The Mixed-Grass Prairie Reserve: Managing the Greater Badlands Region as a Whole System

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CITATION AND REPRODUCTION

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Foreword

From time to time we identify papers written by our students that are outstanding and have the potential to make a meaningful contribution to the public policy debate.

Andre Meade and Sydney Rosen have examined an area -- unique not only because of its ecological and social value -- but also because of its special place in history: the Greater Badlands Regions of South Dakota. The Badlands National Park is the center of this ecological region that includes the Pine Ridge Indians Reservation and the Buffalo Gap National Grassland and is the largest expanse of mixed grass prairie in the United States.

In this paper, Meade and Rosen propose the establishment of a Mixed-Grass Prairie Reserve and suggest alternative plans for implementing a whole system management program that would create a new cultural and environmental resource for all the stakeholders in the Greater Badlands Region.

This paper was originally produced for a workshop course at the John F. Kennedy School of Government. The course, taught by Dr. Charles H.W. Foster, focused on the uses of ecological and bioregional management techniques to encourage partnerships consisting of multiple jurisdictions with different priorities working together to preserve areas of unique environmental and social value.

While the Kennedy School takes pride in the quality of the research that went into this paper, the opinions expressed herein solely represent those of the authors.

Henry Lee
March 1996

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Managing the Greater Badlands Region as a Whole System

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Part I: The Transformation of the Great Plains

Introduction

Great herds of buffalo drift across mile upon mile of uninterrupted prairie. Grass extends to the horizon in all directions, checked only by the grazing of buffalo and intermittent wild fires. Pronghorn antelope and bighorn sheep dot the landscape. In the distance, prairie wolves and black-footed ferrets prey upon prairie dogs.

A vision from the past? It could be a vision of the future. Once devastated by excessive grazing, intensive farming, and unchecked hunting, Badlands National Park in southwestern South Dakota currently protects the country's largest expanse of mixed-grass prairie and provides habitat for a rich array of native plant and animal species. Despite its size and richness, however, the National Park is not large enough to comprise and sustain a complete mixed-grass prairie ecosystem, or to support a free-roaming buffalo herd or resident wolf population.

A whole-system management approach that coordinates the management of Badlands National Park with that of its neighboring jurisdictions, a national grassland and an Indian reservation, could redress this situation. This paper examines the potential for whole-system management in the Badlands and concludes with a proposal for creating an integrated mixed-grass prairie reserve.

The Fate of the Prairie

Badlands National Park lies at the heart of a region in transformation. The last major region of the United States to be populated by European settlers, the Great Plains, stretching approximately from the Mississippi to the base of the Rocky Mountains, may be the first to be abandoned. Shaped and sustained by a semi-arid climate, frequent wildfires, and vast herds of buffalo, the Great Plains was devastated by the ranchers and farmers who moved west across the American continent in the nineteenth century.[1] Enormous expanses were sectioned, fenced, plowed, and grazed. The settlers eliminated the buffalo, replaced native grasses with corn, hay, and wheat, and suppressed natural fires. The Great Plains became one of the most ecologically disturbed regions in the United States.

Concern is now growing that the intensive farming and grazing are unsustainable. The semi-arid Great Plains is dependent upon an enormous aquifer called the Ogallala. The Ogallala is being mined at nearly twenty times its natural recharge rate.[2] Already, the aquifer has retreated from the southern reaches of the region, and dry-land farming has replaced irrigated agriculture. In western Kansas, the

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[1] New York Times, October 19, 1993.

[2] Wall Street Journal, August 16, 1989.

Ogallala is less than six feet deep in some areas, reduced from fifty-eight feet in 1950.[3]

The human population of the Great Plains states is also in decline. Many small towns are being abandoned and growth is occurring only in small pockets. Montana, the Dakotas, and Wyoming each have just one member in the House of Representatives.

As a result of these changes, the future of the Great Plains is uncertain. On one side, there are calls for continued agriculture and ranching, based upon more efficient use of water and public assistance to rural communities. On the other, people are calling for the abandonment of great swaths of land and the return of the buffalo. In either situation, change appears inevitable.

Managing the Badlands

Accordingly, the management issues facing Badlands National Park and its adjacent jurisdictions are of regional and national, not simply local, importance. Innovative approaches to management in the Badlands could serve as a demonstration of how the entire Great Plains region can adapt to the changes ahead.

One approach that can improve the use and protection of the mixed-grass prairie in the Badlands is management based on whole resource systems. With boundaries drawn to encompass a narrow strip of spectacular geologic formations, it is not surprising that the borders of Badlands National Park do not reflect natural systems. A whole-system approach to management concerns looking beyond the boundaries of the National Park to the surrounding national grassland and Indian reservation.

Defining the Greater Badlands Region

The mixed-grass prairie that once dominated the middle third of the Great Plains extends hundreds of miles northward and southward from Badlands National Park. As a working concept, this paper defines the "Greater Badlands Region" (GBR) as the area centered on Badlands National Park and extending into the adjacent jurisdictions, Buffalo Gap National Grassland and the Pine Ridge Indian Reservation, to comprise a mixed-grass prairie ecosystem.

A quick glance at a map of southwestern South Dakota reveals that a number of other lands could easily be included within a "Greater Badlands Region." State and private lands to the north and west of Badlands National Park, the Rosebud Sioux Reservation east of Pine Ridge, and even Wind Cave National Park, at the border of the Black Hills, are all part of the mixed-grass prairie. For pragmatic reasons--to limit the number of parties whose interests are at stake and focus on the largest political jurisdictions--this paper will look only at Badlands National Park, Buffalo

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[3]Anne Matthews, "Slow Death Beyond the 98th Meridian," Outside, May 1993.

Gap National Grassland, and Pine Ridge Reservation. As planning and management experience grows, surrounding jurisdictions can be included in the whole-system management process.

Political Jurisdictions

Badlands National Park

At the core of the Greater Badlands Region is Badlands National Park, a protected area of 242,756 acres under the jurisdiction of the National Park Service, an agency in the Department of Interior. The Lakota inhabitants and early French explorers of South Dakota both dubbed the district of harsh, unforgiving rock faces, steep buttes, and deep gullies "bad land": *makosche shicha* in Lakota, *"les mauvaises terres a traverser"* in French.[4] The name stuck, and Badlands National Monument became part of the National Parks system in 1939. Its purpose was to demarcate and preserve the unique geological formations and vertebrate fossil beds found in the region. The monument was expanded and upgraded to National Park status in 1968.

The southern half of the Park, known as the South or Stronghold Unit and including a detached area called the Palmer Creek Unit, lies within the boundaries of the Pine Ridge Indian Reservation. The South Unit was added to the Park in 1976, when the NPS signed a Memorandum of Agreement with the Oglala Sioux Tribe, incorporating 133,300 acres of the Reservation into the Park.

The Memorandum of Agreement specifies the management obligations of the National Park Service for the South Unit, reserves specific privileges for tribal members, and provides substantial financial compensation to the Tribe. Tribal members retain full hunting, gathering, and cultural access rights within the South Unit, subject to tribal regulations. The Tribe receives 50 percent of Park entrance fees and preference for the profitable lodge and restaurant concession at Cedar Pass. The Agreement also obligates the NPS to provide training and technical support to the Tribe and calls for cooperative development of recreation and interpretive programs on the reservation. These last provisions have not been actively pursued by either party.[5]

Badlands National Park receives as many as 1.5 million visitors a year, mainly between June and September. Most visitors stay for less than one day, driving through the Park on their way to Mount Rushmore or Yellowstone and stopping only at designated lookout points. Almost all visitor facilities in the Park, including the Ben Reifel Visitor Center, Cedar Pass Lodge, hiking trails and guided walks, two campgrounds, and administrative headquarters, are located in the North Unit.

