison that cannot theoretically transmit brucellosis, indicate that more intangible, unconscious factors than brucellosis are involved in this debate. Factors such as the communities with which people identify themselves, their expectations about the way the world works, and demands they make have contributed to the endurance and intensity of the controversy surrounding bison management.

Collectively, people’s identities, expectations, and demands make up their myths, or guiding philosophies and ideologies. Rather than using the term myth to mean merely false belief, this dissertation uses “myth” to describe social constructions of reality and pervade all aspects of society, including entertainment, religion, politics, and advertisements (Patai 1972). They affect everything from what we purchase to the relationships we form to our political positions. For example, historian Lynn White points out that in America, “our daily habits of action . . . are dominated by an implicit faith in perpetual progress which was unknown either to Greco-Roman antiquity or to

the Orient” (White 1967: 1205). Shopping in the aisles of grocery, hardware, sporting goods, or other stores, American consumers often purchase “new and improved” products that simultaneously appeal to and reinforce our faith in progress. Calls for improved testing measures for brucellosis and a safe, effective vaccine for wildlife are also influenced by a faith in progress.

Like corporations who used slogans such as Nike’s “just do it” to sell their products, decision-makers, politicians, advocacy groups and others involved in decision-making processes use slogans and symbols to entice citizens to “buy” their policies. The slogans and symbols are chosen to appeal to different perspectives. In other words, to gain public support, politicians justify proposed policies by appealing to the myths of their constituents (Brunner 1998). For example, in the bison debate, words such as “slaughter” and “massacre” used in conjunction with the killing of large numbers of bison evoke emotions that might lead the public to view the killings as wrong. Such “unscientific” words and phrases become symbols in a policy debate, used to elicit a reaction and to justify policy positions. In contrast, using terms such as “management action” or “eradication measures” to describe the intentional death of bison or other wildlife at human hands might evoke different emotions or be used to minimize emotion. Such non-scientific concepts can be more powerful politically than dense scientific data and calculations or theory.

The purposes of the discussion below are to: 1) describe the relationship between myth and power, or myth in politics, because as discussed in chapter four, many of the problems experienced in bison management arise from power struggles; 2) discuss the influence of conflicting myths on the bison debate and the alternatives

proposed; and 3) demonstrate how understanding underlying myths can help to develop policy solutions--including new myths--and effective justifications for them. The discussion begins with theory and becomes more concrete when discussed in the context of bison management.

Political myths

Myths are fundamental assumptions about the world. Political myths provide nations and other inclusive groups with solidarity (Patai 1972, Tudor 1972). Solidarity through shared political myths allows leaders to gain the approval, or at least acceptance, of those under their power (Lasswell, Lerner et al. 1952). Without this acceptance, chaos results (Lasswell, Lerner et al. 1952). Political myths legitimize government authority.

Issues of authority are central to the bison debate, as described in detail in chapter four. State and federal agencies, agricultural and conservation interest groups, Republicans and Democrats, and long-term and newer residents to the West are all vying for power. Expectations about how to handle wildlife that carry domestic cattle diseases are not stable or shared among participants. Differing perspectives on which agency (or agencies) should control bison management, which participants' interests should be met and how, and how decisions should be made has resulted in a stalemate. The line of decision-making is obscured by fragmented decision-making structures in which decisions get made behind closed doors. The bison debate raises questions about the appropriate means to govern our natural resources.

Using concrete cases to work out expectations about decision processes and find common interest among competing myths is vital. It is essentially impossible to develop such expectations in theory alone, outside of specific contexts. A few characteristics of myths help explain why they are usually implicit, rather than explicit, in policy debates. First, myths are assumptions made without supporting empirical evidence. Many people would never question the existence of God, a Great Spirit (or spirits), Allah, or other supreme beings. In a more secular example, most Americans do not question democracy as the best form of government. Second, mythical and non-mythical arguments often appear together (Tudor 1972). Such coupling is common because “myths are interpreted by and, in a sense, translated into arguments of a non-mythical kind” (Tudor 1972: 127). Mythical arguments are not clearly visible, but remain implicit. For example, many scientific arguments—such as ones relating to range capacity—contain assumptions about desirable natural conditions, including appropriate wildlife population sizes and acceptable levels of “natural” change. Third, when people debate “the literal truth or falsty of the myth, it is evidence that the older bonds of civic cohesion have frayed, perhaps beyond repair” (Lasswell, Lerner et al. 1952: 1). When people do begin questioning their myths, it is an indication that change is in order. Questioning a myth can lead to feelings of release, liberation, or letting go, allowing for social adjustments and political order.

Some concepts in the policy sciences provide a tool to help us think about the role of myths in the bison debate and how to use an understanding of myths to help clarify and secure the common interest. Myths consist of doctrine, formula, and miranda (Lasswell 1949). Doctrine includes the expectations and demands established

by the myth. For example, the Declaration of Independence, the Gettysburg Address, and the Preamble to the Constitution articulate the shared expectations of Americans (Brunner 1994). Americans expect the right to “life, liberty, and the pursuit of happiness” and other rights (Brunner 1994). Formula provide the rules and social structure to meet expectations and demands (Lasswell 1949). In the United States, the Constitution establishes the political structure--such as separation of powers in the three branches of government--and contains the laws (or formula) to achieve political goals (Brunner 1994). Symbols are parts that stand for the whole myth. Signs, which include words, phrases, and images, are the visible component of symbols and stir emotion by representing the larger myth. The American flag, the national anthem, “Lincoln,” and “Washington” are among the symbols that represent American myths (Lasswell 1949).

These fundamental precepts of American democracy are important because, as MacIver wrote in *The Web of Government*, “A multi-group society is a multi-myth society. Its appropriate form of government can be based only on some form of myth that accommodates conflicting myths, and . . . that condition is met by the myth of democracy” (MacIver 1947: 51). Finding and securing common interest among increasing numbers of interest groups and government agencies requires finding effective means to resolve conflict. Understanding how to justify alternatives according to many different beliefs is also vital in achieving resolution to the bison debate. Below I discuss the different myths influencing the bison debate and conclude with recommendations for improving decision-making processes by appealing to the myth of democracy, a myth most Americans share.

Underlying myths in the bison debate

Preservation and modernization

Two conflicting myths have shaped Western culture. Followers of the first, the modernization myth, seek to civilize the untamed wild, to reap material rewards from extractable raw materials, and to shape the landscape into a familiar sight.

Modernization fosters the expectation that humanity can “improve” nature to suit its needs through technological and scientific knowledge that progresses in a linear fashion. Demands are made for the extraction and use of natural resources according to humanity’s needs, with little concern for the past or future or for creatures other than humans. Western heroes such as Buffalo Bill and Kit Carson symbolize this myth.

Political scientist Jim Scott points out that the formula, or rules, used to meet these expectations under modernism (or what he calls “high modernism”) is about “‘interests’ as well as faith” (Scott 1998: 4). He says:

Its carriers, even when they were capitalist entrepreneurs, required state action to realize their plans. In most cases, they were powerful officials and heads of state. They tended to prefer certain forms of planning and social organization (such as huge dams, centralized communication and transportation hubs, large factories and farms, and grid cities), because these forms fit snugly into a high-modernist view and also answered their political interests as state officials.

There was, to put it mildly, an elective affinity between high modernism and the interests of many state officials. (Scott 1998: 4-5).

The centralization justified by high modernism helps officials to gain and maintain control by developing bureaucratic structures capable of large-scale projects that modify the human and natural environment. These structures, as we have seen in the bison case, can serve to grant power to governing officials and keep it from citizens.

“Zero-tolerance” for brucellosis symbolizes the modernization myth in the bison debate. Ranching and veterinary interests expect to improve nature to protect themselves, and demand the eradication and control of bison population numbers. The most intensive management options—including vaccination and testing and slaughtering—are the formula justified under modernization: eradicating brucellosis from bison will improve nature by removing a threat to economic growth and progress. Techniques like testing and slaughtering, contained in the final Record of Decisions, also seek to “improve” bison by making them disease-free and averting what is touted as a possible economic disaster. Controlling bison population numbers will also be an improvement under the modernization myth. For example, Park scientist Dan Huff stated that “‘in my opinion we can’t sit back and let those populations do what they do naturally’” (quoted in Associated Press 1990). Reporter and writer Alston Chase, a well-known opponent of the park’s natural regulation policy, argues that “rather than being rare, buffalo are so numerous that they’ve overpopulated their habitat” (Chase 1997).

Most of the structures of governance have been centralized in agency led efforts and have involved scientific “experts” and high-level officials. Such scientific management in natural resources is an outgrowth and specialization of modernization.

It is not expected that communities have the expertise to resolve these issues without the guidance of centralized authority.

The preservation myth is set in opposition to the modernization myth.

Preservation emphasizes the wildness of the West and the intrinsic value of nature. In this myth, nature is paradise, an idyllic place to keep in a static or “naturally” dynamic state for its own sake and for the enjoyment of future generations. Humanity depends on wilderness for physical, spiritual, and aesthetic survival and must take measures to protect it. The preservation myth arose from the Judeo-Christian concept of nature as Eden. The myth is expressed in narratives in which human actions cause environmental degradation to a pristine natural area and place us in “moral jeopardy” (Cronan 1995: 37).

This myth establishes the expectation that human actions destroy nature. For example, over forty years ago, a proud resident of Jackson Hole, Wyoming and a hunter who made money by leading hunting trips, L. W. Gay Randall described the impact of human settlement on elk in the Jackson Hole region: “The homesteaders came in ever-increasing numbers, until almost every little narrow valley hugged by the mountain ranges was occupied, thus cutting off the last natural retreats for the wild game herds.” He goes on to name Yellowstone National Park as “the only one place left” for wildlife, “a sanctuary” (Randall 1961: 167).

Doctrine to uphold this myth include policies to minimize human actions that alter the environment. For example, historian Dan Flores said, “what we’ve often destroyed is not just species but ecosystems” (Flores 1997: 6). In other words, humanity’s actions have destroyed some pre-existing ideal state. In bison

management, many people refer directly to the idyllic past when making the case for protecting the wild, free-roaming nature of the Yellowstone bison herd. For example, Tony Jewett of the National Parks and Conservation Association stated that the Record of Decision fails to protect the idyllic past: “Each year, three million people visit Yellowstone National Park. Many cite views of free-roaming buffalo as their greatest wildlife thrill—a rare opportunity to see an American West that has been largely lost” (http://hosts4.in-tch.com/www.greateryellowstone.org/bison_newsrelease.htm).

Formula to fix the environment in bison management include alternatives to restore the wild and free-roaming nature of bison. The demand to allow bison to return to historical migration patterns at any population level are part of the formula. For example, one animal rights activist claimed. “having a management objective of capping the herd at 3,000 is self-contradictory to the concept of having a herd of free-roaming, naturally regulated bison” (Farquhar 2000).

The Miranda, or symbols, of the preservationist myth in the bison debate include references to the “second slaughter” and “massacre.” These references compare the current killing of bison to the death of millions of bison at the turn of the century, which occurred because of human actions and desires: the arrival of the railroads in the West, improved commercial tanning processes for buffalo skins, the demand for buffalo robes and bison meat, intentions of individuals in the U.S. Army to exterminate Indians by destroying their subsistence base, and the excitement of the hunt itself for sport (Barsness 1985, Dary 1989, Geist 1996, Haines 1977, Smits

1994). Ecological factors including disease or periodic extinction may have also played a key role (Flores 1997).

Those who argue from a preservationist perspective invoke not only history, but also the natural regulation policy. They make demands for a “wild and free-roaming herd” to support “preservationist” alternatives such as minimizing the death of wild bison. A “free-roaming” bison herd recalls an idyllic past when buffalo roamed the entire continent. In the preservationist myth, wildlife has a right to roam free. Minimizing intervention in nature is demanded.

The goal of finding common interest policy is not to decide which “myth” is the most appropriate, but rather to recognize different myths and values and to find common ground among competing demands. Finding common interest is not a fixed point arising from a fixed method of thinking, but rather is a process of adjusting to changing and competing ideologies and policy outcomes. These ideas are discussed in reference to bison management below.

The influence of conflicting myths on policy

The opposition between “wild and free-roaming” and “zero-tolerance” is an old narrative. Many Western narratives set nature as good and idyllic in opposition to desires to civilize and tame nature. In some versions, early pioneers were heroes who saw the land as wild, and through bravery and cunning tamed nature and opened the way for all Americans. Other versions emphasize the violence necessary to make white settlement of the West possible. Daniel Boone embodies the conflict between these myths in one persona. He is simultaneously seen as a pioneer paving the way

West for the masses on the one hand, and as a hunter and child of nature who disliked settlers because they scared away game on the other hand (Smith 1950).

This opposition continues to influence contemporary stories of Western resource management, and has influenced not only narratives and ideological conceptions of the West, but also the management of natural resources in the West. Ideological appeals in resource management issues throughout the West have allowed for both the creation of national parks and clearcutting of national forests. They have permitted the conquest of Native Americans, land, and resources. They have led to subsequent battles to preserve cultural and ecological diversity. They have shaped the institutions through which we govern natural resources. The state and federal debate and the debate between environmental and ranching interests are also in part rooted in the conflict over preservation and modernization. State control often means more direct intervention in nature through range and game management (modernization). Federal management often means less control over nature, i.e., natural regulation (preservation).

State's rights and the interests of cattle ranchers and extractive industries (the modernization myth) have long dominated institutions and public policy in the West. However, policies such as natural regulation indicate the increasing influence of preservationist ideals. The balance of power seems to be changing. The "changing of the guard" has caused many ranchers to feel isolated in a community in which they once enjoyed great respect and loyalty from fellow citizens. The changing of the guard and subsequent effects on citizens arise in part because of changing assumptions about the relationship between people and the land (Hagenbarth, Raths et al. 1997: 155). For

example, in the early part of the century, the federal government began a predator control program to rid the area of species such as wolves and coyotes that prey on game animals such as elk and on livestock (Haines 1977). After spending decades eradicating wolves to diminish the threat to livestock and “desirable” wildlife, the federal government reintroduced wolves to Yellowstone in 1995. They justified the action in part because reintroduction would restore a “natural” balance between predators and prey. The Endangered Species Act, the National Environmental Policy Act (NEPA), and battles over bison are other indicators of this “changing of the guard.”

The “natural regulation” policy of Yellowstone National Park is perhaps the most salient symbol of this changing of the guard. Natural regulation means the park uses minimal human intervention to manage resources in the park. In other words, nature starvation, predators, and other natural conditions control wildlife populations to the greatest degree possible rather than direct human intervention. This management philosophy may seem like a dream environmentalists and others who subscribe to a “preservationist” worldview--let nature run its course, keep humanity away from nature. But Keiter (1993: 5) observes that the bison controversy “calls into question the validity of the Park Service’s ‘natural regulation’ management policy when adjacent private interests are adversely affected.” To ranchers and others who subscribe to more of a “modernization” myth or world view that prescribes “improving” nature for human use, and who suffer consequences from bison leaving the park, this natural regulation may seem more like a nightmare than a dream--

humanity should control nature. What happens to bison is influenced by who has power and what their underlying myths are.

To many, roaming bison symbolize conservation and even American democracy. A resident of Greater Yellowstone and a journalist, Doug Peacock claims “the right of bison to lead a wild bovid life on America’s wildlands must be a given” (Peacock 1997: 10). A former Undersecretary of the Department of Interior, Don Berry, even said this bison herd is as important to this country as the Statue of Liberty (Bury 2000). Jeanne-Marie Souvigney, an environmentalist formerly with the Greater Yellowstone Coalition, said that “what is happening is a struggle over use of public lands, and the value of wildlife, and in this case the wildlife are losing” (Witkowsky and Arnold 1997). One conservationist calls the killing of bison in Montana an eight-year “continual, incremental massacre of the herd” and asks “is Yellowstone a sanctuary for wildlife, or are we going to allow the livestock industry to turn it into a livestock yard and zoo?” (Wilkinson 1997b). A “sanctuary for wildlife” embodies the preservationist concept of protecting nature, while the “livestock yard and zoo” embody the modernist notions of controlling nature.

In contrast, one representative of the livestock industry said, “the whole bison-brucellosis problem can be considered a symptom of a much larger issue. The management of all the resources affiliated with Yellowstone park or the lack thereof. And I think that’s what most people’s issue is. There is no management” (Campbell 1998). The livestock official is not alone in his thinking. Satchell (1996) cites former Montana state veterinarian, Clarence Siroky, as blaming the natural regulation policy for the debate. Siroky advocates culling, castrating, relocating or feeding bison--the

same methods used to manage livestock--to maintain population levels that the park can support and to prevent them from seeking forage outside the park. He says that "the impact upon Montana, Wyoming and Idaho was never figured as part of the 'natural' equation. Natural regulation has resulted in excess numbers, loss of habitat, with subsequent migration of large numbers of bison and elk onto federal and private grazing lands used by cattle in the GYA" (Siroky 1996). Wyoming Governor Jim Geringer and Wyoming Agriculture Director Rob Micheli see overpopulation of wildlife and failure to vaccinate wildlife populations as the underlying problems in brucellosis management (Urbigkit 1997). One rancher expressed his belief that "'bison in Yellowstone Park are of great value to all of us. Bison outside Yellowstone Park can only offer problems'" (quoted in Howlett 1990).

Others are also highly critical of current wildlife management philosophies. Alston Chase says that "this fiasco signals the intellectual bankruptcy of the entire U.S. preservation effort, which is based on the same philosophy and is producing countless other ecological calamities across the continent" (Chase 1997). He claims that "preservationism has become the victim of a split between two cultures: on one hand, ecologists, most of whom advocate 'active' steps such as culling herds, manipulating habitat and burning forests, and on the other hand, environmentalists, park rangers, and much of the public, whose emotional attachment to the myth of 'undisturbed' wilderness won't allow them to do anything until it's too late" (Chase 1997). These groups and individuals perceive the natural regulation as allowing "unacceptable numbers of animals" to damage the range (Hagenbarth, Rath et al. 1997: 158).

Many people fall somewhere in between views that arise from a modernist myth and view that arise from a preservationist myth. Montana rancher Sandy Pew feel that bison sometimes must leave the park, but he still worries about sanctions placed on cattle if their exit from the park lands them in a cattle herd (Wilkinson 1997a). Others might wish to intervene, but for reasons other than economic gain or progress: Many Native American tribes feel a great sense of guilt, because they feel a responsibility to be the caretakers of bison. At the National Brucellosis Symposium in 1994, members of Native American tribes presented a management proposal that said, “humans are only caretakers of bison, which have significant spiritual and cultural value to tribal people” (Intertribal Bison Cooperative 1996: 46). This statement implies that intervention in nature is needed, but it is a mutual relationship--changes should be made in the spirit of serving as caretakers rather than as agents of improvement and progress. It is a compromise, of sorts, between the preservationist view of humanity and nature as separate (with humanity only serving to destroy nature) and the modernist view that changes made by humans on resources are improvements if they serve people.

Whatever one’s personal philosophy on natural regulation or our relationship with nature, tension is rising in the West as these myths continue to clash and change. Changing myths cause rising tensions. Militia groups may be the most well-known symbol of rising tensions in the West. These groups believe in democratic principles but also that the federal government is failing to uphold democracy. Acts of violence and threats of violence are being aimed at federal employees, especially in natural resource agencies, in the West. In rural Nevada, for example, employees of the

National Forest Service feel threatened, intimidated and harassed because they work for a federal land management agency; an atmosphere of resentment against the federal government pervades natural resource management there (Sonner 2000). While tension has not resulted in widespread violence in the bison debate, it has intensified demands for local authority. The former president of the Wyoming Stockgrower's Association, for example, stated, "the Wyoming Livestock Board must gain the confidence of the Governor and the surrounding state agencies, or the future of Wyoming's livestock industry is going to be decided by others" (Flitner 1997).

