

**Final
General Management Plan
Environmental Impact Statement**

**BADLANDS NATIONAL PARK
North Unit**

United States Department of the Interior



NATIONAL PARK SERVICE
Badlands National Park
P.O. Box 6
Interior, South Dakota 57750

November 2, 2006

D18

Dear Friend of Badlands National Park:

The following Final Environmental Impact Statement/General Management Plan for Badlands National Park-North Unit represents the culmination of several years of planning for the future. This document identifies and assesses the various management alternatives and corresponding environmental impacts relative to natural and cultural resource management, visitor use and access, general development, and park operations in the North Unit. The plan replaces an outdated Master Plan and will guide park management for the next 15-20 years.

A draft plan was written and placed on 60 days public review. Comments were received from individuals, government agencies and organized interest groups. Many of these comments are reflected in this final plan.

Although technically not on review, this plan cannot be finalized for the next 30 days. This is so the public, organizations, and government agencies may look at the document and notify the National Park Service of any legal insufficiencies. Following that 30-day period, the Director, Midwest Region, National Park Service, will sign a Record of Decision, which marks the end of the general management planning process.

We are very pleased to have this plan completed. It will provide the framework for management and development at Badlands National Park in the coming years.

Thank you for your participation in the planning process.

Sincerely,

A handwritten signature in black ink, appearing to read "Paige Baker". The signature is fluid and cursive.

Dr. Paige Baker
Superintendent

General Management Plan / Environmental Impact Statement
BADLANDS NATIONAL PARK / NORTH UNIT
Jackson, Pennington, and Shannon Counties, South Dakota

This *General Management Plan / Environmental Impact Statement* (GMP/EIS) presents and analyzes four alternatives for managing the North Unit of Badlands National Park. The National Park Service (NPS) developed this plan to guide the management of the North Unit of Badlands National Park over the next 20 years. Alternative A, the no-action alternative, would involve continuing the current management of the North Unit. Alternatives B, C, and D would entail different ways of managing the park's natural and cultural resources, including the long-range preservation of such resources. Different approaches also are presented in the alternatives for the types and quality of visitor experiences that should be achieved and maintained in the park. The plan will establish a framework for monitoring resource conditions and visitor experiences relative to defined, long-term goals.

The South Unit of Badlands National Park is located on tribal lands, within the Pine Ridge Reservation. These lands are managed as part of the park, through a memorandum of agreement with the Oglala Sioux Tribe. The National Park Service, Bureau of Indian Affairs, and the Oglala Sioux Tribe are discussing the future of this relationship. This plan was originally intended to cover the entire park. However, due to these ongoing discussions, the future of the South Unit will be addressed in a separate plan.

Four alternatives were developed for the North Unit. Alternative A, which would continue to apply the current management program, establishes a basis for comparing the effects of the other alternatives. Alternative B, the alternative preferred by the National Park Service, would offer a range of high-quality visitor opportunities and improved facilities while ensuring the protection of natural and cultural resources. Alternative C would focus on resource protection, with some improvements for visitors' use of the park. Alternative D would focus on education and on the research value of the park. Resource preservation would remain a key management mandate in all the alternatives.

The effects on natural and cultural resources, visitor experience, and the socioeconomic environment that would result from each alternative also are evaluated in this document. Compared to the no-action alternative, the preferred alternative (B) would result in substantial beneficial effects on visitor experiences by providing visitor opportunities throughout the park.

Compared to the no-action alternative, alternatives B, C, and D would improve the quality of many visitors' experiences in the park and better protect natural and cultural resources. All the alternatives would benefit visitors by offering new opportunities. Alternative B would provide the greatest increase in these opportunities. All of these "action" alternatives would result in positive and negative effects on resources in local areas.

This *Final General Management Plan / Environmental Impact Statement* has been distributed to other government agencies, tribes, nongovernmental organizations, and interested individuals for review and comment. After at least a 30-day no-action period, a "Record of Decision" on the final approved management plan will be issued by the NPS regional director. For further information, contact Superintendent, Badlands National Park, P.O. Box 6, Interior, SD 57750.

SUMMARY

The purpose of this *General Management Plan / Environmental Impact Statement* is to define a general future guidance and direction for the management of the North Unit of Badlands National Park for the next 15 to 20 years. The approved plan will provide a framework for making decisions about ways to ensure the preservation of natural and cultural resources and to provide for a high-quality visitor experience in the North Unit of the park. The completed plan will establish a basis for decision making in accordance with defined long-term goals. The *General Management Plan (GMP)* provides broad direction for resource management and visitor experiences and in most cases does not propose specific actions. Once the GMP is approved, more detailed environmental analysis and documentation would be completed before final commitments are made to specific implementing actions.

The South Unit of Badlands National Park is on tribal lands within the Pine Ridge Reservation. These lands are managed as part of the park, through a memorandum of agreement with the Oglala Sioux Tribe. The National Park Service, the Oglala Sioux Tribe, and the Bureau of Indian Affairs are discussing the future of this relationship. This plan was originally intended to cover the entire park. However, due to these ongoing discussions, the future of the South Unit will be addressed in a separate plan.

PURPOSE AND NEED FOR A GENERAL MANAGEMENT PLAN

The approved general management plan will fulfill the following purposes:

- ◆ Identify desired future conditions for park resources and provide direction for the management of natural and cultural resources, for interpretation and education, for visitor services, and for other programs.

- ◆ Identify strategies for resolving issues within the context of regional, national, and global trends.
- ◆ Fulfill the requirements of the National Parks and Recreation Act of 1978 (16 U.S.C. § 1a-7), which requires the National Park Service to prepare and revise general management plans in a timely manner for each unit of the national park system.

A new plan is needed to address issues and concerns confronting the park, to ensure that park resources are preserved, and to offer opportunities for a diversity of high-quality visitor experiences in the 21st century. The *Master Plan* for Badlands National Park (NPS 1982) was prepared almost 20 years ago. Preparing this plan has given the National Park Service an opportunity to reevaluate the park needs and the desired future conditions for the North Unit of the park on the basis of current information and regional trends.

THE PLANNING PROCESS

The preparation of this plan has been guided by the major elements of park planning and decision making prescribed by the National Environmental Policy Act (NEPA) and other federal laws, as well as by NPS policies. Several scoping meetings were conducted in surrounding communities in 2000 to identify the public's concerns about major issues facing the park.