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[4]John Madson, "South Dakota's Castles of Clay," National Geographic, April 1981, p. 525.

[5]National Park Service, Badlands National Park, Memorandum of Agreement Between the Oglala Sioux Tribe of South Dakota and the National Park Service, 1976.

In the South Unit, the White River Visitor Center, a small, temporary facility, is slated for removal as soon as a replacement site and funding are approved. There are no marked trails in the South Unit. The Bureau of Indian Affairs, another Interior Department agency, continues to lease lands in the South Unit for cattle grazing.

Within the North Unit, an area of 64,144 acres is a legally designated wilderness known as Sage Creek Wilderness. The wilderness includes the largest expanse of mixed-grass prairie in the Park.[6]

Buffalo Gap National Grassland

Surrounding the North Unit of Badlands National Park is Buffalo Gap National Grassland, one of twenty grasslands under the jurisdiction of the United States Forest Service (USFS), in the Department of Agriculture. Buffalo Gap includes approximately 591,000 acres, intermingled with private lands, extending from east of the National Park to the borders of Nebraska and Wyoming. Administration is divided between the Wall Ranger District in Wall, north of the Park, and the Fall River District in Hot Springs, near the Wyoming border.

The land within the Buffalo Gap National Grassland returned to the public domain in the 1930s. Distributed to homesteaders in the late 1800s, the land proved too dry, and the climate too harsh, for European-style farming. When the drought and low commodity prices of the 1920s turned into the Dust Bowl and Depression of the 1930s, many settlers were forced to abandon their farms. Emergency legislation instructed the Agriculture Department to purchase and restore millions of acres. Depending on their locations and resources, these lands were assigned to the National Park Service, the U.S. Fish & Wildlife Service, the Bureau of Land Management, or the U.S. Forest Service.

Like other national grasslands, the purpose of Buffalo Gap is "to serve as a demonstration area, to show how lands classified as unsuitable for cultivation may be managed for forage, wildlife habitat, prairie woodlands, energy/minerals, water, and outdoor recreation to the benefit of both land and people." Buffalo Gap is managed under the Forest Service's policy of multiple use. Different parts of the grassland are zoned to emphasize different uses, but the primary use is cattle grazing, which is coordinated with county cooperative grazing districts and associations. Directly north of the Sage Creek Wilderness Area, for example, the Eastern Pennington County Cooperative Grazing District has twenty members who lease units in Buffalo Gap.[7] Most of the National Grassland is fenced for cattle.

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[6]National Park Service, Badlands National Park, Statement for Management, August 1992, pp. 22-23.
[7]Buffalo Gap National Grassland, USDA Forest Service, Range Allotment Management Plan for Eastern Pennington County Cooperative Grazing District, 1991.

All kinds of recreation are permitted in Buffalo Gap. There is a visitor center at USFS headquarters in Wall, but there are no trails or other recreational facilities in the grassland itself.[8]

Pine Ridge Reservation

To the south of Badlands National Park, and encompassing the Park's South Unit, is the Pine Ridge Indian Reservation, the home of the Oglala Lakota (Sioux) Tribe (OST). Like most Indian tribes in the United States, the OST is a sovereign nation under the trusteeship of the federal government. The reservation is governed by a tribal council, which has extensive legislative powers. The Bureau of Indian Affairs, as the federal trustee, must approve all land use decisions and leases on the reservation.

Most of the reservation land in the vicinity of the South Unit is leased to tribal members and non-members for cattle grazing, with payments accruing to the tribal government. The tribe's fish and wildlife agency, the Oglala Lakota Parks & Recreation Authority (OLPRA), oversees natural resource management throughout the reservation and enforces tribal regulatory codes.

OLPRA is also developing its own comprehensive natural resource management plan for the reservation, based on a revival of traditional Lakota ecological and cultural practices. In addition to managing the land to maximize subsistence opportunities for tribal members, the plan calls for biodiversity protection, the development of ecologically and culturally compatible economic activities, and improved relations with federal agencies.[9]

There are few developed tourist sites or facilities on the reservation. The best known site, Wounded Knee, receives thousands of visitors a year, but it is little more than a roadside marker. In 1991-1992, a joint NPS-OST plan for a national monument at Wounded Knee was derailed by opposition from tribal members who regard Wounded Knee as a sacred site. The future of Wounded Knee remains a subject of bitter dispute within the Tribe.

New plans for an Oglala Lakota museum and cultural center on a site just east of the South Unit are now being developed by OLPRA, with technical support from the NPS as required by the 1976 agreement with the National Park Service. The museum will be a showcase for Lakota history and culture and will provide a center for developing tourism on the reservation.

Most of the 20,000 residents of Pine Ridge are poor. The reservation includes the single poorest country in the United States, and the unemployment rate is nearly 90

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[8]U.S. Forest Service, "The National Grasslands Story" and "Buffalo Gap National Grassland General Information."

[9]Richard T. Sherman, draft of Lakota Ecology Stewardship Model, OLPRA, September 1994.

percent.[10] Wildlife and plants remain an important resource for most tribal members, who rely heavily on hunting, fishing, and gathering for subsistence and for cultural and religious needs.

Geology and Ecology

Physical characteristics

Often called the White River Badlands, the terrain of Badlands National Park consists of formations of soft rock sculpted by wind and water erosion into dramatic spires, buttes, ridges, pinnacles, and canyons. Rain and wind continually erode the surfaces, perpetually altering the landscape. Three perennial rivers flow through the Park: the White River, the Cheyenne River, and the Bad River. There are also numerous seasonal streams. The climate is semi-arid.

Much of the visible rock in the Badlands was laid down as sediments and volcanic ash millions of years ago, creating an ideal environment for fossil formation. The Badlands is now considered the richest site in the world for mammalian fossils of the Eocene and Oligocene epochs.

Ecological characteristics

Badlands National Park is the largest surviving remnant of the mixed-grass prairie that once spanned the middle of the North American continent from Canada to Texas. The original range of mixed-grass prairie in the United States was roughly coterminous with the states of North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma, continuing deep into central Texas. Before being transformed by settlers' plows, the total area of mixed-grass prairie was larger than that of either the tall-grass prairie to the east or the short-grass prairie to the west.

Until the arrival of European ranchers and farmers, buffalo and fire were the two most important factors in maintaining the ecological character of the mixed-grass prairie. Large migrating herds of buffalo grazed individual areas one at a time, creating a succession of habitats for other wildlife. Fire was essential to the growth of the grasses that sustained the buffalo and defined the prairie ecosystem.

The slaughter of the buffalo, overstocking of cattle, and suppression of fire by homesteaders altered the nature of the mixed-grass prairie. By the turn of the century, most of the original grasslands, including those within Badlands National Park and Buffalo Gap National Grassland, had been degraded, and hunting had decimated the wildlife. A 1919 survey found almost no wildlife or trees left in the Park.[11]

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[10]U.S. Bureau of the Census, 1990 Census Report.

[11]National Park Service, Badlands National Park, Statement for Management, August 1992, p. 8.

Following the creation of the Park in the 1930s, many indigenous species returned. The prairie is now dominated by little bluestem, western wheatgrass, and other native grasses. Resident mammals include buffalo, bighorn sheep, pronghorn antelope, mule and white-tailed deer, coyotes, and prairie dogs. Due to their large prairie dog populations, Badlands National Park and Buffalo Gap National Grassland have been designated as priority sites for reintroduction of the endangered black-footed ferret.