When participants come into conflict over specific issues such as bison management in part because of differing underlying myths, the conflict contributes to the mistrust of outsiders and the federal government. This trend began early in the settlement of the West. While sportsmen and other visitors provided income for residents and the town of Jackson, Wyoming, much of the community mistrusted these visitors. As early as 1903, after a visit to the Teton Forest Reserve, the journalist Frederic reported that many residents of Wyoming feared "that the government of the United States is acting as a cat's-paw for the eastern sportsmen's league that avowedly wished to drive the cattle from the mountains and the settlers from their homes," and compared it to "the black page of English history when the rich and powerful confiscated the homes of the lowly to make hunting parks for the amusement of the great" (quoted in Saylor 1970: 184, 193.)

Rather than diminishing over time, the conflict between interests and actions arising from preservation and modernization, and between state and federal authority, has persisted and in some cases has become more intense. Keith Aune, an employee of

Montana Fish, Wildlife, and Parks, said, “we see oftentimes--and I’m speaking also as a person who was raised in this state--we see the federal government trying to dictate to us a policy that appeals to a national audience, but may not be in our best interests in the state of Montana” (Bury 2000). Aune makes a point to identify himself as a “native” of Montana and sets national interests in opposition to the interests of Montanans. Implicit in this statement is the opposition between preservation and modernization, between environmentalism and agriculture.

Significance

Vastly different points of view are deeply embedded in the character of the West. These points of view are not likely to change, but the same policies can appeal to multiple myths simultaneously. In other words, a clash of fundamental worldviews does not preclude the possibility of finding a common interest solutions and justifying it in ways to appeal to different worldviews. Understanding myths can help decision makers to frame policy solutions to appeal to a broad audience. Some have even said, “it is beyond the power of philosophy to destroy the political myths. A myth is in a sense invulnerable. It is impervious to rational arguments But philosophy can help us understand the adversary”(Cassirer 1946: 296). Spatial and temporal separation, cattle vaccination, and other means to lower the potential for brucellosis transmission from bison to cattle, for example, can appeal to those who see the world through a preservation myth because they allow for minimal intervention. (Of course, other risk management means such as vaccinating bison, which require rounding up the animals and injecting them like cattle, would not appeal to preservationists because

of the intensive procedures required). At the same time, low-impact means can appeal to those who see the world more through a modernization myth because it imparts some control over nature—"improvement" of nature—for the benefit of humanity.

Justifying risk management as a better alternative than zero-tolerance for brucellosis-infected bison requires considering the expectations and myths inherent in demands for zero-tolerance. Those who call for zero-tolerance clearly place faith in humanity's (and technology's) ability to eradicate brucellosis. There is also the expectation that in the absence of zero-tolerance policies, ranchers might lose their brucellosis-free status that allows them to trade freely among states and internationally. Ranchers estimate loss of this status could lead \$27 million in testing costs (Hagenbarth, Rath et al. 1997). This expectation is tied to an overall feeling of insecurity in the ranching industry and the perception that environmental protection costs industry.

If we examine zero-tolerance versus risk management in light of the expectations, fears, and myths of many in the livestock industry, risk management makes more sense than zero tolerance. Zero tolerance is costly for federal and state governments, American citizens, and livestock producers. Setting a goal of eradication as the only way to safeguard completely against wildlife-cattle transmission is simply poor public relations. The goal, according to a National Academy of Sciences study, is currently impossible to reach (Cheville and McCullough 1998). Failure to reach such an absolute goal as eradication offers a justification for sanctions placed against Montana's beef by other states or countries. It is legally possible to challenge such sanctions, but a better public relations and marketing strategy for Montana would be to

highlight the field-tested effectiveness of risk management measures such as vaccination of cattle, spatial and temporal separation, and containment if transmission were to occur. Accepting risk management does not mean work on a safe and effective wildlife vaccine needs to be halted. However, the economic viability of the livestock industry and sense of safety among producers does not have to remain contingent upon the development and administration of such a vaccine.

In addition, without a wildlife vaccine, the issue over public lands--between preservation and modernization--might become more prominent as demands by ranchers and veterinarians become more intense. A focus on public lands may force those in and connected to the livestock industry to withdraw their zero-tolerance demands. Such a scenario is not unlikely. Some citizens have already said, "it's time to dethrone the idea that grazing is king" (Gerstell 1997). In response to a proposal to require Wyoming Game and Fish to immediately shoot any elk mingling with cattle, critics said, "if elk can't graze on private lands, then cattle shouldn't be allowed to graze on public land" (O'Driscoll 1997). Some ranchers recognize that if the bison issue becomes focused on the use of public lands, ranchers might loose (Mead, pers. communication).

Even if a wildlife vaccine were developed, it would not solve underlying social, political, and economic problems. First, threats to the livestock industry such as concentration in the meatpacking industry, declining demand for beef, and international competition would not diminish significantly. Attention focused on bison and brucellosis might be better spent addressing market factors. Second, debate over competing uses of public lands will not disappear with brucellosis. There is already a

feeling that each natural resource issue is a battle in a larger war over control of Western resources. Rather than attempting to win this battle, it might prove more expedient for all sides in the long run to work on a common-interest solution. For example, ways might be developed to maintain ranch land to protect open space in the West. Such open space provides wildlife habitat, central to Western culture, and is vital to the livelihood of many Western citizens.

We might also examine the expectations of those who promote zero-tolerance of lethal control of bison, or close to it. The natural regulation policy in Yellowstone is founded on the belief that human intervention in nature will necessarily damage an Eden-like state of natural areas. It is assumed that rising bison populations and re-establishment of former ranges are necessarily good. The expectation is that the less humans attempt to “control” nature through actions such as culling wildlife populations, the better life will be for wildlife and the human communities living near wilderness areas.

However, the almost thirty-year controversy over brucellosis has shown the unintended consequences of attempting to meet such expectations. Bison migrations have led to ranchers and others outside the park to make demands about management in the park. These demands led to the slaughter of thousands of bison. Rather than attempting to fight demands for some control, it might be more prudent to find ways to manage nature for nature’s sake as well as for the sake of the human communities near the park. Alternatives exist such as re-establishing Native American hunts and shipping “excess” calves to tribes and other public lands. Some level of intervention in wildlife populations might move us closer to the goal of maintaining the wild nature of

bison than ignoring the changing ecological, social, and political contexts outside the park. These contexts prevent returning to a previous idealized state of nature.

Thus, it is important for each side to examine its own expectations and myths as well as the expectations and myths of other side to attempt to find common ground. A self-assessment can help groups determine if the demands they are making are actually counter-productive for their own goals in the long run. Remaining aware of other groups goals is not only a necessary step in reducing tension, but also in attempting to win the trust and perhaps even alliance and support of those traditionally seen as adversaries.

The myth of democracy

In addition to attempting to understand differences among the myths of the range of participants, it might also prove useful to identify common myths.

Democracy is a common myth, and appeals to American democracy and the right of the people of the United States to make decisions might prove powerful. John Dewey said, “democracy is a way of life controlled by a working faith in the possibilities of human nature. Belief in the Common Man is a familiar article in the democratic creed” (Dewey 1939: 242). Yet, it also necessitates the belief that even when the needs, ends, and consequences for individuals are different and include rivalry as in sport or competition, democracy “is itself a priceless addition to life” (Dewey 1939: 242).

These ideas are not just theoretical. Appeals to the people and to working together appear in statements of people on almost all sides of this issue. Rancher Bob Lucas, for example, says that:

I hope by telling it like it is that I don't come across as anti-wildlife or anti-buffalo. I only wish to point out realities that very much affect the cow-calf business which very much affect open space which very well might affect the view from your own backyard. I hope that we can all work together in Jackson Hole for the wise management of all wildlife and the preservation of open space in this very special valley. (Lucas 1996: 49).

In this statement, Lucas recognizes the fundamental differences that separate his views from the views of conservationists, Native Americans, animal rights groups, and others. But he appeals to a sense of what they have in common: a desire for preserving open space and a recognition of the uniqueness of the valley. He also expresses a desire that "we can all work together," to find common interest.

Amidst the many myths governing resource management in the West, most groups subscribe to the myth of democracy. Democratic principles in theory allow many groups to live together and work through differences. The challenge is to find ways to make the theory work in practice.

As far back as Machiavelli and in our own country, Thomas Jefferson, people advocated what was called "civic humanism" (McCloughry 1997). Rather than following the industrial, bureaucratic model of uniformity, efficiency, and bureaucracy, civic humanism relies on diversity, spontaneity, and decentralization. It means "restoring people to their role as citizens instead of subjects;" citizens participate in decisions rather than merely follow them (McCloughry 1997: 137). It means listening when citizens such as those in Bozeman, Montana come together to find common ground policies.

An essential component of democracy, community, and “civic humanism” is communication. Some scholars define community as a group of people with a means of communication (see Deutsch 1953, 1966), 107 ff). Dewey says that “merely legal guarantees of the civil liberties of free belief, free expression, free assembly are of little avail if in daily life freedom of communication, the give and take of ideas, facts, experiences, is choked by mutual suspicion, by abuse, by fear and hatred. These things destroy the essential condition of the democratic way of living even more effectually than open coercion” (Dewey 1939: 243). In other words, democracy only works when we use our rights of communication: of free speech, of assembly, and of expressing and working through conflicting beliefs. Loss of trust and feelings of disrespect and disaffection can inhibit communication. Inhibited communication and exchange of ideas threaten democracy, for democracy is built most fundamentally on such precepts as free speech, assembly, and religion. Rather than fighting over philosophical differences or allowing different myths to drive citizens apart, processes must be developed to find common interest despite these differences.

Communication involves such characteristics as the exchange of information, organization of some sort--formal or informal, learning, understanding, flexibility, and adaptation (Deutsch 1953, 1966). Not all communication has to be formal. For example, in Mali, farmers reported that they were five times more likely to receive innovative information from informal channels than from formal research and extension channels. Alternatives to develop democratic processes for communication and civic engagement are discussed in chapter seven.

Conclusion

Many of the conflicts over resources in the American West arise from conflicting myths and systems of authority. The worldviews that participants hold influences their expectations and the value demands they make on specific issues. The endurance and intensity of this debate arise from such clashes and contribute to rising tensions in the American West. Under discussions of brucellosis lie such fundamental issues as changing power structures and conflicting views over how to manage natural resources. Alternatives such as vaccination and control of wildlife and/or cattle may address brucellosis, but will do little to address deeper-seated issues that threaten the civic cohesion of the West. Part of the intent of this chapter is to draw some of these deeper-seated issues to light. Addressing these issues will require attention to social and decision-making processes, as described in further detail in chapter seven.

Works Cited

- Associated Press. (1990). "Yellowstone rangers to shoot bison leaving park." The New York Times. Nov. 17: 24.
- Barsness, L. (1985). Head, hides, & horns: The compleat buffalo book. Fort Worth, Texas Christian University Press.
- Brunner, R. (1998). Justifications: Bison management in Yellowstone. Class handout.
- Brunner, R. D. (1994). "Myth and American politics." Policy Sciences 27: 1-18.
- Bury, C. (2000). Buffalo Wars.
http://abcnews.go.com/onair/nightline/transcripts/n1000209_trans.html, Nightline.
- Campbell, J. (1998). Interview. Oct. 1. Helena, MT.
- Cassirer, E. (1946). The Myth of the State. New Haven, Yale University Press.
- Chase, A. (1997). Bad news: Yellowstone bison plan is working. Feb. 19. Anchorage Daily News: 7D.
- Cheville, N. F. and D. R. McCullough (1998). Brucellosis in the Greater Yellowstone Area. Washington, D.C., National Academy Press.
- Cronan, W. (1995). Introduction. Uncommon Ground: Rethinking the Human Place in Nature. W. Cronan. New York, W. W. Norton & Company: 23-56.
- Dary, D. A. (1989). The Buffalo Book: The Full Saga of the American Animal. Athens, Swallow Press/ Ohio University Press.
- Davies, J. C. (1973). Where from and where to? Handbook of Political Psychology. J. N. Knutson. San Francisco, Jossey-Bass, Inc.: 1-27.
- Deutsch, K. W. (1953, 1966). Nationalism and Social Communication: An Inquiry into the Foundations of Nationality. Cambridge, MA, The M.I.T. Press.

- Dewey, J. (1939). *Creative Democracy--The Task Before Us*. John Dewey: The Political Writings. D. Morris and I. Shapiro. Indianapolis, Hackett Publishing Company, Inc.: 240-245.
- Farquhar, B. (2000). "Montana pleased, greens glum over final bison plan." Casper Star Tribune. Dec. 21: A1.
- Flitner, S. (1997). "Brucellosis-Who will take the lead?" Cow Country March 1997.
- Flores, D. (1997). The West that was, and the West that can be. High Country News, Aug. 18: 1, 6.
- Geist, V. (1996). Buffalo Nation: History and Legend of the North American Bison. Stillwater, MN, Voyageur Press, Inc.
- Gerstell, T. (1997). Parks are for all. USA Today. Feb. 12: 10A.
- Hagenbarth, J., D. Raths, et al. (1997). The cattle industries of the Greater Yellowstone Area. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.
- Haines, A. L. (1977). The Yellowstone Story: A History of Our First National Park. Boulder, Colorado Associated University Press.
- Howlett, D. (1990). Buffalo battle: Conservationists vs. the ranchers. USA Today: 8A.
- Intertribal Bison Cooperative (1996). "Intertribal Bison Cooperative." Caldera 5(5): 46.
- Keiter, R. B. and P. H. Froelicher (1993). "Bison, brucellosis, and law in the Greater Yellowstone ecosystem," Land and Water Law Review. 28: 1-75.

- Lasswell, H. D. (1949). The Language of Power. Language of Politics. H. D. Lasswell, N. Leites and Associates. Cambridge, MA, The M.I.T. Press: 3-19.
- Lasswell, H. D. (1977). The triple appeal principle. Harold D. Lasswell on Political Sociology. D. Marvick. Chicago and London, University of Chicago Press: 281-293.
- Lasswell, H. D., D. Lerner, et al. (1952). The Comparative Study of Symbols: An Introduction. The Prestige Press: A Comparative Study of Political Symbols. I. d. S. Pool. Cambridge, MA, The M.I.T. Press: 1-61.
- Lucas, B. (1996). "Bob Lucas, Teton County Rancher." Caldera 5(5): 47, 49.
- MacIver, R. M. (1947). The Myth of Authority. The Web of Government. New York, The MacMillan Company: 39-58.
- McClaughry, J. (1997). Bringing power back home: Recreating democracy on a human scale. People, Land, and Community. H. Hannum. New Haven, Yale University Press: 133-141.
- O'Driscoll, P. (1997). Feared disease introduced via cattle industry. Feb. 23. Denver Post: A12.
- Patai, R. (1972). Myth and Modern Man. Englewood Cliffs, NJ, Prentice-Hall, Inc.
- Peacock, D. (1997). "Yellowstone bison slaughter." Wild Earth Summer 1997: 6-11.
- Purcell, E. A. J. (1973). The Crisis of Democratic Theory: Scientific Naturalism and the Problem of Value, University Press of Kentucky.
- Randall, L. W. G. (1961). Footprints Along the Yellowstone. San Antonio, Texas, The Naylor Company.

- Satchell, M. (1996). A discouraging word for buffalo: Yellowstone's infected herd is facing roundup, blood tests, bullets--and the slaughterhouse. U.S. News and World Report. 121(13): 61.
- Saylor, D. J. (1970). Jackson Hole, Wyoming: The Shadow of the Tetons. Norman, OK: University of Oklahoma Press.
- Scott, J. C. (1998). Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. New Haven, Yale University Press.
- Siroky, C. J. (1996). Prepared testimony by Clarence J. Siroky state veterinarian, Montana Department of Livestock before the Senate Energy and Natural Resources Committee Subcommittee on Parks, Historic Preservation, and Recreation Senate Hearing for Senate Bill 745. Washington, D.C., Congress.
- Smith, H. N. (1950). Virgin Land: The American West as Symbol and Myth. New York, Vintage Books.
- Smits, D. D. (1994). "The frontier army and the destruction of the buffalo: 1855-1883." The Western Historical Quarterly 25(3): 312(27).
- Sonner, S. (2000). Forest Service examination disputed. Feb. 11. Boulder Daily Camera: 3A.
- Tudor, H. (1972). Political Myth. New York, Praeger Publishers.
- Urbigkit, C. (1997). Geringer warns states to avoid brucellosis disaster. March 12. Jackson Hole Guide.
- White, L. J. (1967). "The historical roots of our ecologic crisis." Science 155(3767): 1203-1207.

- White, R. (1995, 1996). "Are you an environmentalist or do you work for a living?":
Work and nature. Uncommon Ground: Rethinking the Human Place in Nature. W.
Cronon. New York, W.W. Norton and Company: 171-185.
- Wilkinson, T. (1997a). Yellowstone's bison war: a plan to combat disease threatens
America's famous wild and free-ranging bison herd. National Parks. 71: 30(4).
- Wilkinson, T. (1997b). Winter and Park Service pact threaten Yellowstone bison. Jan.
22. Christian Science Monitor: 3.
- Witkowski, K. and E. Arnold (1997). All Things Considered: Yellowstone Bison.
Missoula, MT, National Public Radio, Inc.

Chapter 6

The Role of Science in Policy

When asked to identify the fundamental problem with bison management, a park official responded “a gross lack of adequate science” (Anonymous park official 1988). Similarly, a former employee of the Montana Stockgrower’s Association stated his belief that “If you want to develop a solution to resolving a wildlife management issue the science has to come first” (Campbell 1999). Such statements exemplify a pervasive belief that biophysical science can solve natural resource controversies.

While people often attempt to solve policy problems using science, they also recognize the limited role of science and scientists in policy debates. In the words of the former employee of the Montana Stockgrower’s Association quoted above, “Sometimes science can be like legal opinions. If you look hard enough you can find a lawyer that will tell you what you want to hear. Scientists sometimes try to play that” (Campbell 1999). An animal rights activist observed, “I don’t think there is such a thing as truly objective science. There can’t be, because all the science is done by humans, and everybody carries around baggage. Either a set of values from how they were raised or their education, or what they learned, what they think. And that influences what they do” (Schubert 1999). These statements provide insight into why more or better science has failed to resolve the bison debate over the past ten years: humans perform scientific studies. Humans have biases. Therefore, politics and values influence scientific studies and the use of those studies to justify policies.

The failure of positivistic scientists to solve natural resource problems such as bison management has led many communities dependent on natural resources for their subsistence and livelihood to question the role of scientific experts in decision resolving their problems. Jonathan Kusel of Forest Community Research, for example, said to the National Academy of Science's Board on Agriculture and Natural Resources:

In recent years, I've witnessed a distressing trend: Community-based group and the public generally are valuing forestry research institutions less and less because so many of the problems they face are not being adequately addressed, much less resolved, by the experts. Perhaps worse, there is a growing distrust of science. Many community-based practitioners have been whipsawed by interest-based science that has contributed to a reduced valuation and distrust of science (Conley and Moote 1999).

The failure of natural science to solve policy problems can have consequences that reach beyond a given policy debate.

The implication is not that we ignore the expertise biophysical scientists offer. But if our goal is to make decisions that benefit natural resources and the human communities that depend on them--to make decisions in the common interest--then we need to rethink the role of natural science in management. While natural science can inform natural resource policy debates, it cannot solve them. Other factors influence policy debates, including values, myths, and politics, as discussed in chapters three, four, and five. Rather than attempting to eliminate such factors from

policy-making (an impossible goal), it is important to consider all of these factors--as well as biophysical information--when developing effective policies.

It is also useful to think of different types of expert knowledge and science. Many people think of “science” in the narrowest sense, as positivistic science and the knowledge that results from controlled scientific and quantitative studies. However, expert knowledge includes experts not only on biological issues within conservation debates, but also professionals 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, citizens who live and work with resources carry their own form of “civic” expertise of the social, political, and natural environment. Involving all of these perspectives--natural, social, policy, and civic science--when making policy decisions is important.