The planning team developed four alternatives, including a no-action alternative, which would continue the current management, as required by the National Environmental Policy Act. The preliminary alternatives were presented during public meetings in November 2001. After the initial four alternatives had been defined, a preferred alternative was developed. This involved evaluating the four preliminary alternatives

SUMMARY

with the use of an objective analysis process called “choosing by advantages.”

ALTERNATIVES

The following four alternatives for management were produced through the planning process:

- ◆ **A:** continue the current management approaches and strategies (no action)
- ◆ **B:** provide additional visitor opportunities to extend the duration of each visit to the park (this is the alternative preferred by the National Park Service)
- ◆ **C:** emphasize resource protection, with visitors’ use of the park directed toward preventing or minimizing damage of resources
- ◆ **D:** focus on the research value of the park, and use education to give visitors information about the park

The four alternatives are based on maintaining the park’s purposes and significance; meeting the mission, legal mandates, and policies of the National Park Service; addressing park issues, public views, visitor use patterns, and park resource conditions; and ensuring the ability to implement the actions.

Alternative A

Alternative A, the no-action alternative would involve continuing the current park management direction, relying on existing plans and policies. Approved projects would continue to move forward. All other existing park facilities would be operated and maintained as before.

Alternative B

Alternative B, the plan preferred by the National Park Service, also is the environmentally preferable alternative. This alternative would offer a range of high-quality visitor opportunities and improve the

stewardship of park resources. The objectives of this alternative would be to achieve the following:

- ◆ increase the quality and available range of opportunities of visitor experiences
- ◆ offer more educational and recreational opportunities to extend the average time each visitor spends in the park
- ◆ create management zones for more effective achievement of long-term goals for resource conditions

Additional facilities would be developed so that visitors would be more dispersed throughout the park. In response to a change in visitation patterns, a visitor contact station in the park would be established near Pinnacles, making it possible for visitors to obtain information about the park upon entry from the west. An additional contact station would be established in the town of Scenic through lease or partnership with another entity, pursuant to applicable law and policy. In addition, more hiking trails and routes would be designated in various parts of the park.

Under this alternative, the expansion of the park boundaries in two locations would be recommended to enhance resource protection and offer additional visitor experiences. Approximately 5,400 acres along South Dakota Highway 44 would be recommended for acquisition by the park. These lands would protect additional prairie and badlands features. This would add to the park more bison habitat and additional habitat for the restoration of the black footed ferret, one of North America’s most endangered mammals. The other recommended addition to the park would be 4,500 acres along the western edge of the park’s North Unit, adjacent to the wilderness. This would add to the park more bison habitat and additional habitat for the restoration of the black footed ferret. The boundary expansions would enhance resource protection and allow for additional visitor experiences.

Following completion of the general management plan, the National Park Service would prepare a study to determine if about 240 acres along SD 240 south of Cactus Flats, including the Prairie Homestead, should be added to the park.

Alternative C

The focus of alternative C would be resource protection. Education would be used to advise visitors about the importance of the park's resources and to guide them to minimize or prevent resource impacts. Parts of the park known to be sensitive would be closed to public use.

Additional facilities would be established to serve as points of contact. An orientation facility would be constructed near Pinnacles to offer information about the park upon entry to visitors entering the park at the western end.

Alternative C would entail recommending the expansion of the park boundaries in three locations to enhance resource protection and offer more varied visitor experiences. This alternative would include the two expansions described in alternative B and the acquisition of the Prairie Homestead, which would add a sod house from the homesteading era. Adding this property to federal ownership would make it possible to protect the sod house and tell the story of homesteading in the Great Plains.

Alternative D

The focus of alternative D would be on the research value of the park, which offers an outstanding opportunity to expand knowledge about paleontology and the prairie ecosystem. The park would use this information to educate visitors. Some areas of the park known to have high scientific value would be closed to visitors.

A visitor contact station would be established in or near the town of Wall through leasing a

location or through partnering with another entity, pursuant to applicable law and policy.

The expansion of the park in two locations would be recommended under alternative D to enhance resource protection and offer more visitor experiences. Recommended for addition to the park would be the 5,400 acres along SD 44 and the 4,500 acres along the park's western edge, as described for alternatives B and C.

THE LOOP ROAD

The Loop Road is the primary route through Badlands National Park. The current road alignment over Cedar Pass crosses a landslide. The National Park Service and the Federal Highway Administration recently have taken actions to slow the movement of the landslide and stabilize the road; however, this is not a long-term solution. The Federal Highway Administration conducted a study and presented three potential corridors for realigning the road to avoid the landslide. To facilitate overall planning for the park, these corridors have been incorporated into the action alternatives. The corridors are broad, and final alignment will require additional engineering and environmental analysis. The potential final alignments will be evaluated in a later NEPA document. The corridors are included in the plan primarily to facilitate the zoning of the park, because the location of the road is a key factor in determining a management strategy for the park.

THE NEXT STEPS

After at least a 30-day no-action period, a "Record of Decision" approving a final plan will be signed by the NPS regional director. With the publication of the signed "Record of Decision" in the *Federal Register*, the plan can then be implemented, depending on funding and staffing. (A "Record of Decision" does not guarantee funds and staff for implementing the approved plan.)

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**Purpose of and Need
for the Plan**

PURPOSE, NEED, AND PLANNING PROCESS

INTRODUCTION

Badlands National Monument in South Dakota was recognized as a significant area when the United States Congress authorized its establishment in 1929. The monument encompassed approximately 110,000 acres of the South Dakota Badlands. The monument was expanded by 133,000 acres in 1968, and it was redesignated as Badlands National Park in 1978. The park's outstanding scenic values, its importance to the science of paleontology, and its natural resources were, and continue to be, its signature features.

The 1968 expansion created the South Unit of the park. This is comprised of tribal lands, which are part of the Pine Ridge Reservation. The law required the preparation of an agreement between the Oglala Sioux Tribe and the National Park Service. In 1976 the memorandum of agreement (MOA) was finalized. Through the MOA the tribe granted to the National Park Service the "right of administration... solely for the purpose of providing public recreation and for development and administration...of administrative and public use facilities...."

In 2003, the National Park Service entered into negotiations with the Oglala Sioux Tribe and the Bureau of Indian Affairs concerning the future of the South Unit. The negotiations are exploring various options for the future of the South Unit. Due to these ongoing negotiations, this plan will focus only on the North Unit of Badlands National Park. Planning for the South Unit will be conducted based on the outcome of the negotiations between the tribe, NPS, and BIA.