Part II: Whole-System Management of the Greater Badlands Region

Rationale for Whole-System Management

Managing natural resources as whole systems is not a new idea. The rationale for a systems approach to management is easy to understand. Systems--biological, chemical, physical, and geographical--occur in nature, and political jurisdictions rarely, conform to natural boundaries. As a result, management units such as national parks and national grasslands are influenced by events outside their boundaries. Large mammals, for example, often require a range larger than individual protected areas to maintain viable populations. Human activities also transcend unit boundaries, causing air and water pollution, erosion, habitat fragmentation, and deforestation.

A whole-system approach to management begins to address these trans-boundary problems and offers a number of other benefits. A systems approach helps build relationships and reduces conflict among diverse stakeholders. Coordinated planning inspires managers to take a long-term view and helps ensure that agencies and managers do not work at cross-purposes. Sharing of routine activities like monitoring and research reduces administrative costs for everyone involved.

Despite these apparent benefits, very few successful examples of whole system management can be found. One author argues that the rarity of successful system-wide management is a "testament to the political difficulties of changing arbitrary existing management units, such as regions and municipalities, and the conceptual and practical difficulties of bridging traditional disciplinary and professional boundaries."[12] The relevant question, then, is not, should we manage resources on the basis of whole systems? but, which whole-system management model is applicable to a given area, and how can such a model be successfully implemented?

Watershed Management

The most straightforward natural system on which to base a systems approach to management is a watershed. This model has only limited applicability to the GBR, however, and will not be discussed at length. The small perennial rivers and intermittent streams that flow through the Badlands are dwarfed by the immensity of the surrounding terrain, and the scant surface water flow does not define the region. In fact, the region is partly defined by *lack* of water; along with spectacular geologic formations, expanses of grass, charismatic fauna, and human history. Although watersheds may be useful units for very small, localized conservation projects, the flows of water are small and unobtrusive and make poor focal points for comprehensive management.

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[12] D. Scott Slocombe, "Implementing Ecosystem-based Management," BioScience, Vol. 43 (9), October 1993, p. 612.

Ecosystem Management

The principal unit for the second approach to whole-system management is the ecosystem. The term *ecosystem*, while defined in many different ways, generally refers to a "distinct and coherent ecological community of organisms and the physical environment with which they interact."[13] Unfortunately, identifying an ecosystem is more an art than a science. Although determining precise ecosystem boundaries is difficult, if not impossible, the fundamental idea behind the principle is sound: the management unit should be defined to the maximum extent possible based upon the extents of ecological systems.

There is an ongoing debate over whether humans and human activities should be incorporated into ecosystem approaches. In a recent paper on ecosystem management, the National Park Service believed it is appropriate to include human activities, because to do otherwise would ignore the enormous impacts that humans have on ecological systems.[14] While it is correct to include humans, the discussion of ecosystem management in this paper will focus on ecology. Human activities will be discussed in greater detail in the section on bioregionalism.

One way to determine the applicability of an ecosystem approach is to examine the interrelationships among plants, animals, and the physical environment in an area to identify unifying themes and management issues that transcend administrative boundaries. The following section assess the applicability of ecosystem management to the GBR.

Ecosystem Management in the Badlands

The boundaries of Badlands National Park were designed to encircle a narrow strip of spectacular geologic formations. They were not intended to conform, in even the crudest way, to natural or ecological systems. A typical passage from the 1929 legislation establishing the park boundaries is illustrative: "thence north one-fourth mile; thence west one-half mile; thence north one-fourth mile; thence west three-fourths mile; thence south one-fourth mile..."[15]

Unlike the borders of Badlands National Park, however, the Greater Badlands Region is defined by natural and ecological systems. The topography, geology, flora, and fauna all contribute to the region's distinctive *sense of place*. There are two primary unifying themes and many trans-boundary management issues that identify and characterize the ecosystem. The two unifying themes are the mixed-grass prairie and the indigenous fauna, particularly the buffalo.

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[13]Slocombe, p. 612.

[14]National Park Service, "Ecosystem Management in the National Park Service: Report of the Ecosystem Management Working Group," September 1994.

[15]National Park Service, Badlands National Park, Statement for Management, 1992, p.36.

The Mixed-Grass Prairie[16]

The mixed-grass prairie is the largest component of the Great Plains, effectively separating the tall-grass prairie to the east from the short-grass prairie to the west. It is dominated by grasses two to four feet in height and is entirely devoid of the trees common in the tall-grass prairie farther east. The lack of trees led Major Stephen H. Long in 1820 to label the middle part of the Great Plains the "Great American Desert."[17]

The grasslands are supported by stable bedrock covered in a brownish soil, less fertile than that of the neighboring tall-grass areas. The precipitation fluctuates between fourteen and twenty-three inches per year, with higher wind velocities and evaporation rates than in the tall-grass regions. As a result, the mixed-grass prairie is much more arid than the eastern tall-grass region. It was primarily mixed-grass prairie that turned into the Dust Bowl in the 1930s.

The dominant grass in the GBR is little bluestem, a warm season grass of two to three feet in height. Common cool-season grasses are junegrass and several types of needlegrasses. In the north, western wheatgrass competes with little bluestem, leading to a cyclical pattern of dominance that follows precipitation patterns. Little bluestem also shares its range with buffalo grass and grama grass, and the combination of grasses gives the mixed-grass prairie a layered appearance.

The extensive root systems of prairie grasses, often twice as deep as the grass is tall, allow the grasses to survive intensive grazing by buffalo and periodic wild fires, both of which were critical to the health of the grasslands. By replacing native flora and fauna with exotic species like cattle and wheat, ranching and farming reduced the prairie's resilience, and some areas may now be permanently degraded.

Badlands National Park contains the largest, and one of the best, remnants of mixed-grass prairie left in the United States. It is the grasslands, rather than the geological formations, that provide a unifying theme for the Park and the adjoining areas. The Park itself, however, is too small to comprise and sustain a fully functioning mixed-grass prairie ecosystem. Prescribed burning and control of exotic species, both vital to the health of the prairie, are two of the many challenges that require large-scale planning. The mixed-grass prairie could thus provide a focal point for ecosystem-based management of the region.

Indigenous Fauna

One of the distinguishing characteristics of the GBR and the mixed-grass prairie as a whole is their unique fauna. The mixed-grass prairie is an important faunal

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[16]The general description of the mixed-grass prairie in this section was taken from Lauren Brown, Grasslands, Audubon Society Nature Guide, 1985.
[17]Brown, p.45.

boundary, marking the easternmost range of the prairie dog, pronghorn, swift fox, black-tailed jackrabbit, and desert cottontail. Most important, however, is the buffalo, the species that has come to symbolize the Great Plains.

The tragic history of the buffalo is well known. Before the 1870s, the number of buffalo on the prairie was estimated to be between thirty and seventy million. Buffalo dominated and shaped the Great Plains. By 1900, indiscriminate hunting and outright slaughter reduced the population to between 300 and 1,000 individuals. Conservation efforts saved the species from extinction, and buffalo now number approximately 65,000 buffalo, primarily in national parks and other protected areas. Buffalo were reintroduced to Badlands National Park in 1963, and the Park now hosts a resident population. The park lacks, however, the large tracts of land needed to support the itinerant grazing of a free-roaming herd. Accordingly, the narrow confines of the Park restrict the buffalo population to approximately 400.