This chapter will discuss the role of positivistic natural science in natural resource management using bison management as a case study and the potential for different types of science to contribute to policy decisions. It will recommend alternatives to relying on biophysical and positivistic science to solve value-laden natural resource problems. These alternatives include using policy sciences and civic science to inform policy decisions.

Goals of natural resource management: a moving target

To clarify the most effective roles for different types of science in policy and to understand the historical role of positivistic science in natural resource policy, it is useful to define positivistic science and to understand the development of scientific

management and its characteristics. Positivistic science, as defined in an environmental textbook, is “an attempt to discover order in nature and then use that knowledge to make predictions about what will happen in the future” (Miller 1992: 52). It is characterized by a quest for knowledge to make predictions. The scientific method involves developing a testable hypothesis, designing an experimental study, conducting the study in an unbiased manner, and making inferences based on statistical data (McDonald 1993). The standards of scientific research include objective, value-free inquiry in search of knowledge for knowledge’s sake. Failure to follow this procedure leads others to question the validity of a scientific study and integrity of the scientist. Sanctions for failing to follow the scientific method therefore include such things as the loss of respect within the scientific community (and perhaps larger community) and unemployment.

Scientific propositions have come to function as powerful political symbols (Lasswell 1949). Some time between 1850 and the early part of the twentieth century, the use of science for management purposes--scientific management, or Taylorism--came to dominate all sectors, including government, industry, and education (Wiesner 1980). Scientific management focuses on increasing productivity using rational measurement, eliminating waste, and finding one best way (Merkle 2000). The marriage of science, technology, and government paved the way for technological power over nature, and according to historian Lynn White, “its acceptance as a normal pattern of action may mark the greatest event in human history since the invention of agriculture and perhaps in nonhuman terrestrial history as well” (White 1967: 1203).

This pattern replaced the respect granted to the natural world and the guardian spirits of all objects, animate and inanimate.

In natural resources, efficient development of natural resources became the goal of management (Hays 1959). It became the job of managers with specialized expertise to maintain a disinterested and distant perspective and to find the most efficient means of managing resources (Hays 1959). Focusing on top-down management, rational utility, quantification, and mechanism result in attempts to control human interaction and downplay the importance of human nature (Merkle 2000). In natural resources, this has meant focusing on biophysical goals; placing faith in science, statistical studies, and manipulation of the natural environment to resolve our problems; ignoring social and political factors; and discrediting the importance of institutions that embody the interests of local communities.

According to political scientist James Scott, “Taylorism and scientific agriculture are, on this reading, not just strategies of production, but also strategies of control and appropriation” (Scott 1998: 311). Expressing similar sentiments, Sorel discredits the assertion that the first goal of science is to advance knowledge. Sixty years ago, he said, “science is no longer considered as a perfected means to knowledge, but only as a recipe for procuring certain advantages” (Sorel 1941: 154-55). The status granted to scientists is often used to justify the exclusion of local communities and contexts, with serious social, political, and ecological consequences. Grass-roots groups responded to the attempt by scientific managers to dominate natural resource use and “rise above” politics by using the political process. To gain some sense of power and control over their resources, they began using national

pressure groups to pass single purpose policies (Hays 1959). This allowed them to litigate when they felt left out of the political process.

Scientific management in the national parks

From the start, scientific management as described by Hays influenced park service management. Engineering initially guided park management (Sellars 1997). Engineers and landscape architects advised park officials on how to create, in the words of former Park Superintendent Horace Albright, a “national playground,” by using “any means practicable,” including construction of trails and roads (Sellars 1997: 57. Sellars is quoting from a letter written in the winter of 1917-18 by former Park Superintendent Albright.). By the late 1920s, a different type of science began to replace physical engineering of the landscape. Wildlife biologists warned that creating a national playground to increase park visitation would jeopardize natural conditions, the very conditions that attract tourists. The biologists questioned the profit-oriented goals of park managers. They instead promoted “ecological” goals and articulated their views in a document produced for the National Park Service, “Fauna of the National Parks of the United States: A Preliminary Survey of Faunal Relations in National Parks,” or “Fauna No 1.” This was the first document to recommend restoring wildlife habitat to the condition that existed when white settlers first arrived in the region. Meeting this goal required ecological research and restoration rather than engineering or range science, according to wildlife biologists.

It was not until the publication of another document, commonly called the “Leopold Report” after one of its famous authors, and the rise of environmentalism in the 1960s that ecological scientists began to affect management outcomes (Sellars

1997). The Leopold Report recommended an independent and permanent ecological scientific research unit with an advisory role. The Report did not recommend explicitly the “natural regulation” policy, but it led the Park Service to adopt such a policy. Demands by ecologists and environmentalists for ecological restoration and demands for policy based on “sound” science went hand-in-hand.

This brief history of scientific management and its influence on national parks indicates that social and political settings influence the articulation of goals. These goals, in turn, influence the type of science demanded and the outcomes sought. When managing for natural processes and minimizing human intervention in nature became the goal, ecological science became the management tool. However, ecological science did not eliminate subjectivity, politics, or errors in managing natural resources.

In addition, the rise of ecological science and subsequent mistrust of non-scientific information and of political processes influenced the development of the National Park Service and other natural resource agencies, often to the detriment of the resources they are mandated to protect. Many agencies employ mostly scientific professionals (Clarke and McCool 1996). The U.S. Forest Service (USFS), for example, traditionally hires foresters, professionals trained to manage trees. Yet, timber is only one goal of forest management on the national forests. Providing recreational opportunities, habitat for fish and wildlife, and range for cattle are among the many “multiple uses” mandated in the USFS’s mission. While the profession of forestry is changing, a reliance on and faith in professional scientific expertise persists.

We have seen this same dynamic in the bison debate. As discussed in chapter three, almost all formally commissioned studies and assessments of the bison debate focus on scientific, technical, or economic factors affecting this debate. Many rely on scientific studies to inform and justify decisions, including decisions to maintain the status quo. For example, in 1992, U.S. Senator Alan Cranston commissioned a study of the transmission of brucellosis from wildlife to cattle by the U.S. General Accounting Office (General Accounting Office 1992) and in 1997, Interior Secretary Babbitt commissioned a study of brucellosis by the National Research Council (NRC) (Cheville and McCullough 1998). The Subcommittee on National Parks, Historic Preservation and Recreation of the Senate Committee on Energy and Natural Resources commissioned a similar study in 1997 entitled “Issues Concerning the Management of Bison and Elk Herds in Yellowstone National Park” (U.S. General Accounting Office 1997). Not surprisingly, the report recommended more studies.

Many of these reports attempt to sort out conflicting scientific information regarding bison and brucellosis. While such studies provide useful information, all sides use the information selectively to enforce their prior policy decisions rather than to reconsider them. The National Academy of Sciences report on brucellosis provides a good example of the use and misuse of science in policy-making processes. The Montana Department of Livestock’s web site quotes the study as saying “although it has been stated that brucellosis cannot be eradicated from free-ranging wildlife without eradicating the wildlife, it is certain that brucellosis can be eliminated from YNP (Yellowstone National Park) with combinations of vaccination and culling” (<http://www.liv.state.mt.us/Bxnpmlt.htm>, March 15, 2000). Conservation groups

have used the same document to support their own conclusions, because the document also states that “total eradication of brucellosis as a goal is more a statement of principle than a workable program at present” (Cheville and McCullough 1998: 7).

A 1997 General Accounting Office testimony before the U.S. Senate Energy and Natural Resources Subcommittee on National Parks, Historic Preservation and Recreation reports that “both supporters and critics of the Park Service’s policies [on natural regulation and appropriate bison population levels] have scientific evidence that supports their points of view” (U.S. General Accounting Office 1997: 8). The testimony goes on to say that supporters of natural regulation cite studies that factors other than ungulate populations affect the growth of aspen and other woody vegetation, including climate, moisture levels, fires, and predator levels. However, the testimony states, “critics of Yellowstone’ wildlife management policy disagree that factors other than wildlife grazing are to any significant degree responsible for the lack of robust woody vegetation on the northern range” (U.S. General Accounting Office 1997: 9). The testimony reports similar conflicting information over whether bison can transmit brucellosis.

The testimony recognizes that adequate science exists to justify each political position--supporters and opponents of the park’s wildlife management policies. It also reports that “meetings on this issue [of controlling or eradicating brucellosis in Yellowstone wildlife] have become so heated that a fight once broke out between participants” (U.S. General Accounting Office 1997: 13). While the testimony acknowledges the conflicting scientific information and the intensity of emotion

involved in the debate, it recommends more science to solve the controversy. For example, it states that the House Committee on Appropriations, in its 1998 Interior Appropriations Bill, directed the Park Service to initiate a review by the National Academy of Sciences of available and relevant science. The testimony concludes that “the results of these studies are needed to make informed management decisions” (U.S. General Accounting Office 1997: 17).

Often, the effect of the focus on science has been to exclude the communities dependent on and living near resources. This exclusion not only leads to a deprivation of values in the community, but can also act as a barrier to achieving common interest solutions that protect resources and community values. The goal of managing resources using sound science has often taken the place of managing resources in the common interest, or even managing resources to protect the resource.

For example, many participants criticize the park’s natural regulation policy, arguing that weak science allows environmentalists and bureaucrats to seek a Garden of Eden through “natural” regulation (Chase 1987). Whether scientifically sound or not, natural regulation leads to unintended political and biophysical consequences. As discussed in chapter three, managers stopped culling bison, which led to a rise in the population. This rise in population contributed to the migration of bison outside park borders. The migrations influenced demands made by agencies and interest groups outside of the National Park Service, demands that resulted in the death of thousands of bison and direct human intervention in wildlife management. Conflicts over bison management have led to an approximately thirty-year controversy that continues even

after intense efforts to resolve it. Natural science has done little to address these unintended political consequences of natural regulation.

It is likely that the “hard” positivistic, physical science described in the 1997 U.S. General Accounting Office testimony will continue to fail to produce desired results. Over half a century ago, Harold Lasswell observed that despite the “advances” of the scientific revolution, world politics remain unchanged and many of the world’s problems have increased rather than decreased as a result of the scientific revolution: increased production leads to pollution; weapons now exist that could potentially destroy the entire human population; people feel alienated; and “knowledge is more commonly used for the relative benefit of the few than for the benefit of all” (Lasswell 1970: 4).

Natural science plays a vital role in informing policy decisions but fails to eliminate social problems. If science is not the panacea once envisioned, why does it continue to dominate natural resource management? Conditioning factors that contribute to the domination of science in natural resource policy, as well as the failure of science to resolve natural resource problems, are discussed below.

Science in the political process

In the bison case, training in areas such as range conditions, genetic viability, and disease eradication color the way experts frame problems and the information they seek. For example, a paper summarizing the perspectives of APHIS officials on the bison issue states that “Disease control and eradication is the unique line of work of APHIS. But regardless of whether the agencies concerned with this issue in the

GYA are in the business of resource management, conservation, preservation, or development, they all need to share with APHIS the common goal of supporting a successful effort against brucellosis” (King 1997: 203-04). The disease control perspective of APHIS leads this official to view the problem as one of brucellosis and solicit support from others against brucellosis.

Setting eradication of brucellosis as a long-term policy goal has resulted in a focus on scientific information. To improve bison management, scientists have researched the population dynamics and ecology of bison,¹ brucellosis in bison,² and brucellosis vaccines.³ Such studies have helped to illuminate the biophysical and epidemiological aspects of the bison debate. They are necessary to resolve questions such as the reliability of tests for brucellosis in bison, the infection rate in bison, the location of the infectious organism causing brucellosis in the bodies of hosts, and through what vectors brucellosis might be transmitted. Despite advances in science, at the time of writing (May 2001), well past the original deadline for the completion of the Environmental Impact Statement, agencies from the federal government and agencies from the state of Montana were still having difficulty agreeing on a solution and had to involve the courts (Anonymous 2000).

While brucellosis is a real biological, political, and economic threat to the ranching industry, brucellosis in bison has become a problem for more than biophysical or economic reasons. Even if brucellosis were eradicated from bison,

¹ (for example, Aune 1998, Philo 1998, Baskin 1997, Dobson and Meagher 1996, DelGiudice et al. 1994, Kirkpatrick et al. 1993, Meagher 1989, Taylor et al. 1997, Taylor et al. 1996, Kirkpatrick et al. 1996, Meyer and Meagher 1995, Rhyan et al. 1994, Zaugg et al. 1993).

² (for example, Peterson et al. 1991, Williams et al. 1993, Davis et al. 1990)

³ (for example, Olsen et al. 1997, Palmer et al. 1996, Jensen et al. 1995, Davis et al. 1991).

power struggles would continue among state and federal agencies. Yellowstone's scientific research director John Varley said, "there is no doubt in my mind that the agenda behind the bison policy is not eradication of brucellosis but to use Yellowstone as a means of expressing anger at the federal government'" (Wilkinson 1997: 32). Resolving the bison debate will not resolve federal and state power struggles. Ideological struggles would also persist between citizens who want to preserve resources above all else and those who want to "improve" resources to make them useful for Western residents. As stated in ranchers' own words, the debate is one more indication of a "changing of the guard" (Hagenbarth, Rath et al. 1997: 155) in Western resource management.

As John Munding, a former employee of the Montana Department of Fish, Wildlife, and Parks points out:

Even the technical experts--people who are trained to understand the difference between objective facts and subjective conjectures--argue about who's science is correct. There are no neutral-ground scientists, universally accepted as experts on the topic of bison and brucellosis. Consequently, efforts to manage bison have been remarkably similar to those to solve longstanding religious and ethnic disputes in the Middle East. (Anonymous 1997a)

Munding goes on to say that the issue is more political than scientific. While science is often considered a value-free, fact-based vehicle for making policy decisions, it often fails to meet such expectations. Debates become focused on the merits of different scientific studies.

The same scientific findings lead to different policy decisions. Montana used existing scientific information to influence APHIS to withdraw threats to downgrade the state's brucellosis-free status. APHIS found existing scientific information sufficient to pressure other states to withdraw sanctions from Montana's cattle. These advances were political, not scientific, demonstrating the subordination of science to politics. It is important to use science to inform policy, but only with the understanding that it cannot resolve political problems, which must be dealt with politically.

Many managers are aware of such discrepancies. For example, one Wyoming state official involved in bison management argues that science is often "used unethically" (Bohne 1998). The National Elk Refuge manager reported that researchers from different agencies and independent researchers often differ in their conclusions about the same data, or use different data to support their political positions (Reiswig 1998).

The continued focus on positivistic science, however, presents a barrier to resolving resource problems. Knowledge from the "hard" sciences alone cannot resolve resource issues because these issues are fundamentally social and political. The focus on technical solutions to political problems is linked to increasingly rigid "perspectives, environments, or both" and can "inhibit new adjustments" (Brunner 1994: 7). The increasing role of specialists and technical experts contribute significantly to such rigidities (Brunner 1994), and specialized language alienates non-experts and can undermine human interests (Brunner 1994, Rochefort and Cobb 1990). Setting the expectation that science can resolve policy debates and repeatedly

witnessing its failure to do so can lead to declining faith in scientists and in decision-makers who rely on scientists to develop--or at least justify--policy decisions. These patterns emerge in the bison case, for example, with the emphasis on brucellosis, vaccines, and the belief in the ability of technology to eradicate brucellosis.

In other words, natural resource problems often persist because of social and political difficulties, not because of scientific uncertainty. The bison debate has persisted because of, among other factors, problems in governance, the fragmented nature of the management of bison, increasing numbers of costly lawsuits, rising pressure from and gridlock among interest groups, and a lack of skill among decision makers to identify and resolve social and political problems. The bison debate is one more battle in the “range war” over land in the West, the sides including wildlife advocates, ranchers, housing developers, tourists, hunters, residents, agency officials, unaffiliated citizens and others. No amount of biophysical science can address these underlying problems, even if scientists could find the means to eradicate brucellosis. Effectively addressing natural resource issue will require expanding problem definitions to include social and political obstacles and finding appropriate alternatives to address such problems.

The difficulty of dealing with political and social factors

Social and political factors are difficult to address. In contrast, the focus on brucellosis--on techno-rational solutions--allows us to feel a certain level of control over the issue. Vaccines and other technical, scientific means can conceivably control brucellosis and be used to one day eliminate brucellosis in the wild, although it may

come at a hefty price. Market pressures in the livestock industry, the changing nature of Western culture, state and federal power struggles, out-of-control development of Western lands, and other social factors are more difficult to address or “eliminate.”

The difficulty of dealing with social and political factors and the focus on biophysical problems can lead to the belief that if people would only follow science and eliminate politics the problem could be solved. But science is one among a myriad of factors affecting policy outcomes. This focus on brucellosis misplaces a burden on and faith in science to resolve tough, value-laden policy questions. More science will not achieve the goal of resolving value conflicts. Vaccinating bison may prove a viable alternative when a safe, effective vaccine is developed. However, decisions must be made even in absence of such a vaccine. When and if it is developed, it will take years to eradicate brucellosis in bison and administering such a vaccine may compromise the goal of maintaining a wild herd. Rather than attempting to control what can never be controlled or ignore social and political factors, attempts should be made to develop skills in political processes. Such alternatives are discussed in further detail below.

Implications: Science and the common interest

Biophysical science cannot assess how well policies meet the common interest. Enough science exists to allow managers to eradicate brucellosis from bison, but it could entail killing the entire herd. Eradicating brucellosis through lethal control of bison would serve special ranching and veterinary interests at the expense of other

community interests. Future developments may allow for eradication without depopulation, but bison migrations must be handled now.

Eradication of brucellosis from domestic cattle serves the common interest when applied to cattle herds because it eliminates a potential human health threat and protects the economic health of the livestock industry. However, as early as 1960, the Brucellosis Committee of the U.S. Animal Health Association, a professional association of veterinarians, began to view brucellosis in bison and other wildlife as a serious threat to eradication efforts in cattle (Frye and Hillman 1997). When addressing diseases in wildlife as opposed to only domestic cattle, a host of new social, political, and philosophical issues surface.

Serving one special interest compromises other community goals. Policies such as capturing and testing procedures, hazing, and slaughtering could jeopardize the genetic integrity of the herd. Such policies fail to meet public expectations about how managers should handle the last wild, free-roaming herd of bison in the country. Hundreds of letters in the 1970s and tens of thousands of letters in 1998 were sent to Yellowstone National Park expressing concern over intensive handling and killing of bison. Eradication of brucellosis at the expense of wildlife could also have unintended consequences for ranchers, who might face pressure to vacate public lands if the debate devolved into an either/or decision between cattle and wildlife. Likewise, unrestricted roaming of bison would serve special interests. Policies that allow for uncontrolled migrations could compromise public safety and the Forest Service policy of multiple use, which allows cattle grazing on U.S. Forest Service land.

As eradication might ultimately not be in the best interests of ranchers because of potential unintended consequences of such a policy, unrestrained wandering of bison might not be in the best interest of bison or conservation groups. As with the tens of thousands of elk around Yellowstone, too many bison might damage their habitat. Such questions have already begun to arise in Jackson, Wyoming, where a lawsuit that blocked a bison management plan has limited the killing of bison and has led to population levels that might not be sustainable, according to managers and even some conservation groups.

So biophysical science is necessary to inform decisions about natural resource policy. But focusing too narrowly on biophysical science can lead participants to ignore other vital factors contributing to conflict, namely social and political factors such as fragmented structures of governance.