Unless otherwise stated, the term park in this document refers only to the North Unit of Badlands National Park.

PURPOSE OF THE PLAN

The approved *General Management Plan* will fulfill the following purposes:

- ◆ Identify desired future conditions for park resources and provide direction for natural and cultural resource management, interpretation and education, visitor services, and other programs.
- ◆ Identify strategies for resolving issues within the context of regional, national, and global trends.
- ◆ Fulfill the requirements of the National Parks and Recreation Act of 1978 (Public Law [PL] 95-625), which requires the National Park Service (NPS) to prepare and revise general management plans in a timely manner for each unit of the national park system.

NEED FOR THE PLAN

A new general management plan is needed to address issues and concerns confronting the park, to ensure that park resources are preserved, and to provide opportunities for a diversity of quality visitor experiences in the 21st century. The Badlands National Park *Master Plan and Development Concept Plan* (NPS 1982) was prepared over 20 years ago. This plan is in need of revision to address issues facing the park. Therefore, this general management plan is needed to guide the future management of the North Unit of the park. Preparing this plan has given the National Park Service an opportunity to reevaluate the park's needs and the desired future conditions for the park on the basis of the most current information and regional trends.

REGIONAL CONTEXT

Badlands National Park, one of nearly 400 national parks in the nation, is approximately 70 miles from the growing Rapid City, South Dakota (population 62,000). Most of the park is bordered by Buffalo Gap National Grassland, the Pine Ridge Indian Reservation, and private lands, primarily ranches (see the Vicinity map).

The town of Wall, South Dakota, known over the world for being the home of Wall Drug, is approximately 7 miles from the park's Pinnacles entrance. Wall has about 800 residents, and its primary source of income is related to tourism. The town serves as gateway to the park, offering travel amenities such as hotels and restaurants.

The town of Interior is just outside the park boundary near Cedar Pass. This town of approximately 75 residents provides limited visitor amenities such as a hotel, a campground, and restaurants. The hotel and campground are operated seasonally.

The Pine Ridge Indian Reservation, home to the Oglala Sioux Tribe, is adjacent to the park. The South Unit of the park is entirely comprised of tribal lands and is administered as part of the park through an agreement between the Oglala Sioux Tribe and the National Park Service.

The Buffalo Gap National Grassland, managed by the U.S. Forest Service, is adjacent to the park. A management plan has been finalized for the grassland. The plan describes the desired conditions for these public lands and sets directions to maintain or move toward those conditions. The primary use of the grasslands is grazing. In addition these lands provide recreational opportunities including hiking, hunting, fishing, horseback riding, and off-road vehicle use.

The private lands within the region are primarily ranches. These lands are used for cattle grazing and crop production. Many of these private ranches have grazing permits with the U.S. Forest Service for the Buffalo Gap National Grassland.

THE PLANNING PROCESS

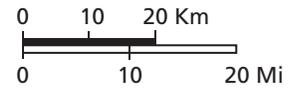
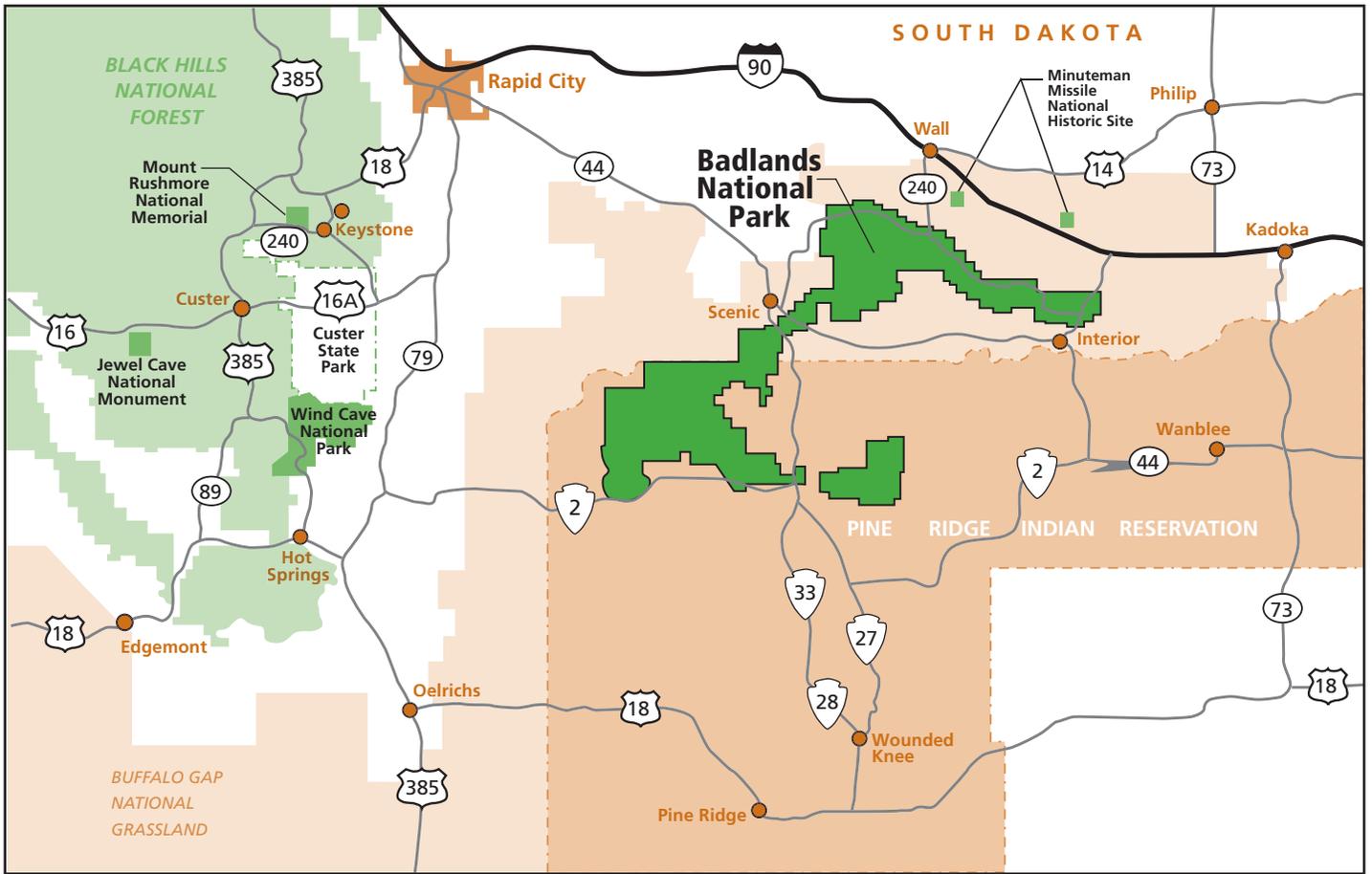
Scoping