The lack of cover on the mixed-grass prairie has resulted in unique fauna sharing the common traits of speed, burrowing, and concentration. The swift fox, the coyote, and the pronghorn- the fastest land animal in the western hemisphere, all adapted to the terrain through speed. Prairie dogs, pocket gophers, weasels, ferrets, badgers, and burrowing owls use burrowing to escape predators, severe weather, and fires. The nature of the grasslands has also influenced the social habits of its inhabitants. Buffalo, prairie dogs, and jack rabbits often congregated in staggering numbers.[18]

Also indigenous to the mixed-grass prairie are mule deer, bobcats, numerous small rodents, more than two hundred species of birds, and about twenty-five species of reptiles and amphibians. Most of these species are present in Badlands National Park. Rocky Mountain bighorn sheep were reintroduced in 1964. In addition, because of the large populations of black-tailed prairie dogs in and near the Park, the U.S. Fish and Wildlife Service has designated the GBR as a priority site for introducing a wild population of black footed ferrets, currently endangered and bred only in captivity. Prairie dogs are a primary food source for the ferrets.

Despite successful reintroductions, the isolation of the resident populations of buffalo and bighorn sheep and the limited size of the Park have fostered concern about genetic diversity and inbreeding. Other native species such as the prairie wolf and the grizzly bear require more habitat than the park boundaries can provide and have not been reintroduced. Coordinated management of the GBR would thus offer concrete benefits, and management regimes built around wildlife management issues hold promise. The development of a buffalo management plan, a black-footed ferret reintroduction plan, or a prairie wolf study could serve as the impetus for joint efforts by local stakeholders.

Implementing an Ecosystem Approach in the Badlands

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[18]Brown, pp. 26-27.

The basic objective of an ecosystem approach to management of the Greater Badlands Region is to create and sustain a mixed-grass prairie ecosystem complete with all of its native components. Defining the boundaries of the ecosystem is not a simple task. While Badlands National Park and adjacent parts of its two major neighbors, Pine Ridge Reservation and Buffalo Gap National Grassland, do not represent a true ecological unit, they do comprise an area large enough to restore a fully functioning modern version of the mixed-grass prairie.

One of the prerequisites for instituting integrated management of any ecosystem that overlaps multiple jurisdictions is to establish an institutional framework for cooperation, communication, coordination, and collaboration among the stakeholders. In the Badlands, the institutional framework will undoubtedly involve some kind of council or working group that includes representatives of all three jurisdictions, the Park, the National Grassland, and the Reservation. This council, and other institutional arrangements, will be explored in depth in the last section of this paper, which puts forward a proposal creating for an ecosystem-based reserve in the Greater Badlands Region. This section will focus on how the idea of ecosystem management could be implemented in the Badlands, once the institutional framework has been constructed.

As suggested above, the goal of ecosystem management in the Badlands would be restoration of a complete and fully functioning mixed-grass prairie ecosystem. The best focal points for coordinated management of the ecosystem may be the issues provide a unifying theme to the region: the mixed-grass prairie and the indigenous fauna.

Potential Ecosystem Management Objectives

Mixed-Grass Prairie Management Plan

The development of a Mixed-Grass Prairie Management Plan that aims to conserve the integrity of the grasslands and protect biodiversity could be an initial task of those charged with implementing an ecosystem approach. The plan might include guidelines for plowing, which destroys the root systems of native grasses, and grazing, which can rapidly degrade the grasslands. Prescribed burning schedules, native reseeding efforts, and exotic plant species control policies could also be developed. A Mixed-Grass Prairie Management Plan would be both a practical management tool and a vehicle for focusing the activities of the three entities on a common objective: improving the condition of the grasslands.

Buffalo Management Plan

Buffalo forage over large areas of grassland, and the narrow confines of Badlands National Park severely limit the size of the herd. At approximately 400 individuals, the buffalo populations within Badlands National Park have reached the carrying

capacity and are often culled, with excess animals given to the Oglala Sioux and other tribes.[19] When buffalo stray outside Park boundaries, they are either driven back in or shot. There are no buffalo in Buffalo Gap National Grassland. Neighboring cattle ranchers view buffalo as a threat, as they occasionally attack cattle and may spread brucellosis, which makes cattle abort.[20] The Oglala also maintain a tribal buffalo herd for cultural and ceremonial purposes, sport hunting, and food. To date, there have been no joint management efforts between the NPS and the Tribe.

A coordinated Buffalo Management Plan could designate larger stretches of the Park, Reservation and Grassland as buffalo range, allowing the region to support a larger and more nearly free-roaming buffalo population. The USFS can gradually retire cattle ranching leases or switch them to buffalo. Alternatively, ranchers could be reimbursed for lost cattle or offered other financial incentives to tolerate the presence of buffalo in areas close to the park. All of these activities would help to improve the size and genetic makeup of the resident herds, which would in turn contribute to restoring the health of the prairie.

Black Footed Ferret Reintroduction

Reintroduction of the black-footed ferret in the Greater Badlands Region is a controversial issue, and one that could best be addressed through an ecosystem management approach. A successful reintroduction effort will require both the maintenance of large prairie dog colonies and a reduction of threats to the ferrets themselves. Although the GBR has an abundance of prairie dogs, a primary food source for the ferrets, there are two obstacles in the way. First, cattle ranchers view prairie dogs as pests that pose a danger to their cattle. Second, ranchers and other long-time users of the National Grassland may regard the reintroduction of an endangered species as a sign of more stringent land use regulations. This concern may lead opponents to initiate lawsuits and other measures to block or delay the plan.

Opposition to the black-footed ferret reintroduction could best be derailed by using participatory processes to develop a coordinated plan. The objectives of the plan can be discussed by the interested public, and the openness of the process can help dispel public fears. If necessary, ranchers can be reimbursed for lost livestock or offered incentives to keep cattle away from ferret habitat. Developing a successful process for reintroducing the black-footed ferret could produce a model for controversial reintroductions elsewhere and hasten the return to the Badlands of the grizzly bear and the prairie wolf. Because of the large land requirements, these efforts cannot even be considered without cooperation among multiple stakeholders.

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[19]The Memorandum of Agreement between the OST and the NPS that added the South Unit to the Park appears to reserve all surplus buffalo for the Oglala, but the NPS has given surplus animals to other tribes as well. This is currently a point of dispute between the two entities.

[20]Todd Wilkinson, "Native Americans and Musicians to the Rescue," Backpacker, June 1992.

The advantages of system-wide management plans for restoring the mixed-grass prairie, rebuilding the buffalo herds, and reintroducing lost species all demonstrate the great potential of ecosystem management in the GBR. The next step in analyzing the applicability of whole-system approaches in the Badlands is to look at the role of humans.

Bioregion Management

A third major approach to managing natural resources as whole systems is known as bioregionalism. In contrast to a watershed or ecosystem, a *bioregion* is an area defined as much by the human pattern of habitation and use as by its physical and ecological characteristics. Bioregionalism incorporates the human presence within natural systems and uses that presence as a strength. Defining a bioregion is an attempt to find a coherent human identity for an area that already has a distinct natural identity as a resource system.[21]

For the purposes of this paper, *bioregion management* will refer to a management approach that seeks to find and implement the best fit between the natural systems of the area and the political, social, economic, and cultural systems of the human population.[22] Like most whole systems, the Greater Badlands Region encompasses many different human interests. One way to begin to assess the applicability of a bioregional approach to manage the GBR is to review those interests and who holds them.

Examining the Interests

There are five main stakeholders in the Greater Badlands Region.

1. *Oglala Lakota Tribe*

Much of the GBR, including more than half of Badlands National Park, lies within the boundaries of Pine Ridge Reservation. Tribal members have profound historical, cultural, and economic interests in the region. Five issues are of particular relevance.