Alternatives

Often, people believe that in the absence of science, chaos and/or special interests will reign. However, the bison debate shows clearly that science alone cannot reduce gridlock or the domination of special interests. A fragmented structure of governance continues to obscure lines of decision-making and therefore accountability. Lawsuits delay the implementation of decisions. These symptoms are common to many natural resource issues. Therefore, resolving some pervasive problems in bison management requires ideological shifts, including changing expectations about the role of science, scientists, and prediction in natural resource

management. This section on alternatives proposes ideological shifts as well as action-oriented alternatives to help us achieve these shifts.

In the early 1900s, pragmatists such as John Dewey, Charles S. Pierce, and William James anticipated the need to seek complete objectivity and reduced scientific uncertainty. Pragmatism proposes the development of empirical knowledge and learning by trial and error (Parsons 1995). The policy sciences directly arose from pragmatism (Lasswell 1971). The goal of the policy sciences is not prediction, but freedom through insight. Freedom through insight requires problem-oriented thinking, contextuality, standpoint clarification, and multiple methods, as discussed briefly below and in greater detail in chapter two.

Rethinking narrow biophysical goals

Statements like those made by Jonathan Kusel questioning the ability of science to resolve natural resource problems (quoted above) are becoming more common in the field and in the academic literature. When managers set the expectation that positivistic science can resolve tough natural resource questions, and it repeatedly fails to do so, people question the value of science and the opinions of scientific experts. Overly high expectations about the ability of science to resolve resource issues establish unattainable standards for scientists. Resolving natural resource problems, and retaining respect for scientists, will require re-examining expectations regarding the role of science in the management of natural resources.

What are the alternatives to relying on science for answers to natural resource problems? Like other policy problems, conservation problems are set in dynamic

social and ecological contexts affected by people's expectations, demands, and actions. For example, in reflecting on problems and alternatives proposed to improve ecosystem management, Brunner and Clark (1997: 31) point out that "ecosystem management is not a technical problem." Rather, it involves fundamental beliefs and practical preferences expressed by those making or influencing policy decisions. In the introduction to a book about resource issues in the Greater Yellowstone, Keiter frames natural resource problems in the area as "how to protect the region's natural values while also accommodating human interests and economic activity" (Keiter and Boyce 1991: 9). Primm and Clark (1996: 162) suggest "any policy alternative that promises to solve the technical problems of GYE [Greater Yellowstone Ecosystem] management must also successfully overcome the bureaucratic and political obstacles." These statements attest to the need for more integrated, interdisciplinary research and practice-based approaches. In other words, resolving natural resource issues will require that managers seek to find common interest rather than merely sustainability or scientific certainty. With common interest as the goal, natural science becomes one tool among many necessary to assess the success of policies at reaching stated goals.

A number of shifts in thinking can help overcome the inflated expectations of science and to work toward finding common interest. First, when defining problems, managers must consider the root causes of biophysical problems--social and political factors. Second, the yardstick of success must shift from scientific or economic standards such as carrying capacity or economic growth to standards for assessing a policy's ability to meet the common interest, as outlined in chapters one and three.

Third, scientists and participants who rely on science must acknowledge that humans can never be completely objective or have complete knowledge to predict outcomes with accuracy. And no matter how accurate they are, scientific predictions cannot eliminate the influence of values, myths, and politics on policy. Rather than claiming to be completely objective, scientists could examine their observational standpoints and recognize biases that influence their research. Likewise, policy makers, the scientific community, and the general public could recognize no scientist or any other human being, including themselves, can maintain complete objectivity. This does not mean anything goes, but rather that those involved in policy debates be aware of and clarify their standpoint. Acknowledging one's biases may help one to keep them in check.

Fourth, effective practices developed through trial and error should be considered when assessing policy alternatives. When practical alternatives such as spatial separation of bison and cattle and cattle vaccinations have been tried and worked, there is little substantive gain made by delaying decisions by commissioning scientific studies. We can never have all the potentially available information on an issue, but we often have enough to make an informed decision with the provision that a decision can change given changing circumstances or new insights. Trial and error--often referred to as adaptive management--can help managers be more contextual, accept error, and correct mistakes. Trial and error does not replace scientific studies, but rather augments them.

Some of the ideological shifts will require training. Part of the training in scientific communities might be aimed at building skills in the policy process, in

interpersonal skills, and in handling the highly emotional and stressful components of natural resource management. Participants might engage in problem-solving workshops, for example, to clarify their own expectations and demands, understand the expectations and demands of others, and explore methods of finding common interest. These problem-solving workshops might help participants to learn how to place problems in their appropriate contexts. Such workshops could be organized around building skills or working through an issue. Sometimes an outside facilitator might be hired. In other cases, it might be more effective for a participant in a debate, such as a rancher, to invite people with different perspectives, such as conservationists, to discuss pervasive issues. Not all officials or participants will take the initiative or have the interest to participate in such training or workshops. Thus, such workshops and training are only one part of a more comprehensive strategy that must be taken to make short and long term changes.

Some of the biggest obstacles to overcoming natural resource problems involve personal issues, such as feelings of isolation and mistrust, threats to self-image, and withdrawal from participating because of rising levels of frustration and/or insecurity (Michael 1995). With such psychological and emotional barriers, it is little wonder that tensions are rising and little progress is being made in an increasingly hostile atmosphere, physically, mentally, and emotionally. This may seem counterproductive to many who enter the natural resource field specifically to avoid such interpersonal issues. But like politics, they are unavoidable. And, of course, skills and knowledge of the policy process could be taught in programs that train natural resource managers. This alternative is discussed further in chapter seven.

Changing scientific institutions

Scientists are often more cognizant and accepting of the uncertainty in their research than those who want to use the research for political ends. But, they might argue, such necessities as funding constrain the possible research topics in which they invest their time. Scientific communities also often reward numbers of publications in peer-reviewed journals rather than the ability of research to contribute to policy decisions, so the incentive structure for scientists to engage in some of the activities suggested is essentially non-existent. Below are some suggestions, albeit not all my own, to begin changing the institutional workings of the scientific community.

Brunner and Ascher (1992) suggest several steps that scientists might take to help themselves alter the expectations and reward structure inherent in the scientific community. One of the most promising options seems to be allowing scientists to patent their research to generate revenue, rather than relying on industry or government-funded research. The Bayh-Dole Act of 1980 explicitly allows universities to patent the results of federally-funded research. While no independent assessments of the economic impact of this Act have been passed, the Association of University Technology Managers⁴ estimates that technology-transfer activities generated \$34 billion in 1980 and supported 280,000 American jobs (Press and Washburn 2000).

Standards for measuring the achievements of science might also use indicators such as contribution to learning or affect on actual improvements in society. Rather

⁴ The Association of University Technology Managers is a consortium of over 300 universities and research institutions that participate in technology transfers.

than performing studies that come to the “right” conclusion, we might measure scientific achievement by a scientist’s ability to push the limits, to put science into practice. Michael, for example, suggests that “great artists and athletes practice every day; they actively learn how to perform better,” and that scientists might be rewarded for the same type of active learning (Michael 1995: 478). Such learning would require us to “acknowledge uncertainty and embrace errors” rather than punish errors or vulnerability (Michael 1995: 478). As chapter three discussed the importance of recognizing threats to and feelings of vulnerability in the ranching industry, it is equally important to acknowledge threats to and vulnerability in the scientific community and bureaucratic structures that rely on science. Rather than merely criticize, participants might verbally accept the existence of uncertainty, error, and complexity and help scientists and bureaucrats to work through these.

For example, the director of the National Elk Refuge in Jackson, Wyoming stated that there is often a perception within agencies that once a position is taken publicly on a management issue, changing that position can be difficult and can create poor press (Reiswig 1998). Complex policy processes include uncertainty and error, and recognizing it is more important than merely trying to avoid it or hide it when it does occur. This may be happening already in certain communities. Members of the public have stated that when agencies are more open and flexible and willing to change positions in light of changing contexts, the public feels less of a need for them to state exact management strategies in a rigid fashion (Lichtman 1998).

Changing processes to include civic expertise

Community-based groups have the potential to change the scientific management paradigm. Recall the Bison Management Citizen's Working Group, discussed in chapter three, that formed in 1991. This group of citizens with many different interests--agricultural, property rights, environmental, tribal, and other--met in Montana to write their own bison management plan. The plan articulated common interest solutions found by group members; the group members all signed off on it, and they submitted it to agencies.

Employing the public earlier in the planning process and can help provide another perspective to check scientific and other biases of agency experts who determine objectives in a management plan. For example, as described in chapter three, the Bison Management Citizen's Working Group that formed in Bozeman in 1991 offered a balanced perspective that was outside of any agency. It was an attempt to clarify and secure the common interest in 1991. The Group included a local rancher, a member of the Montana Wildlife Federation, a member of the Greater Yellowstone Association of Conservation Districts (a now-defunct livestock group), members of the Wilderness Society and the Greater Yellowstone Coalition, retired employees from the Montana DFWP and the USFS, and a local landowner. Technical advisors included agency officials from DFWP, APHIS, Yellowstone National Park, and the USFS. The group also consulted with a member of a tribal organization. While some members of the group might have been expected to demand zero-tolerance for brucellosis in bison, the group's ground rules excluded any party that demanded zero-tolerance for any bison outside the Park or zero-tolerance for any

lethal control of bison. The group sought to satisfy “diverse interests and management perspectives” (Ragsdale, Richard et al. 1991).

The Group established a plan with the objectives that include “to maintain a self-sustaining population of wild bison within Yellowstone; to protect local livestock by reducing the potential for transmission of *Brucella abortus* [the organism causing brucellosis]; and to reduce the potential for bison-human conflict and property damage caused by bison outside the park” (Souvigney 1997). The plan would allow bison outside the Park, but allowed for trapping, testing, and transportation of migrating brucellosis-free bison to tribal lands, other public lands, and back into the Park. It remained flexible enough for the agencies to work out the details. The plan exemplifies how citizens can aid in finding common interest solutions. These citizens demonstrated expertise in management principles as well as skills in attending to social and political dynamics: all valid interests were represented.

For reasons not made explicit, the agencies all but ignored the plan and treated it as one of several hundred comments on the agency-led plan, rather than a common interest solution to consider seriously. At a symposium on bison management held in Cody, Wyoming in August of 1997, an official from the National Park Service was not even aware of the document and discussed public participation and public education as interchangeable concepts (from author’s notes at the meeting). For community-based initiatives to be effective, agencies must take the initiative to work with such interested citizens to implement practical, common interest solutions.

Citizens in Jackson Hole also attempted to pool their “civic expertise” and provide a common interest perspective for the agencies in 1997. An ad hoc group

included Jackson area ranchers, the Executive Directors of the Jackson Hole Conservation Alliance and the Greater Yellowstone Coalition, and the President of the Wyoming Wildlife Federation, a hunting organization. Participants brought to the table practical expertise in cattle management, conservation, and wildlife behavior, as well as in policy and management. They collaborated to draft a letter and sent it to President Clinton, Secretary of Interior Bruce Babbitt, Secretary of Agriculture Dan Glickman, and Governor Geringer of Wyoming. They wrote, "While we share your concern for protecting the 'Brucellosis Free Status' of Wyoming, we think it is secure now because there is no recent history of brucellosis transmission from wildlife to cattle in Teton, Park and Sublette counties and because the ranchers in this area protect their cattle through vaccinations." The letter recommended "non-lethal and non-invasive" techniques of control. The signatories believe current management practices adequately address the risk of transmission, so they only reinforced the need keep cattle and bison spatially separated and to continue vaccinating cattle. The techniques are less intensive than those recommended by the Citizen's Working Group in Bozeman, but the objectives and techniques were similar. They wanted to demonstrate that the Jackson community can resolve such issues without heavy-handed government intervention (Curlee 1998).

The U.S. Fish and Wildlife Service and State Game agencies listened to this group. They worked with the citizens to develop a long-term management plan. However, a special interest animal rights group prevented the implementation of the plan through a lawsuit. Such possibilities exist, but progress toward finding common interest was still made.

Conclusion

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 are important in creating effective policies that seek to meet the interests of a diversity of actors, including the wildlife over which debates are carried out. Expert knowledge thus includes knowledge of professionals with expertise in understanding social and political factors, i.e. experts in “content and procedure” (Lasswell 1971: 39). It also includes knowledge contributed by those that live and work with resources on a daily basis.

In other words, science can inform decisions. Science is invaluable at providing information about the trends and conditions that lead to those trends. However, science cannot provide certainty about the future, nor can it eliminate the need for politics. This is not a post-modern argument that attempts to prove the overall futility of science, but rather an examination of the limitations of science and the role science should be expected to play in policy decisions given these limitations.

Works cited

- Anonymous. (1998). Interview with Yellowstone National Park Official. Mammoth, WY. July 14.
- Anonymous (1997a). “Biases clouding debate on bison.” Eagle Tribune. June 10.
- Anonymous (1997b). “Welcoming objectivity to the brucellosis debate.” Jackson Hole Guide. August 6: A4.

- Anonymous (2000). "Federal judge orders officials to meet over bison dispute."
- Billings Gazette. Jan. 7: <http://www.wildrockies.org/Bufalo/press99/fedz1.html>.
- Aune, K. (1998). Interview with Keith Aune. July 13, 1998. Bozeman, MT.
- Baskin, Y. (1997). "Study shows one-fifth of female bison infected." Science **276**(June 20): 1786.
- Bohne, J. 1998. Interview. June 26, 1998. Jackson, WY.
- Brunner, R. D. (1994). "Myth and American politics." Policy Sciences **27**: 1-18.
- Brunner, R. D. and W. Ascher (1992). "Science and social responsibility." Policy Sciences **25**: 295-331.
- Brunner, R. D. and T. W. Clark (1997). "A practice-based approach to ecosystem management." Conservation Biology **11**(1): 48-58.
- Campbell, J. Interview. Oct. 1, 1999. Helena, MT.
- Chase, A. (1987). Playing God in Yellowstone: The Destruction of America's First National Park. New York: Harcourt, Brace & Company.
- Cheville, N. F. and D. R. McCullough (1998). Brucellosis in the Greater Yellowstone Area. Washington, D.C.: National Academy Press.
- Clarke, J. N. and D. C. McCool (1996). Staking out the Terrain: Power and Performance Among Natural Resource Agencies. New York: State University of New York Press.
- Conley, A. and A. Moote (1999). "Innovations in research: Linking the academy and the community." Communities and Forests **Winter 1999-2000**: 8.
- Curlee, P. (1998). Interview. June 16, 1998. Jackson, WY.

Davis, D. S., J. W. Templeton, et al. (1990). "Brucella abortus in captive bison. I. Serology, bacteriology, pathogenesis, and transmission to cattle." Journal of Wildlife Diseases 26(July): 360-71.

Davis, D. S., J. W. Templeton, et al. (1991). "Brucella abortus in bison. II. Evaluation of strain 19 vaccination of pregnant cows." Journal of Wildlife Diseases 27(April): 258-64.

DelGiudice, G. D., F. J. Singer, et al. (1994). "Physiological responses of Yellowstone bison to winter nutritional deprivation." The Journal of Wildlife Management 58(January): 24-34.

Dobson, A. and M. Meagher (1996). "The population dynamics of brucellosis in the Yellowstone National Park." Ecology 77(June): 1026-36.

Doty, W. G. (1986). Mythography: The Study of Myths and Rituals. Alabama, University of Alabama Press.

Finley, M. 1999. Interview. Feb. 10, 1999. Washington, D.C.

Frye, G. H. and B. R. Hillman (1997). National Cooperative Brucellosis Eradication Program. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

Hagenbarth, J., D. Rath, et al. (1997). The cattle industries of the Greater Yellowstone Area. Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions, Jackson, WY, Wyoming Game and Fish Department for the Greater Yellowstone Interagency Brucellosis Committee.

- Hayes, S. P. (1959). *Conservation and the Gospel of Efficiency, 1890-1920*.
Cambridge, MA: Harvard University Press.
- Jackson Area Ranchers, F. Camenzind, et al. (1997). Brucellosis Management in Wyoming: Letter to President Clinton, Secretaries Glickman, Babbitt, and Governor Geringer. Jan. 31.
- Jensen, A. E., N. F. Cheville, et al. (1995). "Application of pulsed-field gel electrophoresis for differentiation of vaccine strain RB51 from isolates of *Brucella abortus* from cattle, bison, and elk." American Journal of Veterinary Research 56(March): 308-12.
- Keiter, R. B. and M. S. Boyce (1991). The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage. New Haven, CT, Yale University Press.
- King, L. J. (1997). "Perspectives of the Animal and Plant Health Inspection Service on Brucellosis in the Greater Yellowstone Area." In T. Thorne, M. S. Boyce, P. Nicoletti, and T. J. Kreegar, eds. Brucellosis, Bison, Elk, and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions. Cheyenne, WY: Wyoming Game and Fish Dept. Pp. 203-205.
- Kirkpatrick, J. F., D. F. Gundermuth, et al. (1993). "Remote monitoring of ovulation and pregnancy of Yellowstone bison." The Journal of Wildlife Management 57(April): 407-412.
- Kirkpatrick, J. F., J. C. McCarthy, et al. (1996). "An assessment of the reproductive biology of Yellowstone bison (*Bison bison*) subpopulations using noncapture methods." Canadian Journal of Zoology 74(January): 8-14.

- Kuhn, T. (1962, 1970). The Structure of Scientific Revolution. Chicago: University of Chicago Press.
- Lasswell, H. (1970). "Must science serve political power?" American Psychologist 25: 117-123.
- Lasswell, H. D. (1949). The Language of Power. Language of Politics. H. D. Lasswell, N. Leites and Associates. Cambridge, MA: The M.I.T. Press: 3-19.
- Lasswell, H. D. (1971). A Pre-View of Policy Sciences. New York: American Elsevier.
- McDonald, H. (1993). The role of statistics and the scientific method in the art of problem solving. Environmental Ethics: Divergence and Convergence. S. J. Armstrong and R. G. Botzler, eds. New York: McGraw-Hill, Inc.: 4-8.
- Meagher, M. T. (1989). "Range expansion by bison of Yellowstone National Park." Journal of Mammology 70(3): 670(6).
- Merkle, J. A. (2000). Scientific Management. Defining Public Administration: Selections from the International Encyclopedia of Public Policy and Administration. J. M. Shafritz, ed. Boulder, CO: Westview Press: 169-179.
- Meyer, M. E. and M. Meagher (1995). "Brucellosis in free-ranging bison (Bison bison) in Yellowstone, Grand Teton, and Wood Buffalo National Parks: A review." Journal of Wildlife Diseases 31(October): 579-98.
- Michael, D. N. (1995). Barriers and bridges to learning in a turbulent human ecology. Barriers and Bridges to the Renewal of Ecosystems and Institutions. L. H. Gunderson, C. S. Holling and S. S. Light, eds. New York: Columbia University Press: 593.

- Miller, G. T. (1992). Living in the Environment. Belmont, CA: Wadsworth Publishing Company.
- Olsen, S. C., N. F. Cheville, et al. (1997). "Bacterial survival, lymph node pathology, and serological response of bison (*Bison bison*) vaccinated with *Brucella abortus* strain RB51 or strain 19." Journal of Wildlife Diseases **33**(January): 146-51.
- Palmer, M. V., S. C. Olsen, et al. (1996). "Abortion and placentitis in pregnant bison (*Bison bison*) induced by the vaccine candidate, *Brucella abortus* strain RB51." American Journal of Veterinary Research **57**(November): 1064-67.
- Parsons, W. (1995). Public Policy: An Introduction to the Theory and Practice of Policy Analysis. Lyme: Edward Elgar.
- Peterson, M. J., W. E. Grant, et al. (1991). "Bison-brucellosis management: Simulation of alternative strategies." The Journal of Wildlife Management **55**(April): 205-13.
- Philo, M. (1998). Interview. Aug. 7. Bozeman, MT
- Press, E. and J. Washburn (2000). "The Kept University." Atlantic Monthly **March**: 39-54.
- Primm, S. A., and Clark, T. W. (1996). "The Greater Yellowstone policy debate: What is the policy problem?" Policy Sciences, **29**: 137-166.
- Quindlen, A. (2000). "Journalism 101: Human Nature." Newsweek **November 15**: 104.
- Ragsdale, J., J. Richard, et al. (1991). Letter from Bison Management Citizens Working Group to Yellowstone National Park Superintendent Bob Barbee. May 15, 1991.