The general management planning for Badlands National Park is guided by the major elements of park planning and decision-making prescribed by the National Environmental Policy Act (NEPA) and other federal laws, as well as by NPS policies. The National Park Service consulted with American Indian tribes and arranged several scoping meetings in surrounding communities in 2000 to identify the public's concerns about major issues facing the park. At about the same time, the planning team developed statements regarding the park's purposes and significance (see p. 9). These statements have served as the parameters for all subsequent planning.

Developing Alternatives

Once the issues were understood, the planning team defined prescriptive management zones and a list of alternative concepts describing what the park should look like in 20 years. The zones were applied to the park in a variety of configurations to achieve the concepts the team had developed.

The planning team initially developed four alternatives, including a no-action alternative (continue current management), as required by the National Environmental Policy Act. The preliminary alternatives were presented during public meetings in November 2001.



 **Badlands National Park Boundary Area**

Vicinity

Badlands National Park

United States Department of the Interior
National Park Service

REDSC • 137 • 20025 • August 2005

After the initial four alternatives had been defined, a preferred alternative was developed. This involved evaluating the four preliminary alternatives with the use of an objective analysis process called “choosing by advantages.” Through this process, the planning team identified and compared the relative advantages of each preliminary alternative according to a set of goals and facts. The benefits or advantages of each alternative were compared for each of the following areas:

- protecting resources and natural processes
- providing orientation and education for visitors
- providing visitor access and recreational opportunities
- protecting the health, safety, and welfare of the public and park employees
- improving park operational efficiency and sustainability
- ensuring compatibility of the park’s actions with the Oglala Sioux Tribe and the surrounding ecosystem
- improving the knowledge of park resources through research

This comparison helped the planning team to determine the actions that would be most advantageous to the resources and the public. The costs of implementing the proposals also were considered.

The relationships between the advantages and costs of each alternative were established. This information was used to combine the best attributes of the four initial alternatives into the preferred alternative. This alternative would give the National Park Service the greatest overall benefits for each point listed above for the most reasonable cost.

These preliminary alternatives were presented to the public in a newsletter in 2001. The National Park Service conducted a series of

public meetings and requested and received comments on these preliminary alternatives.

Since developing these alternatives, the National Park Service, Oglala Sioux Tribe, and Bureau of Indian Affairs entered into negotiations concerning the future of the South Unit. Due to these ongoing negotiations in October 2003, the National Park Service decided that the alternatives will only address the North Unit. Planning for the South Unit is expected to start once agreement is reached between the Oglala Sioux Tribe, Bureau of Indian Affairs, and National Park Service. This decision did not change the intent of the alternatives nor will it impact the National Park Service’s ability to adequately plan for the North Unit.

DIRECTION FOR THE PLAN

The direction for the alternatives considered in this *Final General Management Plan / Environmental Impact Statement* is based on the applicable legislative mandates, NPS policies, and the park’s purpose and significance. The purpose statements of the park (see page 9) describe why Badlands was established as a national park. The significance section describes the unique qualities that make the park a special place. Other legislative mandates help to further define the parameters of how planning should be done and certain elements that the plan must address.

Legislative mandates and special commitments include measures that apply to the entire national park system, plus park-specific requirements. In addition, the National Park Service must comply with all federal statutes, executive orders, and NPS policies. The intent of all the mandates and commitments is to establish sustainable conservation and to avoid impairing these lands. As a result, visitation can occur only to the extent that it does not result in significant adverse effects on the park’s natural and cultural resources. Also see appendix A.

National Park System Mandates

The National Park Service and its mandates are authorized under the NPS Organic Act (16 USC 1, 2-4) and the General Authorities Act (16 USC 1a-8). The Organic Act directs the National Park Service to promote and regulate the use of the parks

by such means and measures as conform to the fundamental purpose of said parks . . . which purpose is to conserve the scenery, natural and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The Redwood Act, passed in March 1978, amended the NPS Organic Act of 1916. In that act, Congress reaffirmed the mandates of the Organic Act and provided the following additional guidance for managing national parks:

The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established.

According to Senate Report no. 95-528, the restatement of these principles of park management in the Redwoods Act was intended to serve as the basis for any judicial resolution of competing private and public values and interests in the national park system. If a conflict between visitors' use of the park and the protection of resources should occur, this act confirms the intent of Congress to favor resource protection.

The National Park Omnibus Management Act of 1998 (PL 105-391), title II, "National Park System Resource Inventory and Management," supports the integration of scientific study results into management. This act directs the secretary of the interior to take

necessary steps to ensure the full and proper use of the results of scientific studies in making management decisions. In conformance with the 1998 act and the National Environmental Policy Act, this plan has used the best available scientific information.

Badlands National Park Legislation and Special Mandates

Congress authorized the creation of Badlands National Monument in 1929 "for the benefit and enjoyment of the people" (45 Stat. 1553). Report Number 2607 of the Committee on the Public Lands (70th Congress - 2nd session - March 4, 1929), which accompanied the 1929 Act, states the purpose [intent] of the monument was "to preserve the scenic and scientific values of a portion of the White River Badlands and to make them accessible for public enjoyment and inspiration." The report described the monument as "a vast area of rutted ravines, high ridges, hills and cliffs of grayish-white soil with a varied strata of coloring, extending as far as the eye can reach," with "a continuous serrated sky-line series of towers, pinnacles, and precipitous gulches which can not be duplicated elsewhere." Also described were "vast beds of vertebrate fossil remains".... which appear in great variety. The whole area is a vast storehouse of the biological past, and for three-quarters of a century (since 1847) it has been the scene of scientific expeditions from all parts of the world."

The enabling legislation required the state of South Dakota to acquire certain lands and construct a scenic road to provide public access. Those conditions were met in 1939, and Badlands National Monument was established by presidential proclamation (53 Stat. 2521).