- *Protection of and access to sites of historical, cultural, and religious significance.* One of the most important of these is the fortress-like structure in the South Unit of the Park known as Stronghold Table, where Big Foot and his band took

[21]Some definitions of bioregionalism emphasize small-scale, local self-sufficiency, both political and economic, as a key component; other definitions rely on the usual sense of the word "region," an area that is larger than local communities and individual ecosystems. See, for example, Slocombe, p. 618, and Daniel Press, "Environmental Regionalism and the Struggle for California," Center for the Study of Global Transformations, UC Santa Cruz, March 1994, p. 9.

[22]Charles Foster, ENR 522M course syllabus, p. 3.

shelter during the days before they were massacred by the U.S. Army at Wounded Knee in 1890. Big Foot's march through the Badlands and south to Wounded Knee, which is reenacted annually by members of the Tribe, was a defining moment in Lakota history, marking the end of the open conflict between the Tribe and the federal government.

- *Access to traditional lands and protection of plants and animals needed for subsistence.* Tribal members use the South Unit and adjacent reservation lands for a wide range of subsistence activities, including hunting game and gathering plants for food, medicine, and clothing. A 1988 survey found that more than 80 percent of reservation residents rely on subsistence activities for some part of their income.[23] These activities are more than a livelihood for tribal members; they are an integral part of Lakota culture.

- *Exercise of tribal sovereignty over all reservation lands and resources.* The Oglala have been struggling for a century to reassert the sovereign rights they lost when they were confined to the reservation in 1890. Most tribal members place high value on sovereignty and resent any increase in the presence of the federal government in their lives or lands.

- *Development of economic opportunities for tribal members.* With a 90 percent unemployment rate, jobs and income are among the Tribe's highest priorities.

- *Restoration of buffalo to Indian country.* Many Lakota revere the buffalo, which once played a central role in their society and remain essential to many Lakota cultural practices. The OST maintains its own buffalo herd, under the management of OLPRA. The herd currently numbers about 500 head; the long-term goal is a herd of 1,000, but implementation must await funding for land, fencing, and salaries.[24]

2. *Visitors to Badlands National Park*

Nearly 1.5 million people visit Badlands National Park every year. Their interests appear to be relatively straightforward.

- *Maintain the Badlands and prairie ecosystems in a near-pristine state.* The Park should offer habitat for the full complement of indigenous plants and animals and should protect fragile geological formations and archaeological sites.

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[23]Richard T. Sherman, "A study of traditional and informal sector micro-enterprise activity and its impact on the Pine Ridge Reservation economy," Aspen Institute, 1988. The economic value of subsistence activities may have the effect of decreasing the poverty rate mentioned earlier. Subsistence activities appear to have both economic and cultural value for tribal members.

[24]This section is based on informal conversations and personal experience of one of the authors (SR) at Pine Ridge in the summer of 1994.

- *Provide convenient, well-developed visitor services.* Most visitors to the Park stay for only a few hours, visit only the North Unit, and never stray from the main trails and lookout areas. They rely on the Park to provide smooth roads, safe and well-marked trails, a visitor center, interpretive signs, and educational programs. While some visitors care deeply about wilderness campsites and backcountry hiking areas, the majority are probably more concerned with convenient access to high quality services.

- *Offer access to the Park at minimal cost.* Undoubtedly, most visitors would prefer that entrance fees and the cost of other necessary services, like meals and accommodation, be kept as low as possible.

3. *Cattle Ranchers*

Buffalo Gap National Grassland, most of the South Unit of Badlands National Park, and much of Pine Ridge Reservation are used for grazing cattle. The total number of cattle ranchers using these lands is uncertain, but it is probably in the dozens rather than the hundreds. According to a Forest Service report, only about 25 percent of ranchers in South Dakota counties with National Grasslands have grazing permits there, accounting for about 25 percent of the livestock in those counties.[25]

Most of the cattle ranchers probably share three main interests:

- *Maintaining the status quo.* Like other Forest Service land, Buffalo Gap is leased to ranchers at below-market rates (in 1992, the average rate for grazing a cow and calf on Forest Service land was $1.97/month; the average market rate was $9.22[26]). In many parts of the West, efforts to reconcile grazing fees with market rates, designate new wilderness, and regulate range usage in other ways have been met with fierce resistance. It is probably safe to assume that most of the cattle ranchers using the GBR will oppose changes in management practices that favor wildlife at the expense of cattle.

- *Preventing expansion of buffalo range.* Many cattle ranchers appear to view buffalo as a threat, both to their livestock and to their way of life, and as an imposition of outsiders' values.

- *Restoring and maintaining the condition of the range.* Maintaining the range in good condition, by avoiding over-stocking and using good grazing systems, has the potential both to stabilize and improve the forage resource and to forestall further regulation.

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[25]U.S. Department of Agriculture, Nebraska National Forest, Land and Resource Management Plan, 1984, p. II-41. There are also some sheep permits in the western part of Buffalo Gap.

[26]Rennicke, Jeff, "Sacred Cows?" Backpacker, August 1992, p. 48. These numbers are national averages and may differ for individual units like Buffalo Gap.

4. *Federal Agencies*

Like all bureaucracies, the National Park Service and the U.S. Forest Service both have their own interests in the resources they manage, in addition to representing the interests of their public constituencies. These interests are self-explanatory.

- *Achieving the goals of their management plans and federal mandates.*
- *Increasing their funding and other resources.*
- *Expanding their authority over the land and resources within their units.*
- *Furthering the career goals of their staffs.*

5. *Nearby Towns and Communities*

Several small towns are located along or just off Interstate 90, within an hour's drive of Badlands National Park. The best known of these is Wall, the home of Wall Drug (as well as the USFS visitor center for Buffalo Gap). As a rough estimate, the local communities' relevant interests appear to be:

- *Increasing the number of tourists to the Badlands.* Local businesses--motels, restaurants, gas stations, craft and souvenir shops--depend heavily on visitors to the National Park.
- *Maintaining the quality of life in the region.* While more commercial activity is desirable, residents also no doubt wish to preserve the relatively safe and quiet conditions of the rural towns.
- *Promoting non-tourism economic development.* Residents may be wary of depending entirely on tourism for their livelihoods, and may wish to maintain older industries, like ranching and farming, and attract new ones. Many of the local communities are also likely to share the cattle owners' attachment to a traditional way of life.

Other Stakeholders

The list of stakeholders presented here is not exhaustive. The American public at large, as constituents of the Park Service and Forest Service, have an interest in the protection and careful management of all the public lands. The State of South Dakota clearly has a stake in any activity that will significantly affect tourism in the region. Environmental groups are likely to be concerned about the fate of all the natural resources in question. Other Indian tribes may be affected by a change in the relationship between the OST and the NPS. The groups included in the list above

are those who seem to have the most at stake in the future of the Greater Badlands Region.

Conflicts of Interest

If the Greater Badlands Region is to be managed as a bioregion, then there must be a common use or value among at least some of the stakeholders that could engender a sense of regional identity among people who are otherwise very different. Reviewing the interests listed above, a common theme is not obvious.

For example, the Oglala Sioux Tribe, visitors to the National Park, and the National Park Service share a common concern for restoration and protection of the environment; while ranchers, local communities, and the Forest Service hold a common interest in maintaining the long-term viability of the cattle industry. These groupings do not necessarily hold together across other issues. In fact, the Tribe and the NPS are embroiled in constant quarrels over the management of the South Unit. Tribal members are split over the question of cattle versus buffalo. Business owners in nearby towns may care more about increasing tourism than about maintaining grazing rights.

Given these divisions among stakeholders, and considering as well their divergent histories, cultures, and ethnic backgrounds, bioregionalism in the GBR will be difficult. As a model for managing this area, ecosystem management appears to have much more potential.