- Reiswig, B. (1998). Interview. June 18, 1998. Jackson, WY.
- Rhyan, J. C., W. J. Quinn, et al. (1994). "Abortion caused by *Brucella abortus* biovar 1 in a free-ranging bison (*Bison bison*) from Yellowstone National Park." Journal of Wildlife Diseases 30(July): 445-6.
- Rocheft, D. A. and R. W. Cobb (1990). Problem Definition: An emerging perspective. The Politics of Problem Definitions: Shaping the Policy Agenda. D. A. Rocheft and R. W. Cobb, eds. Lawrence: University of Kansas Press: 1-31.
- Schubert, DJ. (1998). Interview with DJ Schubert. September 18, 1999. Bozeman, MT.
- Scott, J. C. (1998). Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. New Haven: Yale University Press.
- Sellers, R. W. (1997). Preserving Nature in the National Parks: A History. New Haven: Yale University Press.
- Simon, H. A. (1976). Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization. New York: The Free Press.
- Sorel, G. (1941). Reflections on Violence. New York: Peter Smith.
- Souvigney, J.M. (1997). Comments of Jeanne-Marie Souvigney. Where the Buffalo Roam: Finding the Common Ground, Cody, WY, Buffalo Bill Historical Center.
- Taylor, S. K., M. Lane, et al. (1997). "Serologic survey for infectious pathogens in free-ranging American bison." Journal of Wildlife Diseases 33(April): 308-11.
- Taylor, S. K., A. C. S. Ward, et al. (1996). "Isolation of *Pasteurella* spp. from free-ranging American bison (*Bison bison*)." Journal of Wildlife Diseases 32(April): 322-25.

- U.S. General Accounting Office. (1992). Many Issues Unresolved in the Yellowstone Bison-Cattle Brucellosis Conflict.
- U.S. General Accounting Office. (1997). Issues Concerning the Management of Bison and Elk Herds in Yellowstone National Park.
- White, L. J. (1967). "The historical roots of our ecologic crisis." Science **155**(3767): 1203-1207.
- Wiesner, J. B. (1980). The Marriage of Science and Government. Propaganda and Communication in World History: A Pluralizing World in Formation. H. D. Lasswell, D. Lerner and H. Speier. Honolulu, University Press of Hawaii. **3**: 16-36.
- Wilkinson, T. (1997). Yellowstone's bison war: a plan to combat disease threatens America's famous wild and free-ranging bison herd. National Parks. **71**: 30(4).
- Williams, E. S., E. T. Thorne, et al. (1993). "Brucellosis in free-ranging bison (Bison bison) from Teton County, Wyoming." Journal of Wildlife Diseases **29**(January): 118-122.
- Yellowstone National Park. (1996). Wyoming Brucellosis Workshop Planning Summary of Information Yellowstone National Park. United States Department of Interior, National Park Service.
- Zaugg, J. L., S. K. Taylor, et al. (1993). "Hematologic, serologic values, histopathologic and fecal evaluations of bison from Yellowstone Park." Journal of Wildlife Diseases **29**(July): 453-57.

Chapter 7

Reforming Practices

Almost a century ago, Albert Einstein said, “we cannot solve the problems we have created with the same thinking that created them.” These words hold true for natural resource management. As discussed in chapters three through six, problems in bison management include institutional fragmentation, conflicting values and myths, and an unfounded faith in the ability of science to solve natural resource policy problems. Evidence exists that the time is ripe to change the way decisions about natural resources are made, to change the thinking that created existing problems. First, criticisms abound, as discussed in greater detail in chapter three, over NEPA and current processes of public participation. For example, a rancher leasing land outside the Park said, “It’s politicized from the very beginning.... it’s who’s got the most pull” and that there is “a need for informed public discourse” (Severin 1998). Second, agencies involved in Jackson bison and elk management hired a firm to recommend ways to improve public participation in decision-making because they recognize it needs improvement. Third, participants with many different interests in Jackson and Montana have reached frustration levels high enough to inspire them to initiate dialogue on bison management among diverse interest groups and agencies.

Despite attempts by citizens to find common ground, agencies repeatedly fail to move beyond gridlock. After almost a decade of negotiations, a final Record of Decision has been reached, but without the approval of many participants. Interest groups continue to plan litigation and openly express dissatisfaction with the process and decisions made.

Agencies maintain control over decision-making through closed meetings and agency-led processes. Agency control and excessive litigation exclude participants and limit the ability of the public to influence decisions. Furthermore, calls for more and better biophysical science, and Congressional funding answering those calls, still ring loudly. And agency alternatives continue to focus more on biophysical problems of brucellosis than on underlying social and political factors.

Some technical solutions such as wildlife vaccination may help to alleviate tension over bison management and seem to be in the common interest at first glance. However, when examined more closely, it becomes clear that these “solutions” fail to address underlying problems and could serve to inflame the issue. A vaccine for bison and elk may reduce the already small threat brucellosis in wildlife poses to cattle, while minimizing lethal control of bison. But a safe, effective vaccine does not currently exist. When and if it is developed, inoculating the entire bison herd will take years and could cost tens of millions of dollars. Furthermore, administering a vaccine or using other means of controlling brucellosis in wildlife will not address breakdowns in governance, rising tensions in the West, the erosion of trust among participants, or a misplaced faith in science and subsequent lack of skills in social and political problem-solving. There has been some success at finding common interest and addressing social and political barriers within community groups, but there has been little progress at securing the common interest.

Chapter three presented alternatives to resolve problems specific to bison management. The alternatives discussed below may alleviate problems in bison management and in other natural resource issues. The discussion begins with community-

based initiatives (CBIs). CBIs are recommended for a number of reasons. First, face-to-face contact among participants with different interests can help generate understanding and trust. Such contact does not guarantee solutions, and can sometimes lead (at least initially) to explosive conflict, but it offers a means to find and secure common interest. In other words, CBIs offer the potential to address some of the social and political problems discussed in detail in chapters three, four, and five. Second, because members of CBIs live and work with the resources in question, there is a direct line of accountability. Third, these groups are not constrained by agency cultures. Fourth, they often form to resolve specific problems. The Yellowstone bison case demonstrates promise of CBIs: groups of diverse community members, with agency officials acting as advisors, derived alternatives based on common ground they found with each other outside of agency-controlled processes. Participants in bison management face the challenge of proceeding with these alternatives in an increasingly contentious atmosphere and to test them on-the-ground.

The second alternative discussed below involves reform in graduate education. As described in chapter six, in their formal training and within their agencies and organizations, many natural resource managers and other participants are indoctrinated into the belief that more and better science can improve natural resource management. Misguided faith in science perpetuates natural resource problems. If graduate schools teach the skills necessary to solve the social and political foundations of natural resource problems, decision-making processes might proceed more smoothly. Problems will arise, but appropriate skills will help officials to address these problems.

The third alternative discussed involves skill-building for officials currently employed by agencies. Many agency officials are expected to execute decision-making tasks for which they have not been trained. They can gain competence with experience on the job, but training in problem-solving and political and social processes may help them fulfill decision-making duties with greater understanding, ease, and success. Providing the opportunity to build skills is not, however, sufficient. Such decision-making skills should be valued and rewarded within agencies, which may require changes in agency culture.

Community-based initiatives: an innovative form of governance

Recall from chapter three the Bison Management Citizen's Working Group. A retired regional supervisor for Montana Fish, Wildlife, and Parks formed the group in 1990 because he was frustrated by agency performance. Members included landowners, ranchers, hunters, conservationists, and retired agency personnel, and they called on tribal members and agency officials as advisors and consultants. The group was more diverse than agency-led efforts, and it was more successful than agency efforts at finding common interest solutions. In addition, the group established a plan, which all members signed off on, thereby suggesting that the plan was substantively in the common interest. However, when the group submitted the plan to agencies, the agencies treated it merely as another comment on their agency-led environmental assessment rather than as a potential alternative to it. Thus, the group's plan was never put to an experiential test.

Recall that a similar group, the Totem Studies Group, formed in Jackson Hole, Wyoming to develop a long-term bison management plan for the bison herd that lives in

Grand Teton National Park and on the National Elk Refuge. Because of the responsiveness of agencies in Jackson, this group proceeded further in the decision-making process than the Bozeman group. Unhappy with the planning process in Jackson Hole and fearful of interference by federal agencies such as APHIS, members of the Jackson community worked to resolve their differences (Curlee 1998). The group included diverse participants: landowners, tribal members, county commissioners, hunters, ranchers, conservationists, and others. It was procedurally inclusive. All members of the group and Jackson agencies signed off on a long-term plan. So it was substantively in the common interest, at least by the judgment of participants in the process. However, a lawsuit filed by the Fund for Animals, an animal rights group, blocked implementation. The plan was therefore never tested experientially, despite widespread community and agency support.

Members of the Totem Studies Group realized that civic engagement provides a means to find common ground. They developed common interest solutions by drawing on the different assets of the members and ensuring that the diverse values important to them were met. For example, community members wished to make their own decisions rather than react to the regulations that the U.S. Animal and Plant Health Inspection Service and other agencies might impose. They each demanded a certain amount of power over the process, and were able to share this power by collaborating on a plan. They decided to work together, across differences, and to focus on their community well-being to show they could solve their problems. They relied on civic engagement and community ties to organize a functional group. Agencies realized that to gain respect *from* citizens, they had to offer respect *to* citizens. They re-examined information used to make decisions, relying

more on information from community members than on perceptions in the agencies or scientific community alone. They also developed listening skills. Some groups continue to feel excluded and felt their demands were not being met. For example the Fund for Animals felt the group did not match their moral standards of not killing wildlife and chose not to participate. The process resulted in increased trust and improved community relations, but no on-the-ground changes in bison management or process changes.

Groups such as the Bison Management Citizen's Working Group and the Totem Studies Group exemplify an *innovation* taking place nationwide: community-based initiatives (CBIs). Citizens began forming community groups in the 1980s as a new method of resolving natural resource debates. These groups are receiving increasing attention among a select audience interested in resource management (Snow 1999). Brunner et al. (2002) provides one of the most detailed descriptions of community-based initiatives. While they specify that no formula exists for defining a CBI, many CBIs share similar characteristics. First, they are place-based. They involve local community members with local knowledge. Second, they tend to be small in scale and membership. Third, they are multi-interest groups: their members represent a range of views and bring to the table different identities, outlooks, and values. Fourth, they are problem-oriented, often forming to address specific problems. Fifth, interactions tend to be face-to-face and collaborative (which does not always mean absence of conflict). And finally, they remain accountable and responsible. However, many variations of community-based initiatives exist. There is no preset formula for defining a CBI or it's potential success. The promise of community-based groups is their potential to find policies in the common interest.

The incentives for forming community groups vary. In the bison case, the groups discussed formed in part from frustration with the lack of resolution to the bison controversy. The Totem Studies Group in Jackson also formed in part because they wanted to avoid heavy-handed involvement by remote federal agencies, such as the U.S. Animal and Plant Health Inspection Service, that affected their neighbors in Montana. CBIs also form out of concern for resources and a shared sense of connection to a place and keeping it in a certain way. A resident of Swan Valley, Montana described a group of citizens that assembled in the interest of keeping their valley “two things: rural and wild” (Pers. Comm. with Melanie Parker, March 29, 2001).

A range of organizations and individuals also initiate CBIs. A retired agency official initiated the Bison Management Citizen’s Group in Bozeman, Montana in 1991. An unaffiliated citizen and an executive director of a non-profit organization collaborate to initiate the Totem Studies Group in Jackson, WY. Whoever initiates a group, the incentive to create the CBI is usually problem- and place-focused. The group remains accountable because living near the resources in questions means they will have to live with the consequences of their proposals and proceedings.

Community-based initiatives, as stock-market investments, involve risk. In Jackson, for example, the Fund for Animals lawsuit shows interest-based politics can derail efforts and create doubt about the utility of CBIs. Circumstances can change, such as leadership, scientific information, outcomes of related natural resource cases, and hundreds and thousands of other variables. But participants can learn from setbacks. Learning and diffusing the learning requires recognizing and addressing failures.

The goal is not to create CBI's for their own sake but rather to develop structures of governance capable of finding and securing common-interest policies. CBIs are the means to the end. It is therefore helpful to consider criteria to evaluate proposed policies developed by such groups. These criteria were discussed in greater detail in chapters one and three and applied above to CBIs in the bison case. In summary, the criteria are procedural, substantive, and empirical. First, for alternatives developed by CBIs to be considered in the common interest, community-based groups should be inclusive: they should be representative of the community as a whole. Having diverse representatives at the table can help to ensure buy-in by a larger population and can help the creative process by introducing new perspectives.

The second criteria for assessing whether a proposed policy is in the common interest is whether groups with valid interests accept the recommendations. Valid interests are those that do not compromise larger community goals. Invalid interests are those that come at the expense of the community as a whole. For example, zero-tolerance for brucellosis-infected bison serves only the special interest of individuals seeking complete eradication of brucellosis--the means to achieve this goal, given current technology, would come at the expense of maintaining a wild and free-roaming herd of bison. Thus, zero-tolerance for brucellosis-infected bison is an invalid interest. Protecting the livestock industry by minimizing the risk of brucellosis transmission from bison to cattle while maintaining the wild and free-roaming nature of the bison herd is a valid interest. A transparent and open process can help to ensure that all interested parties with valid interests accept the recommendations before implementation begins.

Finally, the recommendations proposed by community groups have to be tested through implementation, monitored to assess their effectiveness at meeting stated goals, and adapted to ensure corrective action is taken. Procedural questions can continue to be asked, as well, such as who was excluded who should be included? What changes would their participation bring? How can they be brought into the process? What groups were previously included whose interests are no longer valid? If measures proposed by a group fail to meet the stated goals or if room exists for a group to improve its inclusiveness, it does not necessarily indicate failure. It is an indication of the need to monitor and make adjustments to policy based on the findings of monitoring. A key component to improving practices is monitoring to assess whether goals are being met, and if so, why, and if not, why not and what can be changed to meet goals.

The procedural, substantive, and practical criteria mentioned above are not necessarily quantifiable. Many CBIs are slow to produce on-the-ground results, but develop what social scientists and those in the business world call social capital or human capital. Citizens can invest time and energy into community groups to develop skills and build relationships. Like investing in the stock market, seeing a return often takes time. Gains, losses, and break-even outcomes are all to be expected in the short-term. The hope is that there will be an overall gain in the long-term and that values will be indulged, as in the case of the Totem Studies Group.

Community-based initiatives (CBIs) will not replace single interest groups, government agencies, courts, or legislatures. Nor will the collaborative strategies that CBIs employ replace special interest politics, lawsuits, or other strategies that have characterized environmental debates in recent decades. However, CBIs can overcome

some challenges that complex, inflexible bureaucracies have failed to overcome. Even in business, innovation has been found to occur when workers are given more responsibility and accountability for the processes and type of work that they produce (Petzinger 1999).

Change is not easy, because people become accustomed to ways of doing things that worked in the past. Recall the discussion in chapters four and five about the tension and anxiety in the West arising from changing demographics, myths, values, and power structures. This tension and anxiety contributes to the intensity and endurance of natural resource debates. Maintaining social and political integrity requires not only sustaining wildlife populations and ecological processes, but also addressing the ways that decisions about wildlife and resource management are made.

The call for new forms of decision-making due to changing social and political structures extends beyond bison management. Dan Kemmis--director of the Center for the Rocky Mountain West at the University of Montana, fellow at the Institute of Politics at Harvard University, and former mayor of Missoula, Montana--summarized well the need for innovative new structures of governance in the changing West:

One hundred years ago the West was so lightly populated that the federal management structure made sense, and that led to the creation of the Forest Service--in a sense, to protect the West against itself As the number of Westerners grows, that structure becomes more difficult to sustain. That difficulty is exacerbated by the fact that the federal government can't spend at anywhere near the level that it could before (Anonymous 1998: 7).

Kemmis is calling for institutional reform, for a reform in the way decisions are made. What once worked is now failing because of changing circumstances, and we need to change the way we solve problems.

Other natural resource issues in Greater Yellowstone indicate that some learning and change has taken place as a result of innovative community-based initiatives, but that institutional and psychological barriers still exist. Agencies involved in bison and elk management in Jackson Hole, Wyoming, for example, hired an outside consulting firm to make recommendations regarding public input into planning for bison management (The U.S. Institute for Environmental Conflict Resolution 2000).¹ Not surprisingly, the report focused on biophysical issues and agency-led processes, including herd size and interagency coordination.

The report did acknowledge the need for more direct public involvement in planning. It recommends that a working group appointed by an interagency team examine the appropriateness and scope of alternatives. Such a process has promise, but the report raises concerns based on the findings of this dissertation for two reasons. First, it perpetuates the model of agencies controlling the definition to the problem and therefore heavily influencing the range of alternatives considered. Second, it gives agencies the power to choose members of the working group, whose job is to examine alternatives rather than help define problems. Overall, it perpetuates the bureaucratic model of decision-making, which relies on scientific management. It seems little learning has taken place from one process to another.

¹ This report can be downloaded from www.ecr.gov/new.htm, www.merid.org, or www.uwyo.edu/enr/ienr.htm.

The limited learning evidenced by this report indicates that innovations such as CBIs are only the first step in reforming practices. Reform will require diffusing lessons learned from on-the-ground trials such as bison management, and it will require adaptation to accommodate different contexts and settings. The process of innovation, diffusion, and adaptation occurs more or less spontaneously when new alternatives such as community-based initiatives are invented in response to policy failures (Brunner and Clark 1997). However, without conscious monitoring, assessment, adaptation, and diffusion, the processes are subject to breakdown. Ways to enhance this process of reform are therefore discussed below. As with any innovation, CBIs are not panaceas. They have limitations, and these too will be discussed.

Diffusing lessons learned from CBIs

Diffusion of lessons can help current and future community groups to improve their success at finding and securing common-interest solutions. Opportunity exists in Jackson to initiate a citizen's group to aid in the bison and elk planning process, mentioned above. In addition, controversy over bison in Yellowstone did not end with the release of the final Record of Decision (ROD). An opportunity exists for a new community-based initiative to form, drawing on the success of previous groups at finding common interest. As discussed in chapter three, a re-convened or new CBI could focus on preparing an alternative that serves the common interest better than the alternatives in the ROD. Such a group would not have to start from square one; innovative solutions have already been developed. The 1998 Citizen's Plan to Save Yellowstone Bison, which was built upon and was consistent with plans developed by earlier and more inclusive groups in Jackson and Bozeman, offers an ideal starting point. The Plan was endorsed over the

interagency alternatives in a super-majority of public comments. Federal agencies have already worked with the organizations that wrote this proposal to revise the government's preferred alternative in the Draft EIS. The challenge will remain to ensure buy-in by Montana state officials.

A multiple interest group could include representatives of livestock, conservation, and tribal interests as well as landowner and agency perspectives. A group such as the Northern Lights Institute, which played an important role in the success of other community-based initiatives, could facilitate it (Brunner, Colburn et al. 2001). Initiating such a group and involving them in the process will take leadership from all sides.