Public Law 90-468 (82 Stat. 663), enacted on August 8, 1968, expanded the boundaries of the monument by authorizing the acquisition of lands of outstanding scenic and scientific character but limited the total monument area to 244,000 acres. The lands were in the Pine

Ridge Indian Reservation and had been used by the Air Force as a bombing range. Under the provisions of this act and the subsequent memorandum of agreement between the Oglala Sioux Tribe and secretary of the interior, 133,300 acres of land in the reservation were added to monument. (The national monument was redesignated Badlands National Park in 1978.) The lands in the reservation are held in trust by the U.S. government for the Oglala Sioux Tribe and are administered by the National Park Service as the South Unit of Badlands National Park.

Congress designated 64,250 acres of Badlands National Park as wilderness when it passed Public Law 94-567 on October 20, 1976. As a result, these lands are managed under the provisions of the Wilderness Act (16 USC §1131 *et seq.*).

Park Purposes

The purposes of Badlands National Park are based on the various pieces of legislation that resulted in the creation of Badlands National Park and the legislation governing the National Park Service. Badlands National Park is to be managed to accomplish the following:

- ◆ protect the unique landforms and scenery of the White River Badlands for the benefit, education, and inspiration of the public
- ◆ preserve, interpret, and provide for scientific research of the paleontological and geological resources of the White River Badlands
- ◆ preserve the flora, fauna and natural processes of the mixed grass prairie ecosystem
- ◆ preserve the Badlands wilderness area and associated wilderness values
- ◆ interpret the archeological and contemporary history of use and settlement of lands within the park, with

special emphasis on the history of the Sioux Nation and the Lakota People.

Park Significance

The significance and unique characteristics of Badlands National Park are as follows:

- ◆ The park's geological and paleontological resources provide insight into climatic history, biological diversity, evolution, and geological processes particular to the boundary between the Eocene and Oligocene epochs.
- ◆ Fossil and geologic records provide a unique opportunity to trace the evolution of the prairie ecosystems of the Great Plains.
- ◆ The park contains places of spiritual and historical significance to the Lakota people.
- ◆ The harsh climate and extreme geography of the badlands region influenced both aboriginal use and contemporary settlement patterns of lands now administered by the National Park Service and directly contributed to the establishment of the park.
- ◆ The long history of research in the White River Badlands has contributed greatly to the science of vertebrate paleontology in North America.
- ◆ The park contains a substantial remnant of native prairie and encloses the largest mixed-grass prairie protected by the National Park Service.
- ◆ The park contains large, fully protected prairie dog colonies that provide habitat for the endangered black-footed ferret.
- ◆ The park contains spectacular scenery, predominantly highly eroded landforms that comprise a concentrated collection of rutted ravines, serrated towers, pinnacles, and precipitous gulches.
- ◆ The park contains 64,000 acres of designated wilderness made up of

badlands and prairie that offer outstanding opportunities for exploration and solitude.

Primary Interpretive Themes

The National Park Service explains the park's natural and cultural resources to visitors through interpretation. An integral part of providing for visitor enjoyment of national parks is offering visitors the opportunities to develop connections to the ideas and meanings inherent in the resources within the park. Interpretive themes are stories, ideas or concepts that are central to the park's identity.

The primary interpretive themes define concepts that every visitor should have the opportunity to learn. These also provide a framework for the park's interpretation and education programs.

In 1999, the National Park Service finalized the *Badlands National Park Long-Range Interpretive Plan* which identified the following primary interpretive themes:

- ◆ The Badlands fossil and geological record reflects changing climates and the great diversity of species existing during various periods; its study provides insight into the survival of species.
- ◆ Different cultural groups, from historic and present day American Indians to homesteaders have had and continue to have spiritual and physical relationships to the resource of the Badlands.
- ◆ Studying the mixed grass prairie ecosystem and the human relationship to it helps to understand the changing grassland ecology of the Great Plains and helps us restore and protect this fragile and remarkably diverse ecosystem.
- ◆ Badlands, an evolving landscape formed by the processes of deposition and erosion and forces of the wind and water, offers lessons for all visitors on the impacts of natural forces on our communities and our lives.

- ◆ Badlands offers excellent opportunities for solitude and contemplation and unusual opportunity to experience wildness in a prairie setting.
- ◆ The science of vertebrate paleontology was born in the Badlands region; paleontology and other forms of science continue to evolve and play an important role in management of Badlands National Park.

Park Mission

The National Park Service has developed the following mission statement for Badlands National Park:

Badlands National Park preserves a diversity of significant resources for the education and inspiration of a world audience. These resources are a blend of the best known Oligocene fossil deposits contained within the archetypal Big Badlands formations, a rich and varied cultural history spanning from paleo-Indian occupation through the early 20th century homesteading period, and a fine expanse of mixed grass prairie ecosystem. Other qualities, most notably the wilderness character, clean air, quiet, solitude, vastness, and natural processes, give visitors a setting for exploration and appreciation through such experiences as hiking, camping, wildlife viewing, scenic drives and vistas, research, educational opportunities, and quiet contemplation.

Mission Goals for the Park

Mission goals for the park are statements of desired future conditions. Goals have been developed for resource stewardship and protection, access and enjoyment, education and interpretation, proactive leadership, science and research, and professionalism. The following goals were established in the *Strategic Plan for Badlands National Park* (NPS 1999).

Preserving Park Resources. The primary responsibility of the National Park Service is to protect the park resources from impairment.

Goal 1: The natural and cultural resources and associated values in Badlands National Park are protected, restored, and maintained in good condition and managed within their broader ecosystem and cultural context.

Goal 2: Badlands National Park contributes to knowledge about natural and cultural resources and associated values. Management decisions are based on adequate scholarly and scientific information.

Public Access and Enjoyment. The park will be managed to offer the nation's diverse public access to and recreational and educational enjoyment of the lessons contained in Badlands National Park, while the unique attributes that are its contribution to the national park system are maintained.

Goal 1: Visitors safely enjoy the facilities, services, and appropriate recreational opportunities at Badlands National Park and are satisfied with their availability, accessibility, diversity, and quality.

Goal 2: Park visitors and the general public understand, appreciate, and support the preservation of Badlands National Park and its resources for this and future generations.

Organizational Effectiveness. The National Park Service must create and maintain a highly professional organization and a diverse workforce.