Is There a Role for Bioregionalism?

This pessimistic conclusion about the applicability of the bioregion approach to the Greater Badlands Region does not imply, however, that bioregionalism has nothing to offer. Examining the history, culture, activities, and values of the human users of the Badlands may generate ideas that can enrich and expand the ecosystem management model.

Rather than looking for a coherent identity shared by all the stakeholders in the GBR, it may be enough to find some minimum human goals that could be incorporated into an ecosystem management scheme. The very general goals listed below, for example, appear to be some that most of the stakeholders could support, in some form, and that none would seriously oppose.

- Maintain and improve the condition of the prairie ecosystem, including the size and biodiversity of protected lands, and avoid damage to fragile lands.

- Promote environmentally and culturally appropriate tourism and other forms of economic development.

- Improve relationships among agencies and levels of government to prevent conflict and avoid duplication of effort.

- Maintain the stability and viability of existing towns, communities, and social networks.

- Exercise local and regional autonomy and self-determination.

While these general goals might not be enough to function as an organizing dimension for a true bioregion, they could help orient an ecosystem management model toward the human systems that overlap the natural ones--in other words, to find the *best fit* between the human and natural systems.

Finally, despite all the differences among the stakeholders in the GBR, undoubtedly all of them do share a pride in the spectacular landscape, flora, and fauna of their region. One of the benefits of the Mixed-Grass Prairie Reserve, the vision to which this paper now turns, is that it may itself have the potential to turn this local pride into a real common interest, around which a bioregional identity could someday coalesce.

Part III. Proposal for a Mixed-Grass Prairie Reserve

The three models of whole-system management assessed above--watershed, ecosystem, and bioregion--are not mutually exclusive. Elements of all three can be combined into a hybrid approach tailored to the unique requirements of any local area. The Mixed-Grass Prairie Reserve (MGPR) is one idea for using a hybrid ecosystem/bioregion model for implementing whole-system management of the GBR.

Before describing the MGPR in any more detail, it should be emphasized that this proposal is intended to illustrate the potential of whole-system management, not necessarily as a realistic prescription for the Badlands. It is intended to demonstrate how the institutional barriers to ecosystem management might be overcome and what some of the results could be. Imposing an outside vision on a local area certainly violates one of the precepts of bioregionalism, and experience at places like Yellowstone argues strongly that it won't work.[27] The MGPR is primarily a thought experiment.

Vision for the MGPR

The Mixed-Grass Prairie Reserve is a whole-system answer to the challenge of restoring the pre-settlement mixed-grass prairie. Unlike traditional approaches to establishing large parks or reserves, it does not entail removing human populations or the economies that sustain them. Instead, the Mixed-Grass Prairie Reserve aims to incorporate local populations and create additional economic opportunities while generating and sustaining a healthy mixed-grass prairie ecosystem.

The general goals of the MGPR are straight forward. There are five.

- To restore and protect an entire mixed grass prairie ecosystem.
- To return a free-roaming buffalo herd to the northern Great Plains.
- To improve the quality of life of nearby communities by revitalizing and stabilizing local economies.
- To improve relations among all the stakeholders in the system and reduce resources invested in conflict.
- To demonstrate the potential benefits from using a whole-system approach to the management of a complex natural resource system.

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[27]Bruce Goldstein, "The Struggle Over Ecosystem Management at Yellowstone," Bioscience, Vol. 42 (3), March 1992, pp. 183-187.

The choice of boundaries for the reserve is a pragmatic one, based on existing political jurisdictions for expediency. The area in question has three principal management entities: the National Park Service, the U.S. Forest Service, and the Oglala Sioux Tribe. The reserve will start with these three areas, and welcome neighboring jurisdictions as time and experience allow.

In the reserve, buffalo will gradually replace cattle. Wildlife corridors will link buffalo zones while cattle ranching continues. Later, prairie wolves and grizzly bears will be reintroduced. The area will still retain its multiple use characteristics, but the uses will change. Cattle ranching will give way to buffalo ranching, sport hunting of buffalo, sheep, and pronghorn, and ecotourism. The new activities are not only ecologically sound; they will also provide a stronger and more stable economic base for the region. The ultimate purpose is to recreate a complete and fully functioning mixed-grass prairie reserve that supports strong and vibrant economies and human populations.

The Man and the Biosphere program (MAB), a conservation program managed by UNESCO, may offer a viable model for the MGPR. MAB designates biosphere reserves composed of a protected core area surrounded by buffer zones of decreasing levels of environmental protection. In the MGPR, Badlands National Park would constitute the core protected area, with restrictions consistent with current NPS guidelines. In the areas surrounding the park, the management goals and plans would be consistent and coordinated, but allow a wider range of uses.

Why Choose the Badlands?

With prairie grasslands originally stretching from Canada to Mexico and from the Great Lakes to the Rockies, many different sites could be chosen for establishing a new prairie reserve. In fact, serious proposals have been made to protect grasslands in a number of states, and several tall-grass prairie reserves are already in underway.[28] The Greater Badlands Region of South Dakota is not the only place to establish a new grassland reserve, but it is one of the best.

There are at least four compelling reasons for locating the Mixed-Grass Prairie Reserve in the Badlands.

- First, Badlands National Park already protects the largest extant tract of mixed-grass prairie in the United States. The core of the MGPR is in place, under the jurisdiction of an agency whose mandate meshes well with the goals of the project.

- Second, the explicit purpose of Buffalo Gap National Grassland, which would become a buffer zone around the core, is to demonstrate alternative

[28]For example, on a Nature Conservancy site in Oklahoma and a National Park Trust site in Kansas. See The Christian Science Monitor, November 4, 1994 and The New York Times, October 19, 1993.

management regimes and uses. The Forest Service also sets as a goal for the grasslands, "To the extent feasible, [to] integrate the Federally-owned land with the associated private and other public lands into natural management units in order to favorably influence development of sound land conservation and utilization practices."[29]

- Third, most of the land adjoining the National Park, which would be incorporated into the MGPR, is managed by only two administrative entities, the USFS and the Oglala Sioux Tribe. The small number of principal entities would greatly simplify coordination.

- Finally, as vividly as any single site in the United States--and more than most--the prairie of South Dakota reflects the full panoply of American history, including that of Native Americans, early explorers, cattlemen, railroaders, and settlers. Few places in the United States are as integrally associated with Indian history and culture, and the proximity of Pine Ridge Reservation and the desire of tribal members to preserve and practice Lakota culture would allow the MGPR to serve as a cultural resource as well as an ecological one.

Principles for Implementation

Seven key principles should guide the implementation of the MGPR.

- *Progress incrementally.* Changing attitudes and practices of government agencies and private citizens takes time and patience. Time must be spent exchanging information and educating one another. Incremental change can help build consensus and eliminates the fear that comes with rapid disruptions in people's lives. People have a limited ability to absorb change and often react angrily when forced to change too rapidly.

- *Be pragmatic.* Many whole systems projects fail because the new regimes they propose are unrealistic or inflexible. A more effective tactic is to fit each decision to the circumstances of the case, always keeping in mind the constraints facing the participants and other stakeholders.

- *Utilize adaptive management.* The management of the MGPR should be considered an experiment. Policies and programs will be refined and improved through iteration as experience is gained. The managers should strive to create a learning management regime.

- *Avoid grand schemes and ambitious announcements.* Many interesting proposals encounter trouble the moment their first report is released, because it

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[29]Department of Agriculture, Nebraska National Forest, Land and Resource Management Plan, 1984, p. II-3.

contains sweeping statements and broad plans that threaten many people and cause opposition to crystallize almost overnight.[30]

- *Take the easy steps first.* A few small successes early on is much more important than a big success later. Early victories will build momentum and confidence among participants and funders, and starting with the simplest and least controversial steps will lessen the chances of scaring away potential supporters.