Participants in the Yellowstone, Jackson, and other processes might also look to networks designed to share lessons about community-based initiatives. For example, a national Communities Committee arose as part of the Seventh American Forest Congress held in 1996. Their mission is to "focus attention on the interdependence between America's Forests and the vitality of rural and urban communities" (Jungwirth 1996). To enhance local community well-being, they attempt to change political and economic structures, increase community stewardship of resources, ensure diverse participation in decision-making, and foster collaborative processes (Jungwirth 1996). The Committee has members nationwide and publishes *Communities and Forests*, which contains information about and for community groups, including "quick guides" on policy processes such as Congressional budgeting. They also have a listserv² and conduct

² The Communities Committee has two listservs. Members of CFNews can post announcements and news updates. Members of CFForum can exchange ideas and information about community forestry. To subscribe, send the following message to <listserv@listserv.arizona.edu>: "subscribe CFNEWS your name" or "subscribe CFFORUM your name."

outreach programs such as informing Congressional representatives, national interest groups, and federal agencies about community forestry (Moote 2000).

Such information can prove invaluable for community groups. The 1991 Bison Management Citizen's Working Group, for example, had trouble getting agencies to listen. Submitting recommendations as comments on an agency plan proved inadequate to get results. Information on Congressional budgeting and other policy processes can help such groups to find effective strategies to fund and otherwise gain support for their plans.

Organizations also exist to help communities reach decision-makers. American Forests, based in Washington, D.C., is one such organization. Its program on community-based ecosystem management seeks "to serve citizen and community groups as they explore ways to develop and implement approaches to sustain healthy forests and vital communities"(<http://www.americanforests.org/fpc/cbemfpc.html>). Their activities include information development and sharing, policy monitoring and education, training and workshops, and educational fieldtrips. They have a number of publications available for community-based groups in both urban and rural settings.³

Other groups have similar networking resources. The Sonoran Institute offers the Community Stewardship Exchange on its website.⁴ They promote an exchange of ideas, information, and contacts about community-based strategies to meet the ecological and economic needs of communities. The Northern Lights Institute in Missoula, Montana publishes the *Chronicle of Community* two to three times a year to provide theory and practical information about community-based groups. The U.S. Forest Service has a site,

³ For a list of available publications, go to www.americanforests.org/fpc/fpcpubt.html.

⁴ The website is www.sonoran.org/front.html.

Eco-Watch Policy, to discuss regional and national issues.⁵ And *High Country News*, a biweekly paper “for People who Care about the West” is available on-line and covers community-based initiatives.⁶ The site TreeLink provides information, research, and networking opportunities for people involved in community groups.⁷ The site includes such resources as educational materials, how-to-guides, a database, discussion forums, news articles, a newsletter, links to similar sites.

Many groups have services available specific to their region’s needs. For example, the Institute for Agriculture and Trade Policy in Minneapolis began the Community Forestry Resource Center.⁸ This center provides services such as advice on business development, training for foresters and loggers, and assistance in developing management plans. The Community Resources organization in Baltimore, Maryland provides information and technical assistance on neighborhood nurseries, market gardens, urban non-timber forest products, and vacant land restoration.⁹

Many regional networks also exist. For example, the Collaborative Learning Circle, based in Ashland, OR, includes community-based groups in southern Oregon and northern California. These groups not only provide valuable information for each other, they also provide emotional support for each other (Cate Hartzell, pers. comm.) The Lead Partnership Group is another regional group composed of community-based groups and non-profits in northern California and southern Oregon. They collaborate on such

⁵ The web site is www.fs.fed.us/eco/eco-watch/ecowatch.html.

⁶ The web site is www.hcn.org.

⁷ The web site is www.treelink.org.

⁸ The Center’s phone number is 612-870-3407 and their web site is www.forestrycenter.org

⁹ The groups phone number is 410-448-4900; their web site is www.communityresources.org.

activities as running pilots on multi-party monitoring to develop innovative monitoring techniques, which are then assessed and the lessons learned diffused among the network.

The advantages of diverse, decentralized networks for diffusion of ideas include multiple, overlapping structures that cover information about a range of resources and geographic areas. They create opportunities to gain practical and theoretical knowledge. Information useful for but not unique to community-based groups, such as Congressional appropriations, is also provided by such networks.

Community-based initiatives need to be brought to the attention of a wider audience. Brunner gives the example of President Clinton's visit to the Jackie Robinson Academy in Long Beach, California to help publicize a school uniform program that aided in reducing crime. The following year, 6,000 of the country's 16,000 school districts, aided by a U.S. Department of Education manual on how to adapt to the program, established similar programs (Brunner, Colburn et al. 2001).

Demonstration projects provide another means to diffuse ideas. For example, in California and Montana, the Communities Committee helped establish two stewardship demonstration projects, designed to "increase awareness and knowledge of community-based forestry" as well as to provide "valuable experience to use to help other people tell their stories" (Daly 2000). Congressional staffers for Republicans and Democrats, U.S. Forest Service officials, timber contractors, forest policy specialists, community leaders, and forest workers recently visited a demonstration project in the Trinity Mountains of northwest California. This project is "part of a national demonstration in land stewardship aimed at finding new ways to manage national forests that bring long-term benefits to the land and involve local communities" (Braxton-Little 2000: 3). Such demonstration

projects can prove invaluable to educate people who have power to supply resources to community-based initiatives, to lend authority to the groups, and to diffuse the idea of CBIs widely. It might be beneficial to add national media figures or high-profile individuals to the list of participants invited to such demonstrations.

Monitoring and adaptation

Circumstances differ temporally and spatially. What may work in one community or at one time may not work in another community or at another time. For example, many participants in the Totem Studies Group in Jackson cited changes in leadership in the agencies and local conservation organizations as factors contributing to the Group's progress. Without these changes, they said, the Group might not have been able to change perceptions within the agencies.

A new CBI focused on Yellowstone bison management can build on and learn from past successes and failures, but will have to adapt to a new political context. Interagency efforts are close to disintegrating, leaving the process no closer to a solution than when Montana began shooting bison outside the park in the mid-1980s. A repeated pattern over the past fifteen years of soliciting and rejecting citizens' comments on interagency alternatives in EISs also increased levels of frustration and decreased trust in agency competency and among participants. The atmosphere is more gridlocked and contentious than ever, which poses a challenge to any multi-stake group. However, it also provides an opportunity. Change often occurs during crises, and a crisis close to that of 1996-97 will surely result without an approved long-term plan for bison that migrate out of Yellowstone.

Adaptation also requires changing practices that failed in the past. Neither the Jackson nor Bozeman group developed a plan that was experientially tested, but they still made remarkable achievements on which participants can now draw. The experiences in Greater Yellowstone are not uncommon. Many groups experience failures. That is why, according to Carol Daly, Vice Chair of the Communities Committee, people have to talk about successes *and* the failures and reasons for them. She says, “community-based forestry has a solid commitment to relentless self-examination, to transparency, and to all-party monitoring. We are the first to identify any problems we have and face up to them” (Daly 2000). Adaptation requires that participants not inflate expectations of success as kinks are worked out, nor to deflate real achievements because of uncertainty (Brunner, Colburn et al. 2001).

In addition, there is opposition to community-based groups. Below I discuss some of the overarching criticisms of CBIs and some of the implications for existing groups and institutions.

Criticisms of community-based initiatives

First, many questions arise over how to “measure” a CBI’s success. Douglas S. Kenney, a researcher at the University of Colorado’s Natural Resources Law Center who studied community-based watershed groups, said, “I suspect that most observers believe that any real definition of success must require achievement of—or real progress toward—on-the-ground goals in resource maintenance or restoration. Only if it is a means to a practical end do the ‘feel-good’ products of collaborative-based processes merit the level of enthusiasm which many parties, myself included, have expressed” (Kenney 1999: 35).

Claims that few CBIs are successful arise from the demand for measuring a policy's success based solely on biophysical criteria.

On-the-ground results need to occur. However, recall the criteria for assessing common-interest: procedural, substantive, and experiential. Recall the Bozeman Citizen's Group met the procedural and substantive criteria. All interested parties collaborated on the bison management plan and all involved parties signed off on the plan. However, the agencies failed to work with citizens to implement the plan, never putting the plan to an experiential test. Do we blame the CBI for failing to deliver on-the-ground results when they lack necessary implementation power? Furthermore, if a plan is tested and fails, that does not necessarily mean the CBI failed. Rather, it means there is room for improvement and the CBI may need to adapt its plan, as the U.S. Forest Service or other agencies adapt plans in the face of changing circumstances and knowledge.

The importance of procedural gains made by many CBIs should be highlighted, as well. The benefits of CBIs include building "social capital"--respect, trust, working relationships, etc.--that can be used to address some of the underlying problems discussed in chapters three, four, and five. For example, recall from chapter five that many ranchers, Native Americans, and others involved in bison management feel deprived in respect, wealth, affection, skill, enlightenment, well-being, rectitude, and power. In contrast to lawsuits, closed interagency meetings, and legislation, CBIs offer the potential to indulge participants in the values they seek and to generate understanding among people with vastly different world views. While these may not be biophysical gains, they are nevertheless substantive successes.

Jim Burchfield, director of the Bolle Center for People and Forests at the University of Montana's School of Forestry, points out that in CBIs, "people who have fought each other for years, with all the ugly, dehumanizing consequences, may come to understand each other" (Burchfield 1998: 36). He quotes a participant in a CBI in Montana, who discusses listening to his neighbor in a new way: "I have been able to listen to his passion. We have considerable divergence, but he is a human being that I have come to appreciate. We have bridged something. Not our perspective, because I don't think that he's budged an inch. But I appreciate what he has to say" (Burchfield 1998: 36). This quote exemplifies a new-found respect for someone with a very different worldview. This understanding demonstrates that while people may hold differing worldviews, or myths--such as preservation or modernization as described in chapter four--they can still reach a common understanding. Rather than merely traditional avenues of power such as lawsuits and elected representatives, these neighbors have a new wealth of resources on which to draw to solve problems.

Brunner, Colburn, et al. (2001) also highlight several advantages of CBIs for existing institutions. First, they can alleviate some of the pressures on overextended policy makers. Second, they can help to find common-interest solutions to place-based issues, including consideration of economic and environmental issues. Third, they can create a system of accountability and responsibility to affected communities. Fourth, they can foster the development of political skills that will prove useful in larger policy arenas. And finally, they can help establish structures of governance to adapt to changing and increasingly complex situations.

The second criticism I will address involves the belief that power is being stolen from distant stakeholders. Michael McCloskey, chairman of the Sierra Club, said, “few urbanites are recognized as stakeholders in communities surrounding national forests. Few of the proposals for stakeholder collaboration provide any way for distant stakeholders to be effectively represented” (McCloskey 1996). Such fears are not surprising. Recall from chapter five that one of the most influential base values in the bison debate is power, and that one of the most relied upon strategies of environmental groups is litigation. Litigation has led to many victories in the environmental movement.

But the political atmosphere has changed since the emergence of environmentalism. Lawsuits do not guarantee environmental protection. One lawyer representing various conservation and tribal organizations in lawsuits over bison even remarked the legal system no longer seems to be working in this case (Angell, personal communication). One judge, sympathetic to the state of Montana, made most of the legal decisions over bison management. While the power of a single judge can be advantageous to a group if the judge is sympathetic to the interests of the organization, relying so heavily on legal strategies can backfire. And even when a group “wins,” it can end up losing the respect and trust of local communities and government officials, respect and trust that might be needed down the road.

Rather than taking power away from any one group and giving it to another--as court cases, Congressional legislation, and other traditional political strategies can--CBIs can allow for power sharing. Jack Ward Thomas, former chief of the U.S. Forest Service, says, “keep in mind that people want power. That’s not an ugly word. Collaboration offers power to local people” (Anonymous 1998: 11). And Jim Burchfield says, “because

it's concerned with learning together, collaborative stewardship is about power” (Burchfield 1998: 36). CBIs involve power sharing. Groups such as the Sierra Club that refuse to participate in collaborative efforts could lose power in the long run, as CBIs gain more political power and respect among those with decision making authority and control.

Third, some go so far as to accuse CBIs of being illegal. A law professor warns, “local collaborative solutions could impede or contravene national laws or policies” (Coggins 1998: 31). However, it is unlikely that a CBI can attain authority to override national laws. Statutes such as NEPA set guidelines for how citizens can participate in policy debates (Brunner, Colburn et al. 2001). And the First Amendment to the Constitution guarantees freedom of speech and assembly (Brunner, Colburn et al. 2001). Community-based initiatives are groups made up of multiple interests and have the same rights to participate in policy making as single interest groups: through developing and promoting plans, monitoring the implementation of policy, filing lawsuits if necessary, and appraising the effectiveness of existing policies (Brunner, Colburn et al. 2001).

Fourth, some complain that CBIs are often short-lived and unstructured. A law professor says, “without guaranteed long-term funding, they will have no professional staff, and thus will lack institutional structure. Without a permanent institutional structure, they are destined to wither away as the perceived crisis passes” (Coggins 1998: 31). This can be true. However, it is not necessarily a negative phenomenon. The short-lived nature of groups like the Bozeman 1991 Citizen’s Group are to be expected, for it has been found that the more general the interest served by a group, the more permeable its membership and the less intense its demands are.

In addition, the less structured, formalized nature of CBIs in part account for their appeal. According to political scientist Jim Scott:

One could say that democracy itself is based on the assumption that the metis of its citizenry should, in mediated form, continually modify the laws and policies of the land. Common law, as an institution, owes its longevity to the fact that it is not a final codification of legal rules, but rather a set of procedures for continually adapting some broad principles to novel circumstances (Scott 1998: 357).

In other words, democracy allows for citizens to continually adapt common law and policies as circumstances changed. The framers of the U.S. Constitution recognized the need for adaptability when they allowed for the system of amendments. But we do not need a constitutional amendment to reform practices, institutions, or policies. CBIs can work within the existing structures of government to enhance the democratic process and adapt to local contexts.

Implications for existing institutions and groups

How will CBIs affect existing institutions and traditional power-balancing processes? We have already witnessed fears of the first potentially affected group: conservation groups. Many fear that if CBIs gain power, they will remove power from lobbyists in Washington, D.C. or special-interest groups who use the muscle of the court. Law professor George Cameron Coggins, for example, criticizes CBIs because he says that “the law and its processes, imperfect as they are, are still far preferable to local negotiation” and that “we have always been a litigious people, and public interest litigation fits, though somewhat uncomfortably, in the national mold” (Coggins, 1998 :

27; 29). Rather than replacing litigation, CBIs offer another option to resolve disputes and find common interest solutions. CBIs do not remove litigation and legislation as a powerful tool to be used in extreme and necessary circumstances.

CBIs may prove attractive to environmental groups who have lost some of the litigation power they enjoyed in the 1970s. While environmentalists enjoyed support by officials such as Mike Dombeck, Chief of the Forest Service, under the Clinton-Gore administration, it seems the Bush administration will not be so sympathetic. For example, it has already prevented a rule to stop building roads in existing roadless areas in the national forests. The Washington-based influence that many groups rely on is a less effective means of securing their interests than in the past.

CBIs offer one strategy for environmental groups to work through changing political contexts. As stated in previous chapters, working with communities to find common interest can secure environmental and other interests rather than endangering them. D.C. and local interest groups need not abandon traditional “watch-dog” roles, but instead of monitoring only government activity, these groups can serve as outside assessors of the success of community-groups at meeting the common interest.

There is a precedent for single interest groups to work with industry, other interest groups, and government in innovative ways. National environmental groups have been forming partnerships with industry to find integrative solutions. For example, when it became clear that the Styrofoam boxes used by McDonald’s released CFCs and contributed to holes in the ozone layer, the Environmental Defense Fund (EDF) attempted to initiate a consumer boycott of McDonald’s (Hayden, Check et al. 2000). Americans’ craving for greasy, convenient food allowed the fast-food giant to win. EDF then used

cooperative, rather than coercive, strategies. They worked with McDonald's to develop a box to meet the goals of industry (and consumers) and environmentalists: the new paperboard box keeps hamburgers warm without destroying the ozone layer. Now called Environmental Defense, the group continues to work with McDonald's to cut energy consumption by ten percent and worked with UPS to develop methods for them to use more recycled material in their packaging. Conservation International advised Starbucks on ways to grow organic coffee plants in Mexico and the Gap uses organic cotton (Hayden, Check et al. 2000).

Coalitions have also been forming, coalitions that aim to find integrative solutions. For example, the Massachusetts Community Forestry Council is a coalition of professional organizations, non-profit groups, citizens, and state agencies. They provide a forum for discussion and education. They provide tree care workshops, networking opportunities, and materials and monitoring activities.¹⁰ Such coalitions allow groups to share knowledge and build skills and relationships. These are all examples of integrative solutions in the common interest. While different than CBIs, interest group involvement in partnerships and coalitions shows that they recognize the value of trying alternatives to court battles and legislation. CBIs offer one additional way for interest groups to network with each other, with government, and with industry.

The second group of institutions and participants potentially affected are government agencies. CBIs do not eliminate the need for government involvement. In contrast, according to David H. Getches, who studies community-based groups, "virtually all the groups . . . that were doing anything of importance had considerable involvement

¹⁰ Their phone number is 1-800-407-TREE; their email is mfcouncil@aol.com

of government entities including tribes, cities, counties, and especially the federal government. A closer look at their roles suggests that the government role is not only helpful but critical--a nearly universal element of all those groups that seemed to be working successfully" (Getches 1998: 32). The community groups formed around bison management included government participants. The Totem Studies Group in Jackson, Wyoming worked closely with agency officials and used the government-led process of writing an Environmental Assessment and Long-Term Plan to develop a community-based plan. And the Citizen's Working Group in Bozeman, Montana included retired officials and consulted with agency officials.

Some agencies are recognizing the potential for community-based initiatives to help them. In Jackson, officials from the Fish and Wildlife Service and Wyoming Game and Fish realize the potential of community-based groups to make their jobs easier (Bohne 1998, Griffin 1998, Reiswig 1998). Many of these officials realize that what might seem good for an agency may not be in the common interest (Bohne 1998). And contact with the public can help agencies dispel expectations they have about public opposition that may not in reality exist (Bohne 1998).

The U.S. Forest Service in particular has been struggling to work with communities. In proposed regulatory revisions publicized on October 5, 1999, the U.S. Forest Service quoted the first chief of the agency, Gifford Pinchot. They wrote, "if national forests are going to accomplish anything worthwhile, the people must know all about them and must take a very active part in their management" (the regulations can be viewed at www.fs.fed.us/forum/nepa/rule). The agency is also beginning to institutionalize collaborative efforts. For example, they are organizing a service-wide

collaborative support team to identify barriers to collaboration and ways to overcome them. They also have the task of helping the organization to become a learning organization – one that shares information across the agency and learns over time (personal communication with Ruth McWilliams, April 24, 2001). Many barriers exist to institutionalizing changes agency-wide. For example, direction from the Washington D.C. office of the Forest Service does not guarantee changes on the ground, but it is significant that movement is being made in the direction of collaboration.

Why the change, or at least the rhetoric of change? According to former Forest Supervisor Orville Daniels, the USFS is experiencing “tremendous chaos” at the national level because “there’s almost a vacuum at the top as people there are so caught up in political battles that they don’t know what’s going on out in the field” (Anonymous 1998: 8). In addition, as the USFS and other agencies enter into interagency agreements, the number of mandates with which they must comply becomes unnecessarily complex: the cooperating agencies writing the bison management plan must comply with at least thirty-nine different federal and state pieces of legislation and policies (National Park Service, State of Montana et al. 1998). And finally, many agency employees feel that they no longer have time to spend with local people, because they must spend time on technical analysis and fighting legal battles.

The USFS is experiencing some obstacles in attempting to move toward collaboration. First, they ultimately answer to Congress. Until Congress begins holding the agency accountable for how well it incorporates the alternatives of communities into its work, USFS officials will continue to report on inadequate performance measures such as the number of projects completed, acres of forest land treated, and miles of road

obliterated. Second, as with any bureaucracy, change is slow. Changing the scientific management paradigm of the USFS will not be easy. With offices nationwide, changes can be made in policy in Washington, D.C., but monitoring the implementation of a nationwide change in policy is difficult. Communication channels among different levels of the agency are obscure. In addition, the USFS promotes employees by transferring them. Therefore, an employee either leaves a community, the relationships he or she established in that community, and unfinished projects or forgoes promotion.