Goal 1: Badlands National Park adopts current management practices, systems and technology to accomplish its mission.

Goal 2: Badlands National Park increases its managerial resources through initiatives and support from other agencies, organizations, and individuals.

GUIDING MANAGEMENT PRINCIPLES AND STRATEGIES

PRINCIPLES AND MANAGEMENT STRATEGIES

A number of guiding principles and strategies are described below. These are based on legal mandates and NPS policies that would continue to shape the way in which Badlands is managed under the alternatives being considered in this plan. All the alternatives support the purposes and significance of Badlands National Park. Some of these principles and strategies describe approaches the park staff is currently taking. Other principles and strategies are not being implemented at present, but they are consistent with NPS policy, they are not controversial, and their implementation may not require additional analysis under the National Environmental Policy Act.

Ecosystem Management

Approaches to ecosystem management are varied and occur at many levels. To achieve the desired future conditions described for park resources, a regional perspective must be considered, and it must be recognized that actions taken on lands surrounding the park directly and indirectly affect the park. Many of the threats to park resources, such as invasive species and air pollution, come from outside the park boundaries. An ecosystem approach is required to understand and manage the park's natural resources. An understanding of the health and condition of the ecosystem also is imperative.

Cooperation, coordination, and partnerships with agencies, tribal governments, and neighbors are crucial to meeting or maintaining the desired future conditions for the park. This approach to ecosystem management may involve many parties or cooperative arrangements with federal and state agencies, tribes, or private landowners to obtain a better understanding of transboundary issues.

Badlands is managed holistically as part of a greater ecological, social, economic, and cultural system. The following strategies will allow the National Park Service to lead in resource stewardship and in the conservation of ecosystem values within and outside the park. These strategies will allow the National Park Service to maintain good relations with owners of adjacent property, surrounding communities, and private and public groups that affect and are affected by the park. The strategies also will allow proactive management of the park designed to resolve external issues and concerns and to ensure that park values are not compromised.

- ◆ The National Park Service will continue to seek agreements with the U.S. Forest Service, the Oglala Sioux Tribe, and other owners of adjacent property to protect the Badlands ecosystem.
- ◆ The National Park Service will continue to work cooperatively to manage nonnative species in the region.
- ◆ The National Park Service will continue to act as a partner with the research community to further the knowledge of the natural and cultural resources of the park.
- ◆ When feasible, the National Park Service will seek partnerships with other public agencies and with the Oglala Sioux Tribe to share orientation, contact stations, and administrative facilities.
- ◆ The National Park Service will continue to work with partners to protect species of concern and reintroduce extirpated native species when practicable.

Relations with Private and Public Organizations, Owners of Adjacent Land, and Government Agencies

The National Park Service must consider that Badlands National Park — socially, politically, ecologically, and historically — is part of a greater area and that actions in the park affect the surrounding environment and society. For instance, the management of the park influences local economies through tourism expenditures and the goods and services the Park Service purchases to support park operations. To ensure that the National Park Service continues to have good relations with landowners and communities surrounding Badlands National Park, and to ensure that the park is managed proactively to resolve external issues and concerns, the following strategies will be implemented:

- ◆ The park staff will continue to establish partnerships with public and private organizations to achieve the purposes and mission of the park. Partnerships will be sought for the purposes of resource protection, research, education, visitor enjoyment, visitor access, and management.
- ◆ To foster a spirit of cooperation and encourage compatible uses of adjacent lands, the park staff will keep landowners, land managers, tribes, local governments, and the public informed about park management activities. The park will consult periodically with landowners and communities that are affected by or potentially affected by park visitors and management actions.
- ◆ The National Park Service will work closely with local, state, and federal agencies and tribal governments whose programs affect or are affected by activities in Badlands National Park. In particular, to meet mutual management needs, park managers will maintain a close working relationship with the U.S. Forest Service, the Oglala Sioux Tribe, U.S. Fish and Wildlife Service, and the owners of adjacent private land.

Relationships with American Indians

The National Park Services recognizes that the Badlands area has long occupied a prominent position for American Indians in the Great Plains. The park staff will work to ensure that traditional American Indian ties to the Badlands are recognized and will strive to maintain positive, productive government-to-government relationships with tribes culturally affiliated with the Badlands. The viewpoints and needs of tribes will continue to be respected, and issues that arise will be promptly addressed. American Indian values will be incorporated in the management and operation of the park. To enhance its relationship with the tribes, the National Park Service will carry out the following strategies and actions:

- ◆ Consult regularly and maintain government-to-government relations with federally recognized tribes that have traditional ties to resources within the park to ensure productive, collaborative working relationships.
- ◆ Continue to identify and deepen the understanding of the significance of the park's resources and landscapes to American Indian people through collaborative research and sharing.
- ◆ Once they have been identified, protect and preserve the sites, resources, landscapes, and structures of significance to the federally recognized tribes as required under federal laws and NPS *Management Policies 2001*.
- ◆ Encourage the participation of tribes in protecting the park's natural and cultural resources of interest and concern to them
- ◆ Involve tribes in the park's interpretation program to promote accuracy of information about American Indian cultural values and to enhance public appreciation of those values.
- ◆ Support the continuation of traditional American Indian activities in the park to

the extent allowed by applicable laws and regulations.

- ◆ Continue to consult and collaborate with tribes concerning issues and proposed actions that might affect American Indians.

Managing and Protecting Natural Resources

The protection, study, and management of the park's natural resources and processes is essential for achieving the park's purposes and mission goals. The following principles and strategies will help the National Park Service to retain the ecological integrity of Badlands National Park, including its natural resources and processes. These actions will help ensure that the park's natural features are unimpaired, that the park continues to be a dynamic, biologically diverse environment, and that Badlands is recognized and valued as an outstanding example of resource stewardship, conservation, education, and public use.

Management activities will be evaluated to ensure that the best management practices are used to carry out the proposed action. This evaluation will determine the best method to use to ensure that management actions are completed in a manner that is best for the resource and is conducted in an efficient manner. NPS administrative off-road vehicle use will be limited to what is determined to be necessary to conduct emergency operations and to accomplish essential park management activities.

Inventory and Monitoring. Knowing the condition of natural resources in a national park is fundamental to the National Park Service's ability to protect and manage parks. Badlands is confronted with increasingly complex and challenging issues, and the park staff needs scientifically credible data to make management decisions. Inventories involve compiling existing information as well as collecting new information. Inventories contribute to a statement of the condition of

park resources in relation to a standard condition, especially the natural or unimpaired state.