- *Use cooperation and voluntary incentives, rather than coercion.* It should be demonstrated to people that the MGPR is more beneficial to them than the status quo, and they should be given incentives, financial or otherwise, to change their actions.

- *Make a serious commitment to the economic well-being of the GBR.* The economic gains should be kept in the area and innovative and profitable ways of using the natural resources should be continuously sought. Strong economies and healthy incomes are the allies of the MGPR and can help expand the concept.

Institutional Framework

To some, establishing a Mixed-Grass Prairie Reserve should involve merging Badlands National Park with Buffalo Gap National Grassland and some part of Pine Ridge Reservation into a single integrated management unit, large enough to sustain migratory buffalo herds and the other indigenous species of the northern plains. On paper, this vision may be compelling. In reality, however, the separate jurisdictions will cause implementation to be a slow, complicated, expensive, and contentious business. Building new institutions, creating constituencies, altering land uses, and implementing a coordinated ecosystem management plan should be understood to be the work of decades, not years.

The first, and one of the hardest, steps on this long road will be to develop an institutional framework within which the vision can take shape. Coordination--of planning, research, management goals and methods, economic development and other activities--is the very essence of managing resources as whole systems. Nothing can be accomplished without it.

As noted earlier, the MGPR will overlap three major political jurisdictions: Badlands National Park, Buffalo Gap National Grassland, and Pine Ridge Reservation. Although many other jurisdictions may ultimately participate in or be influenced by the MGPR, these three agencies are the key players. The challenge for

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[30]An example is the "Buffalo Commons," a proposal advanced by Frank and Deborah Popper of Rutgers University for parts of ten Plains states to be turned into a huge nature reserve. Opposition from Westerners is intense and violent, even though the vision is intended more as a metaphor than a practical proposal. Anne Matthews, "Slow Death Beyond the 98th Meridian," Outside, May 1993, p. 76.

the MGPR is thus to find a way for the Forest Service, the Park Service, and the Tribe to work together.[31]

Designing an MGPR Council

Expecting any of the three governmental agencies to surrender any authority over its lands is fruitless. No obvious legal mechanism exists for persuading them to do so, even if that objective were truly desirable. Even if the two federal agencies tightly coordinated their activities, the Oglala Sioux Tribe retains sovereign authority over all land within the Reservation and is unlikely to surrender it. Changing the mandates or operating styles of the agencies is equally unlikely. The only course open for integrating the management of the three land units is voluntary participation in an inter-agency committee, council, or working group.

A MGPR Council could include representatives of all the stakeholders in the GBR, following the model of the *committee of the whole*, or it could be limited to the three main agencies. Although broad participation from all stakeholders may ultimately help build consensus, it would also produce a slow and unwieldy council. In the beginning, it may be preferable to choose the latter, narrower option, with each of the agencies taking responsibility for representing the interests of its own public constituency. Once established, the council can decide independently when and how to expand participation.

Since the council will be given responsibility for coordinating the management plans of three independent agencies, participants should include the individuals who have the authority to make management decisions: the Superintendent of Badlands National Park, the Superintendent of the Buffalo Gap National Grassland, and, if possible, the President of the Oglala Sioux Tribe.[32] Chief planners or resource managers for each agency might also participate.

However it is constituted, the council should meet regularly and frequently in order to nurture the collaboration, build trust and understanding, and exchange relevant information. Although it will have the authority to take on specific projects, the council will be an essentially consultative body whose goals are to build commitment to the MGPR vision, coordinate plans and activities, generate and discuss new ideas, and strengthen the personal relationships that will be needed to achieve real joint management. Cooperative action begins with an understanding of values, and council meetings offer an opportunity for each agency to explain its own values while trying to understand the values of neighboring stakeholders.

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[31]The Oglala Sioux Tribe is of course a sovereign nation, not an agency of the federal government. The term "agency" is used here only for convenience. The Tribe is likely to be represented in this effort by its own natural resources agency, the Oglala Lakota Parks & Recreation Authority (OLPRA).

[32]The tribal president reports to the tribal council, which must approve all decisions, but the president is the individual with the most authority to represent the Tribe.

More than anything else, the council should strive to establish an atmosphere of trust and confidence among the participating agencies.

Responsibilities of the Council

The first task facing the inter-agency council would be to set its own agenda for the coming years. Keeping in mind the principle of *doing the easy things first* and avoiding over-ambitious plans, that agenda seems likely to include some of the following tasks.

- Develop, publicize, and build support and constituencies for the vision of a Mixed-Grass Prairie Reserve. Developing a vision statement that lays out the long-term goals of the collaboration may be a good starting point.

- Set a tentative timetable for implementation, based on general phases rather than specific chronological targets.

- For council use only, generally delineate the borders for the initial core and buffer zones for the reserve, and designated the goals and permitted uses of each zone. These borders will have to be refined almost continuously as the project progresses, but even a very rough outline will allow managers to understand the scope of the project, balance different uses of the land, and identify initial obstacles to implementation.

- Based on the agreed-upon uses permitted for each zone, set general guidelines for individual agency management regimes, and attempt to harmonize management plans. This is a key component of the whole-system approach and was discussed in detail in the section on ecosystem management. It may be the most important and most difficult task assigned to the council.

- Bring basic regulatory codes, such as those governing recreational activities, into conformance with the zone designations.

- Establish protocols for routine information exchange and the sharing of technical expertise, so that all agencies can benefit from the research activities of each one and no additional negotiations are needed for one agency to obtain information from another.

- Provide opportunities for training and institutional capacity building for participating agencies.

- Design a joint research agenda and program.

- Develop conflict resolution procedures to foresee and forestall disputes and, when disputes do arise, provide a reliable forum for settling them out of court.

- Coordinate ecotourism, education, and visitor programs and facilities development, to achieve economies of scale and offer as diverse a set of services as possible.

Next Phase

As public support for a Mixed-Grass Prairie Reserve develops, fundamental restructuring of institutions and mandates may become possible and desirable. In the long run, Congress may consider formalizing cooperative management of the National Park and the National Grassland and signing long-term co-management agreements with the Oglala Sioux Tribe and with any other entities whose lands should be managed as part of the Reserve.

In view of the spotty record of whole-system management efforts, it is unrealistic to expect miracles at Badlands. In the absence of real institutional reform, the differences among the mandates, styles, and interests of the Park Service, Forest Service, and other agencies pose a daunting obstacle to coordination. This is a sobering conclusion, and it warns us not to artificially raise expectations for an advisory body. What we can expect an inter-agency council to do is to create the enthusiasm, momentum, and trust needed to spur more fundamental change in the future.

Policy Ideas to Consider

The miscellaneous set of policy ideas described below is intended to demonstrate the kinds of joint activities and programs that the Inter-Agency Council might put on its agenda.

- *Develop a scientific research program and coordinate research among the participating agencies.* Creating a protected area intended to restore and protect a fully functioning ecosystem is an untried endeavor, and it is likely that many basic questions still need to be answered. Inventory and monitoring programs should be jointly managed, and the results shared. Training researchers and developing research capacity, especially within the Oglala Sioux Tribe, would also be a valuable contribution.

  Although scientific research is probably one of the least controversial components of the GPER proposal cooperation should not be taken for granted. One of the OST's main objections to the National Park Service is that NPS personnel do not take seriously traditional Lakota ecological knowledge systems or practices.