A number of changes could be made within the USFS to overcome some of these barriers. First, the USFS can capitalize on the skills and knowledge of staff in private, nonprofit organizations by developing public-private partnerships with them. These organizations often have networks within the community. Second, the “strike team” model to address problems that arose with the Northwest Economic Adjustment Initiative (which was established to help timber-dependent communities adjust to mill closings after the controversy over spotted owls) could be used. Third, Congressional funding could be tied to projects that work with community-based initiatives. A precedent exists in fifty-six stewardship pilot programs nationwide that aim to test new contracting mechanisms in the USFS and to encourage collaboration with communities. Fourth, rewards could be given to those who work with communities. Successful Forest Service projects that work with community groups could be used as examples agency wide, and lessons dispersed through the agency. Fifth, performance measures can be revised to assess how well the USFS is meeting stewardship goals and how well they are collaborating with communities.

Finally, academics might be affected by CBIs. As discussed in chapter six, many academics involved in conservation issues are trained in the natural sciences. Academics can contribute to CBIs by providing information to help inform decision-making processes within the community-based initiatives. Academics can, for example, provide valuable information in assessments of CBIs. As discussed above, one important step in changing practices through innovative solutions involves adaptation. Adaptation is important to make new institutions work in different contexts as well as to learn from mistakes and adapt accordingly. Rigorous outside assessment of CBIs by the academic community can prove valuable to CBIs and to the process of innovation. Because the role of science and science-based education is so central to natural resource management, the role of academics is discussed in further detail below in relation to CBIs and natural resource management more generally.

Education

The problem

The institutional, procedural, social, and political problems identified and discussed in this dissertation stem not so much from conflict but rather from inadequate means to resolve conflict. One strategy to find resolutions, discussed above, involves finding new structures of governance, such as community-based initiatives. A second strategy involves improving the problem-solving skills of participants. Agency officials are key participants to target, because they maintain much control in decision-making. As described in chapter six, scientific management directly influences the perspectives officials bring to policy debates and the strategies they use to resolve problems. Bison

management, for example, continues to focus on brucellosis. Veterinarians trained in animal health approach the debate from a disease-control perspective. Many wildlife biologists are more interested in the effect of brucellosis on bison. Few professionals involved in this debate have training in or focus on conflict resolution or problem solving. Few have been able to identify or address institutional, social, and political barriers.

It is becoming more commonly recognized that graduate education in natural resources needs to include policy processes and problem-solving skills. Recall the words of natural resource researchers quoted in chapter one: “We believe that the profession needs to reexamine its traditional biologically dominated perspective in view of contemporary needs and situations” (Decker, Brown et al. 1992: 34). Many natural resource programs, such as those at Yale University, the University of Michigan, and Duke University, now include courses on the human dimensions of natural resources and encourage students to think across disciplinary boundaries.

Despite the recognized need for problem-solving skills in the natural resource field, graduate programs are rooted in the philosophy of technical rationality, also known as positivism, adopted early in the twentieth century (Schon 1987). The philosophy of positivism proposes that the purpose of science is to predict, thereby reducing uncertainty and serving as a basis for policy decisions. As described in chapter six and as seen in the bison case, positivism can lead to the view that problem-solving is an instrumental, rational process based on improving scientific knowledge and theory-building. Curricula based in positivism emphasize such skills as quantitative and economic analysis to the exclusion of context-sensitive methods of analysis such as interviewing, cognitive

mapping, ethnography and participant observation, content and narrative analysis, and q-methodology (deLeon and Steelman 1999).

Furthermore, natural resource graduate education seems to mean something different in every program. In a web search for “natural resource graduate programs,” over twenty-two different types of programs were returned, including: Energy and Resources; International Relations and Resource Environmental Management; Human Ecology; Conservation and Sustainable Development; Natural Resources; Wildlife Fisheries Science and Conservation; Sustainable Systems; Marine-Estuarine Environmental Studies Program; Resource Administration; Fisheries, Animal and Veterinary Science; Renewable Natural Resources; Environmental Planning; Wildlife and Range Resources; Rangeland Ecosystem Science; Natural Resource Recreation and Tourism; Rangeland Resources; Resource and Applied Economics; Arid Land Resource Sciences; Environmental Science, Policy, and Economics; Pulp and Paper Science; Interdisciplinary Ecology; Resource Development; Water Resources Engineering; Ecology and Population Genetics; Resource Policy and Behavior; Quantitative Ecology; and Rangeland Resources Management. This range of program titles and foci indicates the fragmentation in natural resources curricula. Students in such programs become well-trained in their specialties, but often lack the ability to integrate knowledge or to identify and resolve problems (Manning 1998). While a diversity of perspectives can add to the creative process, mechanisms--institutions and the skills of individuals--must be sufficient to identify a problem and find and integrate the knowledge necessary to address the problem. The gap between these types of problem-solving and integration skills needed by professionals and the knowledge they gain in higher education has led to

criticisms of almost all graduate programs, not just those in natural resources. At least one researcher (Schon 1987) reported that many students, professors, and professionals outside of academia feel that graduate education needs to focus on teaching skills more applicable to the “real” world.

This section primarily focuses on suggestions to improve graduate education in natural resources and continuing training for professionals, although many of the skills identified would be useful for undergraduate students. The section is also aimed at programs that explicitly include a policy or management component in their natural resource programs, although suggestions might prove beneficial for all natural resource professionals. Below, I describe possible ways to improve education in graduate and professional schools and continuing education for professionals.

Education in professional schools

Almost a century ago, Myres McDougal and Harold Lasswell proposed the role of the scholar in all fields should be to integrate knowledge to make decisions in the common interest. They thought policy education in particular should be grounded in empirical knowledge and focused on real-world outcomes (Falk 1990). Education should not just train professionals, but also create “enlightened citizens capable of understanding the issues of the day as a struggle to realize the values of human dignity” (Falk 1990: 1993). More specifically, the goals of programs in natural resource management and policy are to train students to make decisions in the common interest and to provide them with the skills and knowledge to understand and improve decision-making processes. Problems cross disciplinary boundaries, so meeting this goal requires knowledge integration across disciplines and making a connection between theory and practice.

Making better decision requires a combination of knowledge *in* and *of* the policy process. Both types of knowledge require an outlook that is problem-oriented, contextual, and multi-method. These elements exist in the theory and framework of the policy sciences, as described in detail in chapter two. Knowledge *in* the policy process includes content knowledge, or subjects specific to a policy issue. For natural resources, such knowledge might include Geographic Information Systems (GIS), population ecology, conservation biology, environmental sociology, hydrology, forestry, rangeland management, and political ecology. In bison management, it is important to understand the dynamics of transmission of diseases between bison and cattle. Knowing that brucellosis is transmitted through birthing materials and how long the infectious organism *brucella abortus* can survive outside its host is important to develop risk management strategies. This knowledge led to alternatives such as changing grazing allotments to allow bison and cattle to be separated temporally and spatially, thereby preventing the chances of cattle coming into contact with bison birthing material infected with *brucella abortus*.

Knowledge *of* the policy process might be thought of as process knowledge and includes knowledge about how policy making works and the way social interactions shape the policy process. Knowledge *of* the policy process includes knowing who conducts studies and what their personal and professional biases might be, which agencies are involved in managing bison and the relationship of their staff to other participants, what different participants are expecting and willing to accept, and how much influence they have over decisions. Knowledge *of* the policy process can help professionals identify barriers to resolving the bison debate despite adequate scientific

knowledge and the existence of common-interest risk management policies. The goal here is not to promote the use of policy sciences, per se, but rather to promote any equivalent system of rigorous analysis that provides insight into social and decision-making processes and can lead to innovative, common interest policies.

As mentioned in chapter one, this thesis in many ways demonstrates the use of the policy sciences. Chapters three, four, and five demonstrate ways to apply the policy sciences theory and method. I am not suggesting that mastering policy sciences is a prerequisite to conducting effective natural resource policy. However, I am suggesting that natural resource managers must gain skills in social and political processes. The essential elements, however they are incorporated into a program, include self-observation and awareness, skills in defining problems, knowledge *in* and *of* policy processes, and skills in methods that allow one to track trends and conditions in social and decision processes and make projections about the effects of proposed policies on meeting stated goals and securing the common interest. Ways to incorporate such skills into natural resource graduate curricula are suggested below. I then discuss barriers to teaching such a theory and framework and ways to address some of these barriers.

Standpoint clarification

Observational standpoint involves degrees of “control, complexity, and duration” (Lasswell and McDougal 1992: 898). Control refers to the influence of the researcher on a study. The interviewer and participant are more active, and the spectator and collector are more passive. Observational standpoints may also be simple--available with little training--or complex--requiring training. A professional conversation is considered

simple, and a more formalized prolonged psychoanalytic interview is considered more.

Duration refers to the length of a study.

Problem orientation and Contextuality

Problem definition can be thought of as “what we choose to identify as public issues and how we think and talk about these concerns” (Rochefort and Cobb 1990: vii.).

In the policy sciences, problem orientation consists of five intellectual tasks: clarifying goals, describing trends and conditions that lead to or away from the realization of goals, projecting what is likely to happen given current trends and conditions, and inventing alternatives to help achieve goals. Problems are discrepancies between outcomes and goals, or preferences.

People have personal and official policy goals. Having personal goals when participating in public policy processes is neither undesirable nor avoidable. Clarifying one’s personal preferences can help participants work more effectively. For example, as discussed in chapters three and four, many ranchers not only seek to protect the health of their cattle and economic viability of the industry, but also to maintain close ties with their neighbors and political. Demanding zero tolerance of brucellosis-infected bison is almost a sure way to deprive themselves of all of these goals. They may lose grazing leases if a choice has to be made between cattle and wildlife on public land. Likewise, animal rights activists seeking to protect wildlife and to win moral disputes might thwart their efforts if they demand zero tolerance for lethal control of bison.

Graduate school programs can include training in identifying one’s personal goals. These skills are important because by reflecting on their own goals and listening to the perspectives of others, managers might escape from their own “patterns of error” that

result from automatic responses to policy situations and problems (Schon 1987: 61). When practitioners become “experts” in their field, they often explain away anomalies. Remaining aware of one’s personal goals along with policy goals can help practitioners face unique cases with a fresher perspective and better understanding of potential problems. This type of thinking is called “reflection-in-action” by some (see (Schon 1987) and “goal” or “value” clarification by others (e.g., (Lasswell and McDougal 1992). Publicly stating biases can also create an atmosphere of honesty and openness in scientific inquiry, increasing rather than decreasing the validity and integrity of studies. Many scientific journals now even require scholars to disclose funding sources, so potential monetary influence on a study’s conclusion might be considered along with the scientific facts presented (Press and Washburn 2000).

The process of identifying personal goals is not academic. Rather, it can help guide decisions so that policies can be developed in the common interest. Many graduate programs that focus on positivistic science teach students to distance themselves from the political process. The role of the researcher and the professional, they are taught, is to provide information but to remain neutral and objective. Thus, many programs never teach professionals how to innovate solutions to the problems they encounter or to intervene in creative ways in the policy process. To create leaders, however, it is important to teach not only analysis for the sake of generating new knowledge, but also for the sake of improving decisions. Even if they only provide information to decision-makers, students and researchers are part of the decision-making process. Students and professionals must learn to recognize their role in the policy process, rather than deny that they have one. They can then work toward conducting analysis with self-awareness. They

can make policy recommendations based on an understanding not only of relevant biophysical trends, conditions, and projections, but also relevant social and political trends, conditions, and projections. Development of alternatives should be creative¹¹ and can prescribe new policy, institutional structures, or procedures (Lasswell and McDougal 1992). Opportunities for innovation should be sought to meet goals. Alternatives should be evaluated based on their ability to meet goals in an integrative fashion, minimizing losses and maximizing gains.

In addition to the personal goals discussed above, official policy goals in the bison case include maintaining a wild and free-roaming population of bison while protecting the economic interests of the livestock industry. Chapters three through six showed these goals have different implications for alternatives depending on a participant's perspective. To some veterinarians, protecting the economic interests of the livestock industry requires zero-tolerance for brucellosis-infected bison. Some ranchers would prefer no bison be allowed to migrate out of the park. For many conservationists, maintaining the wild and free-roaming nature of bison prevents options such as rounding up bison and testing them for brucellosis or holding them in quarantine facilities. These discrepancies are evidence that problem orientation is an iterative process (Lasswell and McDougal 1992). As trends and conditions are identified, alternatives discussed, and projections made, goals continue to be clarified, new trends and conditions researched, and new alternatives proposed.

It is helpful to identify, or "map," trends that lead toward or away from goals. These maps should include not only ecological factors, but also social and political factors. Recall the words of Lasswell, quoted in chapter four, that politics involves "who

¹¹ Creativity can be encouraged by expanding and contracting the focus of attention, alternating between intensive concentration and

gets what, when and how” (Lasswell 1936). This simple phrase can help guide trend analysis. In other words, who participates, with what perspectives, seeking what values, using what resources and which strategies, in what situations, with what outcomes and what effects? Relevant functions of decision-making to consider include intelligence gathering (which includes research and the process of defining a problem), promotion or open debate of an issue, prescription or formal rules, invocation and application of the prescriptions to real situations, assessment of policies, and termination or adaptation of policies and programs. All of the categories in social and decision-making processes, as described in chapter two and summarized in Appendix B, can be used to identify relevant trends.

Identifying trends is not sufficient to invent policies that will meet stated goals. Situations and conditions can change, so what happened in the past might not necessarily occur in the future. Therefore, it is important to identify the conditions under which trends occurred. The categories described above can also be used to help identify relevant conditioning factors, described below. For example, one relevant trend is the movement of bison beyond park borders (a change in the biogeographic *situation*). A number of conditioning factors contributed to this trend, including the natural regulation policy (a change in *prescription*), harsh winter conditions (a biogeographic *situation*), possibly herd memory (a biogeographic *situation*), and possibly the grooming of roads (a change in biogeographic *situation*, *prescription*, and *invocation*). The number of participants, many of them removed from the scene of action, is a conditioning factor in the level of conflict and its enduring nature.

inattention, free association, and experimenting with random combinations (Lasswell and McDougal 1992: 38).

Many disciplines have tools to help identify trends and conditioning factors. The natural sciences help to explain phenomenon that occur in the natural world. Social sciences such as psychology, sociology, economics, and anthropology can help to explain phenomenon that occur in the social and political world. Graduate programs can include courses that teach students how to map trends and conditions, and expose them to the relevant disciplines that provide insight on how to interpret those trends and conditions to make projections about the future.

For example, given the large number of bison migrating out of the park in low-food years (such as after the fires in 1988 and in the harsh winter of 1996-97), managers might expect a repeat of these migrations in the future. Projection of alternative futures can be enhanced by using “developmental constructs” of possible futures based on “conscious, explicit, comprehensive, and realistic” expectations (Lasswell and McDougal 1992: 37-38). Projections do not necessarily require mathematical modeling.

Multiple methods and knowledge integration

Multiple methods can help managers, researchers, and other participants to identify the root causes of problems. Multiple methods, or interdisciplinary work, also provide a means to overcome biases and decrease fragmentation (Lasswell 1971: xiii). Multiple methods can mean using data from many sources, using different data collection methods to investigate a single problem, collaborating with other investigators, employing several theories to interpret data, and bringing the insights of many disciplines to enhance the understanding of a given context (Janesick 1994). Useful methods and approaches include but are not limited to case studies, correlational studies, experiments, and prototypes.

Different methods and collaborative research efforts allow different foci of attention to reduce blind spots and can result in a more comprehensive study. For example, psychology, social psychology, sociology, economics, statistics, anthropology, history and other social disciplines all offer insights into social and decision-making processes. Historians often conduct trend analysis and historical methods can prove invaluable in identifying relevant trends. Sociologists and natural resource scientists such as hydrologists, wildlife biologists, and soil scientists often identify conditioning factors. Many social scientists and many natural scientists, especially economists and natural scientists specializing in modeling, make projections. Policy-makers, natural resource managers, and lawyers specialize in selecting alternatives.

The goal is not to make a social scientist out of natural resource practitioners, but rather to equip them with the insight into human behavior and motivations so that they might better comprehend the social and decision-making processes in which they are involved. A conservation biologist must understand something about the interrelationships among hydrological systems and watersheds, flora and fauna, anthropogenic effects on resources, and geological conditions. Likewise, natural resource managers should be equipped to understand the interrelationships among human beings and their social, built, and natural worlds. Not every manager or participant in a policy process need be an expert in every discipline. Interdisciplinary teams or even participation in CBIs with unaffiliated citizens, interest group representatives, government officials, and other researchers can allow participants to pool their intellectual resources and experiences to identify problems and invent creative, integrative solutions.

In addition, context-sensitive methods associated with different disciplines can help in gathering information. Such methods include interviewing (Fontana and Frey 1994), cognitive mapping, ethnography and participant observation (Adler and Adler 1994), content and narrative analysis (Roe 1994), q-methodology (Brown 1980, Brown 1993, McKeown and Thomas 1988, Stephenson 1973), participatory and rapid rural appraisal (Freudenberger 1997), review of material culture (Hodder 1994), and review of archival materials (Barzun and Graff 1992). Methods such as q-sorts can even be used to help in goal clarification (Brown 1996). Theoretical insights in these disciplines can be used to interpret the significance of trends and conditions identified in problem analysis. These methods could be taught in graduate programs.

Potential barriers

Changing the expectations and practices of professionals is not easy. Most people seek approval from peers, colleagues, and supervisors to receive their loyalty as well rewards such as job security, raises, and promotions. Learning new methods or changing ones' values and beliefs can be risky in pragmatic as well as emotional and psychological ways. For example, in general, the closer one works with basic science (as opposed to applied science or day-to-day technical skills), the higher one's academic status (Schon 1987). While such an epistemology fails to produce effective practitioners in professions ranging from law to medicine to management consulting, it is widely accepted and often rewarded through better jobs and the respect and admiration of colleagues (Schon 1987).

There are a number of alternatives that might facilitate changes in graduate education. First, as described above, changing practices requires innovation, diffusion, and adaptation of alternatives. We can learn from past courses in natural resource policy

to diffuse and improve graduate education. Ronald Brunner, a political scientist at the Center for Public Policy Research at the University of Colorado in Boulder, describes several specific barriers he has faced teaching policy sciences (Brunner 1997). First, many students mistake the policy sciences as one framework equivalent to other policy frameworks. Brunner addressed this problem by including a week in his course on identifying this common problem with many other theories as one of acontextuality and understanding the effects of positivism on problem framing. Second, students worried that they were only being exposed to one theory. Brunner subsequently included a week on policy sciences as part of the larger policy movement and includes readings from other policy theories for comparison. Third and fourth, many students assumed the theory was irrelevant to practical problems when attempting to use it in term projects and felt more applications needed to be covered in class. This barrier stems in part from the emphasis in positivistic thinking on developing causal theories. Brunner now includes a section on prototyping as an example of the application of the policy sciences and includes more examples of concrete application of the theory. Fifth, Brunner recognized the need to place more emphasis on knowledge integration. He now includes more integration and comparisons of policy sciences with other policy theories and discusses functional equivalents of concepts in the policy sciences. Sixth, Brunner recognized a need to place more attention on self-orientation in the term projects. Brunner suggested students begin mapping the social and decision process rather than problem-orientation to overcome this problem.

Second, to change practices, one of the most vital components to add to natural resource graduate education is a hands-on component. Physicians, athletes, musicians,

and artists are all examples of professions that require hands-on learning. Institutions that provide these experiences include hospitals, sports teams, conservatories, and studios. Working in the field with practitioners can prove beneficial in a number of ways. First, it provides a way for students to learn through demonstration, questioning, and feedback. Second, they have the opportunity to apply the theory and knowledge they acquire in school to real-world situations. Third, hands-on experience exposes students to a different system of rewards than that found in universities and professional schools. Fourth, it forces them to act in the field but provides the opportunity for them to return to the “safer” environment of the university to reflect on their actions. And finally, it provides students with valuable insight into the skills sought by and values of future employers.