A long-term ecosystem monitoring program is necessary to enable managers to make better informed decisions, to provide early warning of changing conditions in time to develop effective mitigating measures, to convince individuals and other agencies to make decisions benefiting the park, to satisfy certain legal mandates, and to provide reference data for relatively pristine sites for comparison with areas outside of the park. Monitoring also enables the park staff to evaluate the effectiveness of management actions and obtain more accurate assessments of progress towards management goals. Using monitoring information will increase confidence in managers' decisions and improve their ability to manage park resources.

- ◆ Inventories and long-term monitoring programs will continue to be developed to address the status and health of the park. Key indicators of resource or ecosystem conditions will be developed and monitored over the long term to record ecosystem health.
- ◆ Inventories will be conducted to identify vertebrate and invertebrate animal species, vascular and nonvascular plant species, and air, water, and geologic resources in the park.
- ◆ Badlands National Park will continue to participate in the Northern Great Plains Inventory and Monitoring Network. The park staff will work with its partners and collaborators to inventory resources and monitor vital components of the ecosystem. This will make it possible to better assess the condition of park resources and trends and to develop databases, data analyses, and retrieval tools so that the usefulness of natural resource information can be improved.
- ◆ Badlands National Park will continue to cooperate with the National Park Service's Northern Great Plains Fire Management

Office in the ongoing fire effects monitoring. The monitoring will be used to determine if resource objectives are being met and if any unwanted effects are occurring.

Air Quality. Badlands Wilderness Area is designated a class I area under the Clean Air Act. This designation permits the least degradation of air quality and air quality related values, including visibility. The following policies and strategies will ensure that Badlands' air quality will be enhanced or maintained with no significant degradation and that nearly unimpaired views of the landscape both within and outside the park are available.

The following policies and strategies will also ensure that scenic views that are integral to the visitor experience will be protected.

- ◆ In Badlands, the National Park Service will strive to set a global example of how class I areas and critical airsheds can be effectively protected.
- ◆ Emissions associated with administrative and recreational use of the park will be reduced.
- ◆ Baseline information about air quality related values will be expanded through research, inventory, and monitoring programs to identify human stressors and general air quality trends.
- ◆ The National Park Service will expand programs for sharing air quality information with surrounding agencies and will develop educational programs to inform visitors and regional residents about the threats of air pollution to park resources.
- ◆ The National Park Service will continue to participate in regional air quality planning, research, and the implementation of air quality standards.
- ◆ The National Park Service will protect the park's noteworthy night sky as a natural and cultural resource as an inspiration for visitor enjoyment.

Natural Sound. Natural sound predominates in the Badlands National Park. Visitors have the opportunity throughout most of the park to experience natural sounds. The sounds of modern society are generally confined to the developed areas in the park.

- ◆ The National Park Service will protect the park's natural sounds as an inspiration for visitor enjoyment.

Fire Management. Prescribed and wildland fire will be used as a tool to meet park management objectives. The following strategies will ensure that wildland fire will be used in an effective manner to protect park resources.

- ◆ The National Park Service will develop and maintain a current fire management plan for the park.
- ◆ The park will collaborate with adjacent communities, groups, state and federal agencies, and tribes to manage fire in the park and the region.
- ◆ The park will continue to support national, regional, and local fire management activities and provide public education on the role of fire management in its historic and ecological context.
- ◆ Fire will be used to maintain and restore native prairie and control nonnative plant species.

Geologic Features. Badlands National Park was established to protect the unique landforms of the area. The following policies and strategies will ensure that the park's geologic features are not significantly degraded and the scenic views remain unimpaired.

- ◆ Geologic features will be inventoried, mapped, and monitored to assess their condition.
- ◆ The National Park Service will allow natural geologic processes to proceed unimpeded.

PURPOSE OF AND NEED FOR THE PLAN

- ◆ Interpretive and educational programs will be developed to educate visitors and the public about geology.
- ◆ Intervention in natural geologic processes will be permitted only when directed by Congress, when necessary in emergencies that threaten human life and property, when there is no other way to protect natural resources, park facilities, or historic properties, or when intervention is necessary to restore impacted conditions and processes.
- ◆ The park will actively seek to understand and preserve the park's soil resources and to prevent to extent possible its physical removal or contamination.
- ◆ High impact visitor use areas will be monitored and actions taken to reduce impacts on geologic resources.
- ◆ Facilities being proposed in the park, including trails and roads, will be investigated for potential geohazards during site planning and design.

Paleontological Resources. Badlands National Park contains outstanding paleontological resources that have helped in the understanding of climatic history, biological diversity, evolution, and geologic processes. The following strategies will be implemented to better understand and protect paleontological resources consistent with 16 U. S.C. § 441d.

- ◆ Inventorying and monitoring will be expanded to ensure that these nonrenewable resources are not lost.
- ◆ Paleontological resources will be managed and studied in their geologic context, which provides information about the ancient environment.
- ◆ The park staff will be a partner with federal, state, and local agencies and with academic institutions to conduct paleontological research.
- ◆ Interpretive and curricula-based education programs and media will

continue educate visitors and the public about paleontology.

- ◆ Fossils collected will be managed in accordance with the park's collection management plan.
- ◆ The park staff will continue to improve fossil exhibits, fossil preparation facilities, and storage conditions according to NPS museum standards.
- ◆ The park staff will continue to expand opportunities for researchers to use the park's fossil collection to further paleontological knowledge.
- ◆ High impact visitor use areas will be monitored and actions taken to reduce impacts on paleontological resources.

Threatened or Endangered Species. The Endangered Species Act mandates that agencies, including the National Park Service, promote the conservation of all federally listed threatened or endangered species and their critical habitats within the park boundaries. Several federally listed and state-listed threatened or endangered species are known to exist in and around Badlands National Park and to use habitats in the park. The following actions will be taken to protect threatened or endangered species.

- ◆ The park staff will continue to work with the U.S. Fish and Wildlife Service, tribal governments, and South Dakota Game, Fish, and Parks to ensure that the National Park Service's actions help special status species (state-listed or federally listed threatened, endangered, rare, declining, sensitive, candidate, or special concern species) to recover. If any state or federally listed or proposed threatened or endangered species are found in areas that would be affected by construction, visitor use, or restoration activities proposed under any of the alternatives in this plan, the park staff will consult with the above agencies.
- ◆ The park staff will cooperate with the agencies mentioned above to inventory,

monitor, protect, and perpetuate the natural distribution and abundance of all special status species and their essential habitats in Badlands National Park. These species and their habitats will be specifically considered in ongoing planning and management activities.