- *Develop a policy research program and coordinate research among the participating agencies.* There are many serious obstacles to establishing the GPER, and many of them will demand an entirely new set of policy approaches. An active policy research program should be developed to study efforts in other

countries and regions, analyze incentives and voluntary measures, study the economics of cattle and buffalo ranching, and undertake other policy research.

- *Conduct a survey of other efforts to build new institutions that overlap existing political jurisdictions for the purpose of natural resource management.* In the Australian Alps, for example, the Alps Liaison Committee is a multi-jurisdictional group that coordinates management of the entire ecosystem, which is split among three states and seven national parks.[33] Closer to home, a plan is being developed for managing the North Cascades ecosystem using a core/buffer model under joint administration by several U.S. and Canadian agencies.[34] The MAB biosphere reserves offer another model for integrating conservation and economic development across existing political boundaries.

- *Develop a set of voluntary policy measures for securing the cooperation of cattle ranchers.* The recent failure of federal efforts to reform grazing policy on public lands in the West does not bode well for a proposal to limit uses of rangeland in South Dakota. Re-acquiring grazing rights in BGNG and instituting further grazing standards are bound to incite vehement opposition from ranchers. Voluntary measures, often based on economic incentives, are likely to be the best alternative. Policy research should seek widely for precedents that can be adapted to Buffalo Gap and adjacent lands. Among other options, researchers might investigate:

  * purchasing conservation easements in leased land to create wildlife corridors
  * establishing a compensation fund for damage to ranchers caused by wildlife
  * targeting the use of the Conservation Reserve Program, which has already restored many thousands of acres of prairie[35]
  * purchasing critical parcels of land by private nonprofit conservation organizations, to be managed as part of the GPER[36]
  * placing tighter renewal conditions on grassland leases to obtain better conditions for wildlife
  * creating economic incentives for ranchers to switch from cattle to buffalo.

- *Build a MGPR visitor center and research station.* Public support for the vision of a Mixed-Grass Prairie Reserve is perhaps the single most important requirement for moving this proposal forward. A visitor center devoted entirely to the MGPR will provide a focal point for attracting media attention, drawing visitors, raising funds, and generally disseminating the vision. If possible, this

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[33]Slocombe, p. 614.
[34]Carmi Weingrod, "Two Countries, One Wilderness," National Parks, Jan/Feb 1994, p. 29.
[35]An alternative to the Conservation Reserve Program is proposed by Bret Wallach of the University of Oklahoma, who advocates gradual public purchase of the lands that are withdrawn from grazing and farming under the CRP. Matthews, p. 179.
[36]In Kansas, a Tallgrass Prairie National Reserve will be created on land owned by the National Park Trust, a private nonprofit organization, and managed by the National Park Service. Christian Science Monitor, November 4, 1994.

center should be designed to complement, rather than compete with, the museum and visitor center that the OST plans to construct near the South Unit.

Conclusion: Obstacles and Potential

As noted early, creating a Mixed-Grass Prairie Reserve in the Badlands is a long-term endeavor, requiring commitment, patience, money, political skill, and generous doses of good timing and good luck. Both the challenges and potential benefits of the project are impressive.

Obstacles

Three of the most serious obstacles that the MGPR will face are a lack of trust, a lack of funding, and opposition from cattle interests.

Trust

For both valid and frivolous reasons, the three agencies involved in this project regard one another with high degrees of distrust and disrespect. Lack of sympathy between the Forest Service and the Park Service is well known. Relations between the National Park Service and the Oglala Sioux Tribe are equally poor. The Tribe believes that the NPS is deceptive and disrespectful and accuses the Park staff of neglecting the South Unit. Tribal sovereignty is fiercely defended by tribal members, and any proposal that appears to threaten sovereignty is unlikely to be tolerated.

The National Park Service, in turn, probably distrusts tribal government and believes that the tribe has too little manpower and experience to provide adequate protection to the wildlife, fossils, and other resources in the South Unit. Racism and cultural ignorance on both sides also play a role in straining relationships. With relations so tense among all the agencies, securing even a tentative willingness to participate in a joint project will not be easy.

Funding

With Congress attempting to balance the federal budget and the Park Service and Forest Service already facing budget and staffing cuts, new public funding will not be available for a project like this one. Securing funding for the MGPR will be a difficult task. Initially, a private grant could be sought to get the project off the ground. Private foundations have often shown interest in cooperative proposals submitted jointly by several agencies. In the long run, the most promising revenue source may be the reserve itself, through tourism and sales of surplus wildlife. Ironically, the budgetary constraints facing all three participants in the MGPR may brighten the prospects for administrative coordination that reduces costs for everyone involved.

Opposition from cattle interests

The most stubborn obstacle of all may turn out to be the cattle ranchers who fear, perhaps rightly, that they will one day be displaced by buffalo. Although only a handful of individuals will be affected by the MGPR, the threat to traditional grazing rights could mobilize powerful anti-government forces throughout the West. Project managers will have to move slowly and work closely with cattle interests.

Potential

The obstacles to a whole-system approach to natural resource management, both in the Badlands and in general, are daunting, but the potential benefits far outweigh them. A successful endeavor in the Badlands could improve the management of the local ecosystem, provide an unparalleled example of the complete mixed-grass prairie, and serve as a model for resource managers throughout the Great Plains states, where the future is uncertain and the need for answers urgent.

As the preceding discussion indicates, a whole-system approach that combines elements of ecosystem and bioregion management makes sense for the Greater Badlands Region. A number of unifying ecological and social themes transcend administrative borders and underlie the proposal to manage the Badlands as an integrated system. The mixed-grass prairie, the fate of the buffalo, Lakota culture, and the history of settlement of the West all come together in the Badlands. The Mixed-Grass Prairie Reserve proposal builds upon these common themes to overcome the mismatch between political and natural boundaries, confront shared problems, improve the management of natural systems, strengthen the performance of public agencies, and create a new cultural and environmental resource for all the stakeholders in the Greater Badlands Region.

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The Center's Director is Graham Allison, former dean of the Kennedy School. Marie Allitto is Director of Finance and Operations.

CSIA's International Security Program (ISP) is the home of the Center's core concern with security issues. It is directed by Steven E. Miller, who is also Editor-in-Chief of the journal International Security.

The Strengthening Democratic Institutions (SDI) project works to catalyze international support for political and economic transformations in the former Soviet Union. SDI's director is Graham Allison.

The Science, Technology, and Public Policy (STPP) program emphasizes public policy issues in which understanding of science, technology, and systems of innovation is crucial. Lewis Branscomb, former head of the National Institute of Standards and Technology, and former chief scientist at IBM, is STPP's director.

The Environment and Natural Resources Program (ENRP) is the locus of interdisciplinary research on environmental policy issues. It is directed by Henry Lee, expert in energy and environment. William Clark, an environmental scientist and editor of Environment, serves as ENRP's faculty chair.

The heart of the Center is its resident research staff: scholars and public-policy practitioners, Kennedy School faculty members, and a multi-national and inter-disciplinary group of some two dozen pre-doctoral and post-doctoral research fellows. Their work is enriched by frequent seminars, workshops, conferences, speeches by international leaders and experts, and discussions with their colleagues from other Boston-area universities and research institutions and the Center's Harvard faculty affiliates. Alumni include many past and current governmental policy-makers. Graceann Todaro is CSIA 's Fellowship Coordinator.

The Center has an active publication program including the quarterly journal International Security, book and monograph series, and Discussion Papers for work in progress. Teresa Lawson is CSIA's Senior Editor, and is also Deputy Editor of International Security. Members of the research staff also contribute frequently to other leading publications, advise the government, participate in special commissions, brief journalists, and share research results with both specialists and the public in a wide variety of ways.

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