Third, we might change the standards within academia to applaud and reward practical knowledge applied to real-world problems. This can include minor incentives, such as grants for applied projects in communities near a university. In the longer run, however, it might require such dramatic shifts as assessing the tenure review process and placing more emphasis on achieving change.

Education and the professional

Education should continue for professionals in the field. Workshops provide one way to enhance the skills of professionals. The Northern Rockies Conservation Cooperative (NRCC), a non-profit research institution, for example, ran a problem-solving workshop in 1997 in Jackson, Wyoming in which I participated. Participants included agency officials, county commissioners, scientists and other academics, community leaders, conservationists, and others. The workshop focused on examining

decision-making processes in issues including elk management, feedgrounds for wildlife, bison management in Jackson, and grizzly bear management. Although conflict arose during the workshop, all participants agreed in written assessments of the workshop that they would recommend it to others. The skills they gained included thinking through decision processes more effectively, directing their focus of attention to a broader range of issues, and understanding the importance of social processes in decision making. They also recognized a need to rethink current decision-making paradigms and to conduct more open assessments and appraisals (Cromley 2000).

NRCC ran a similar workshop in Australia. An example of a format for such a workshop is provided in the manuscript “Interdisciplinary problem-solving workshops for flora and fauna branch professionals, department of conservation and natural resources, Victoria, Australia” (Clark, 1996). The workshop in Australia began with a discussion of general issues concerning professional challenges. The discussion was followed by an introduction to interdisciplinary problem-solving methods and then application of the method to specific problems faced by participants in the workshop. The application was done in teams. Participants in the workshop felt the workshops and a related 400-page reader were highly relevant to their work and improved their problem-solving skills, their understanding of policy processes, and their ability to articulate their own problem-solving approaches and experiences.

The workshops in Jackson and Australia are just two examples; workshops can be conducted in a number of ways. For example, leaders of these workshops could lead problem-orientation exercises. Specific issues could be discussed to make the training concrete, but consciously reflecting on social and decision processes could allow

participants to gain skills applicable to any natural resource issue. Attention could be focused on the root causes of problems such as conflicting values and myths, mistrust, built-up frustration, and breakdowns in the decision-making process. Such workshops could allow practical problem-solving exercises to be combined with skill-building. These workshops need not only be addressed at those employed by natural resource agencies or other organized interest groups. Jonathan Kusel suggests, “people need to be brought into the research process not only to be informed and educated about the science, but to be engaged in order to share their knowledge and have a mutual exchange of information with scientists” (Conley and Moote 1999).

How will such interactions help to bring the ideological shifts discussed above? First, interacting with people who bring different perspectives to an issue can help people to become aware of their biases. Lasswell and McDougal (1992: 22-23) state, “it is our strong recommendation that the scholar should be as conscious as possible of the different communities with which he identifies, of which he is a member, and upon which he has unavoidable impacts.” The same is true for any participant in a policy process. Their reasoning is that researchers may be more successful at reaching the goal of objectivity by remaining cognizant of their biases, by following the adage “know thyself,” rather than claiming to be objective. Working with people from different communities--scientific or other--often results in conflict because assumptions about the way the world works are brought to a conscious level. Such conflict is healthy and can be productive if methods are available to work through the conflict. Second, rather than merely studying the social and political context, such interactions force scientists, decision-makers, and community members to deal with these contexts. Such face-to-face contact forces social

interactions and politics to be worked out rather than discussed as “the problem.” And finally, such interactions allow the expertise--scientific or otherwise--of many people involved in an issue to come together to inform the issue.

In the case of bison management, an exchange of information could, for example, include ranchers who co-exist with bison and are aware of other pressures on the industry, Native Americans who have centuries of cultural knowledge about bison, members of conservation groups who monitor the implementation of policies, agency officials who know regulations and have knowledge about the land they manage, and veterinarians and wildlife biologists who have specialized knowledge of diseases and wildlife. All of these participants might evaluate their goals and biases in promoting various alternatives in bison management. Such self-evaluation might help to alleviate some of the tension and mistrust built up over the past few decades.

Given the limited time and funding of many participants in these policy processes, pamphlets and workbooks offer another alternative to help improve skills among professionals. For example, the Sonoran Institute published a workbook entitled “Measuring Change in Rural Communities: A Workbook for Determining Demographic, Economic, and Fiscal Trends” (Rasker, Johnson et al. 1998). The workbook is designed to teach citizens and leaders how to track relevant trends in their communities, including demographic, economic, and tax structure changes, so that they can reach “decisions about local economic development and needed services” (Rasker, Johnson et al. 1998: iii). Understanding community trends in relation to national and global trends and in relation to larger community goals can help government officials, businesses, and citizens

to improve community planning, including land development, economic development, and growth.

Conclusion

The story of bison management is a story about who is getting their way and who is not in bison management, when, where, and how. This dissertation explains why although much of the debate centers on technical aspects of brucellosis and bison behavior, resolving the bison issue and other environmental problems will require understanding more than the biophysical aspects of the issues. Science can help to solve the problem, but science is not the answer.

The bison controversy, like many environmental controversies, is about finding common interest among many single interest groups making demands on precious natural resources. In other words, it's about how we allocate our natural resources and who decides. Every case will be different, and the social and political context is important to finding a solution. Finding common interest requires not only understanding biophysical aspect of natural resources, but also social and political aspects. Finding common interest also requires more than research. The best research and science can go a long way to inform policy-makers. But protecting our precious natural resources like bison will require the cooperation of people in power and those living with the resource.

This chapter suggests changing practices so that common interest might be found. Change is rarely easy, but often necessary. The old way of doing things is failing. Different ways exist, ways that hold much promise but no guarantees. Trying these different ways will be a risk, but no more of a risk than continuing to use tried and failed

methods. Taking the leap to make the changes will take leaderships in communities, in government agencies, in interest groups, and in academia. These leaders must have a vision of a better way of doing things and a willingness to take some chances. It is the only way to change the way we solve problems and to work towards enduring resolutions.

Works cited

- Adler, P. A. and P. Adler (1994). Observational techniques. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications: 377-392.
- Anonymous (1998). "The Lubrecht Conversations." Chronicle of Community 3(Autumn): 5-16.
- Barzun, J. and H. F. Graff (1992). The Modern Researcher. New York: Harcourt Brach Jovanovich College Publishers.
- Bohne, J. (1998). Interview. June 26. Jackson, WY.
- Braxton-Little, J. (2000). "Congressional staffers visit pilot stewardship contracting projects." Communities and Forests 3(4): 1,3.
- Brown, S. R. (1980). Political Subjectivity: Applications of Q Methodology in Political Science. New Haven, CT: Yale University Press.
- Brown, S. R. (1993). "A Primer on Q Methodology." Operant Subjectivity 16: 81-97.
- Brown, S. R. (1996). Interests, selectivity, and the clarification of goals. Association for public policy analysis and management, Pittsburgh, PA.
- Brunner, R. D. (1997). "Teaching the policy sciences: Reflections on a graduate seminar." Policy Sciences 30(4): 217-231.

- Brunner, R.D. (2001). "Problems of governance." In Finding Common Ground: Governance and Natural Resources in the American West. R. D. Brunner, C. Colburn, C. Cromley, B. Olson. Boulder, CO, Manuscript. Submitted for publication to Yale University Press, 2001.
- Brunner, R. D., C. Colburn, C. Cromley, R. Klein, B. Olson (2001). Finding Common Ground: Governance and Natural Resources in the American West. Boulder, CO, Manuscript. Submitted for publication to Yale University Press, 2001.
- Brunner, R. D. and T. W. Clark (1997). "A practice-based approach to ecosystem management." Conservation Biology 11(1): 48-58.
- Burchfield, J. (1998). "Abandoned by the roadside: The long road ahead for collaborative stewardship." Chronicle of Community 3(Autumn): 31-36.
- Coggins, G. C. (1998). "Of Californicators, quislings and crazies: Some perils of devolved collaboration." Chronicle of Community 2(Winter 1998): 27-33.
- Conley, A. and A. Moote (1999). "Innovations in research: Linking the academy and the community." Communities and Forests Winter 1999-2000: 8.
- Cromley, C. M. "The killing of grizzly bear 209: Identifying norms for grizzly bear management." T. W. Clark, A.R. Willard, C. M. Cromley, eds. Foundations of Natural Resources Policy and Management. New Haven, CT: Yale University Press.
- Curlee, P. (1998). Interview. June 16. Jackson, WY.
- Daly, C. (2000). "Sharing community forestry lessons." Communities and Forests Winter 1999-2000: 2.
- Decker, D. J., T. L. Brown, et al. (1992). Toward a Comprehensive Paradigm of Wildlife Management: Integrating the Human and Biological Dimensions. American Fish and

- Wildlife Policy: The Human Dimension. W. R. Mangun, ed. Carbondale: Southern Illinois University Press: 33-54.
- deLeon, P. and T. A. Steelman (1999). "The once and future public policy program." Policy Currents 9(2): 1-9.
- Falk, R. (1990). "Casting the spell: The New Haven School of international law." The Yale Law Journal 104: 1991-2008.
- Fontana, A. and J. H. Frey (1994). Interviewing. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications: 361-376.
- Freudenberger, K. S. (1997). Rapid Rural Appraisal; Participatory Appraisal: Notes to accompany an introductory course. May 1-2. Yale University.
- Getches, D. H. (1998). "Some irreverent questions about watershed-based efforts: What does it take for a watershed initiative to be successful?" Chronicle of Community 2(Spring): 28-34.
- Griffin, J. (1998). Interview. June 15. Jackson, WY.
- Hayden, T., E. Check, et al. (2000). The battle for planet earth. Newsweek, . April 24: 51-53.
- Hodder, I. (1994). The interpretation of documents and material culture. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications: 393-402.
- Janesick, V. J. (1994). The dance of qualitative research design: Metaphor, methodology, and meaning. Handbook of qualitative research. N. K. Denzin and Y. S. Lincoln, eds. Thousand Oaks, CA: Sage Publications: 209-219.

Jungwirth, L. (1996). Memo to the members of the communities committee. June 28.

Seventh American Forest Congress Communities Committee.

Kenney, D. S. (1999). "Are community-based watershed groups really effective?:

Confronting the thorny issue of measuring success." Chronicle of Community

3(Winter): 33-37.

Kovacs, K. (1999). Interview. February 10, 1999. Washington, D.C.

Lasswell, H. D. (1936). Politics: Who Gets What, When, and How. New York: McGraw-Hill.

Lasswell, H. D. (1971). A Pre-View of Policy Sciences. New York: American Elsevier.

Lasswell, H. D. and A. Kaplan (1950). Power and Society: A Framework for Political Inquiry. New Haven: Yale University Press.

Lasswell, H. D. and M. S. McDougal (1992). Jurisprudence for a Free Society: Studies in Law, Science and Policy. New Haven: Yale University Press.

Manning, R. E. (1998). "Integration in natural resources education: Designing a core curriculum." Society and Natural Resources 11: 179-90.

McCloskey, M. (1996). "The skeptic: Collaboration has its limits." High Country News 28(9): http://www.hcn.org/1196/may13/dir/Opinion_The_skepti.html.

McKeown, B. F. and D. B. Thomas (1988). Q Methodology. Newbury Park, CA: Sage.

Moote, A. (2000). "Letter to the members." Communities and Forests 4(1): 2.

National Park Service, State of Montana, et al. (1998). Draft Environmental Impact Statement for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park. National Park Service, state of Montana, U.S.F.S., U.S. Animal & Plant Health Inspection Service.

- Petzinger, T. J. (1999). The New Pioneers: Men and Women who are Transforming the Workplace and Marketplace. New York: Simon & Schuster. .
- Press, E. and J. Washburn (2000). "The Kept University." Atlantic Monthly March: 39-54.
- Rasker, R., J. Johnson, et al. (1998). Measuring Change in Rural Communities: A workbook for Determining Demographic, Economic, and Fiscal Trends. Bozeman: Sonoran Institute.
- Reiswig, B. (1998). Meeting with Barry Reiswig, NER manager, Tim Clark, Christina Cromley, Brad Kahn. June 18. Jackson, Wy.
- Rocheft, D. A. and R. W. Cobb (1990). Problem Definition: An emerging perspective. The Politics of Problem Definitions: Shaping the Policy Agenda. D. A. Rocheft and R. W. Cobb, eds. Lawrence: University of Kansas Press: 1-31.
- Roe, E. (1994). Narrative Policy Analysis: Theory and Practice. Durham, NC: Duke University Press.
- Schon, D. A. (1987). Educating the Reflective Practitioner. San Francisco: Jossey-Bar Publishers.
- Scott, J. C. (1998). Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. New Haven: Yale University Press.
- Severin, B. (1998). Interview. September 25, 1998. Gardiner, MT.
- Snow, D. (1999). "What are we talking about?" Chronicle of Community 3(Spring): 33-37.
- Stephenson, W. (1973). The Study of Behavior: Q-technique and Its Methodology. Chicago: University of Chicago Press.

The U.S. Institute for Environmental Conflict Resolution. (2000). Jackson Bison and Elk Herd Management: Situation Assessment and Process Recommendations. July 21. The University of Wyoming's Institute for Environment and Natural Resources, The U.S. Fish and Wildlife Service, National Park Service.

Appendix A: List of Abbreviations

APHIS	U.S. Animal and Plant Health Inspection Service
CEQ	White House Council on Environmental Quality
DOL	Department of Livestock
EA	Environmental Assessment
EIS	Environmental Impact Statement
DFWP	Montana Department of Fish, Wildlife, and Parks
FACA	Federal Advisory Committee Act
GAO	General Accounting Office
GYA	Greater Yellowstone Area
GYE	Greater Yellowstone Ecosystem
GYIBC	Greater Yellowstone Interagency Brucellosis Committee
ITBC	Intertribal Bison Cooperative
MEPA	Montana Environmental Policy Act
MOU	Memoranda of Understanding
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NPS	National Park Service
NRC	National Research Council
OPON	One People, One Nation
USAHA	U.S. Animal Health Association
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service

Appendix B

Policy Sciences Framework

Problem Orientation

Goals: What preferences (personal and policy) do participants have? Whose goals are to be realized?

Trends: What are the trends that have led towards or away from those goals?

Conditions: What conditions account for the trends?

Alternatives: What alternatives are available to move closer to meeting goals?

Projections: What is likely to happen in the future given past trends and conditions?

Problems are discrepancies between goals and the actual state of affairs.

Social Process

Participants: Who participates?

Perspectives: With what perspectives?

- Value demands
- Expectations
- Identity

Situations: In what situations?

- Geographic or ecological
- Institutional (Organized, unorganized)
- Temporal

- Crisis or intercrisis
- Value inclusive or exclusive

Base values: With what base values, or assets and resources to influence policy?

- power
- respect
- enlightenment
- skill
- affection
- rectitude
- wealth
- well-being

Strategies: Using what strategies? What strategies will work to meet stated goals?

- Communicative (diplomatic, propaganda)
- Collaborative (military, economic)

Outcomes: With what outcomes?

- Value indulgences and deprivations
- In each decision function (see below)

Effects: With what long-term effects?

Decision Process

Intelligence: Gathering, processing, disseminating information. Problem definition.

Promotion: Open debate about a policy. This often includes media campaigns and other activities to add intensity to a policy debate.

Prescription: Stabilized expectations about norms and sanctions for violating norms.

Invocation: Initial characterization of a situation according to compliance or non-compliance with prescriptions.

Application: Final characterization of a situation according to prescriptions.
Appellate courts, for example, can re-characterize a lower court's initial ruling, or invocation of a given prescription.

Termination: Ending or modifying a prescription.

Appraisal: Evaluating a prescription according to its ability to meet goals.

GREATER YELLOWSTONE AREA

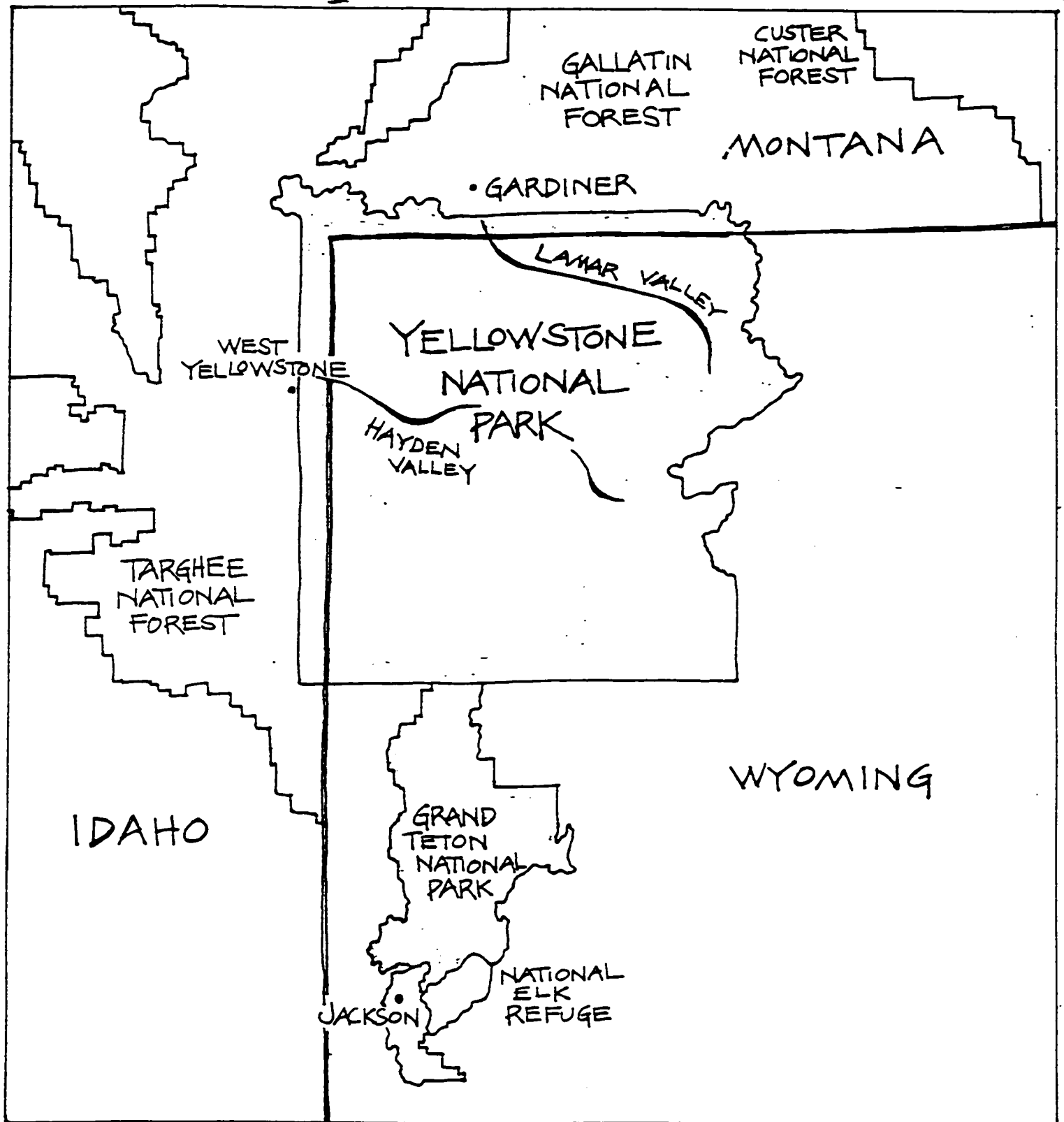


Figure 1