- ◆ The National Park Service will continue to be a partner with the U.S. Fish and Wildlife Service, the U.S. Forest Service, American Indian tribes, South Dakota state agencies, and non-government organizations in the recovery of the black-footed ferret, one of North America's most endangered mammals, and the swift fox.
- ◆ Interpretive and curricula-based education programs and media will continue to educate visitors and the public about park efforts to restore extirpated native species.

Vegetation. Whenever possible natural processes will be relied on to maintain native plants and plant communities. Communities will include the diverse species, genetic variability, plant associations, and successional stages representative of an ecologically functioning system in the Great Plains. The following actions will be taken to manage the park's vegetation.

- ◆ Plant communities will be inventoried to determine the species present and monitored to assess their condition. The park will continue its effort to inventory rare plants.
- ◆ The National Park Service will continue efforts to eradicate invasive exotic (nonnative) plants in the park. The park staff will continue to work with the Oglala Sioux Tribe, other federal, state and local agencies, and private landowners to prevent the spread of exotic plant species into and out of the park.
- ◆ The park will continue to use fire as a management tool for restoring and maintaining plant communities.

- ◆ Interpretive and curricula-based programs and media will continue to educate visitors and the public about park efforts to restore native prairie habitat and manage exotic plant species.

Wildlife and Fish. The condition of wildlife and fish will be determined through baseline inventories and long-term monitoring programs. The following policies and strategies will ensure that the park's wildlife and fishes are protected.

- ◆ The park staff will seek to perpetuate the native animal life as part of the natural ecosystem. Minimizing human impacts on native animals will be emphasized, as will minimizing human influence on naturally occurring fluctuations of animal populations. Ecological processes will be relied on to control the populations of native species to the greatest extent practicable.
- ◆ The preservation of populations and habitats of migratory species inhabiting the park, such as birds and mountain lions, will be ensured. Whenever possible, the park staff will cooperate with others to ensure the preservation of the populations and habitats of migratory species outside the park.
- ◆ Educational programs will be developed to inform visitors and the general public about wildlife issues and concerns.
- ◆ The management of populations of exotic animal species will be undertaken whenever such species threaten park resources or public health and when control is prudent and feasible.
- ◆ The park will continue to work to restore extirpated native species where suitable habitat exists, and it is compatible with the social, political, and ecological conditions. The restoration of species such as the gray wolf and grizzly bear, whose habitat requirements and impacts on the human environment would make success unrealistic, will not be pursued by the National Park Service at this time.

- ◆ The park will continue to work to expand the range of the bison herd in the park.
- ◆ Interpretive and curricula-based programs and media will continue to educate visitors and the public about wildlife issues and concerns.

Carrying Capacity

General management plans are required to include identification of and implementation commitments for visitor carrying capacities for all areas of the unit. Visitor carrying capacity is the type and level of visitor use that can be accommodated while sustaining the quality of park resources and visitor opportunities consistent with the purposes of the park. It is not necessarily a set of numbers or limits but rather a process involving monitoring, evaluation, actions (managing visitor use), and adjustments to ensure park values are protected. At the GMP level of decision making, management zones address carrying capacity because they include qualitative descriptions of desired resource conditions and visitor opportunities. The strategy of addressing carrying capacity at Badlands National Park is a tiered approach that will keep a general eye on broad trends while focusing more specific monitoring and management on areas where action is most likely needed to achieve desired conditions.

This general management plan addresses issues and trends affecting the park for the next 15 to 20 years. The visitation level at Badlands National Park is expected to stay level or grow slightly during the life of this plan. While total numbers are not expected to change very much, the nature of use could shift. Each of the management zones generally addresses quality of park resources and visitor opportunities consistent with the purposes of the park.

One of the first implementation actions will be to initiate general monitoring of visitor use. The park needs to keep a broad perspective on carrying capacity, watching for trends that

may warrant moving to more specific monitoring and management. The park currently has data flowing in from a variety of sources: the entrance stations, visitor center, trail counters, vehicle counts, rangers, maintenance workers, and volunteers regarding visitor use and resource conditions. The park will develop a more systematic database that will pull the wide variety of existing information and observations together on a regular interval of time in a manner that will make trends visible. Significant changes in trends seen in the database may trigger more specific monitoring and management focused on areas of concern.

Where there are known threats or impacts to resources or visitor experience, monitoring and management actions will begin.

- ◆ Many overlooks and developed areas have social trails — places where people have left designated trails and created impacts to soils and vegetation. These areas will continue to be identified and rehabilitated, and pedestrian areas will be improved to contain future impacts.
- ◆ Popular hiking destinations such as Deer Haven do not currently have designated routes, which has resulted in a series of trails to the same location. Designated routes will be established (see “The Alternatives” chapter) to alleviate impacts.
- ◆ A few specific resources are known to be extremely vulnerable to inadvertent visitor damage or vandalism. Site-specific monitoring for the most sensitive known resources (i.e., paleontological sites) will be implemented.

If this first tier of monitoring indicates trends of resource degradation or impacts to the visitor experience, a more systematic visitor use management planning effort will be required. This will entail using a planning process such as Visitor Experience and Resource Protection (VERP). This planning framework will allow the park to develop more detailed goals for resource conditions

and visitor experiences in areas of the park. Based on these goals a monitoring program, using indicators and standards, will be established. The results of the monitoring will be applied to managing visitor use in these areas.

Wilderness

Congress designated 64,250 acres of the North Unit of Badlands National Park as wilderness in 1976 (PL 94-567). The intent of a designated wilderness is to ensure that wilderness lands retain their wilderness characteristics and values, that visitors will continue to find opportunities for solitude and primitive, unconfined recreation, that the signs of people remain substantially unnoticeable, and that the wilderness be affected primarily by the forces of nature. All the alternatives in this general management plan have been developed to ensure these lands are managed in accordance with the mandates of the Wilderness Act.

To carry out this intent, the National Park Service will adhere to the following strategies.

- ◆ Management decisions affecting wilderness will be consistent with the minimum requirement concept in accordance with federal laws and policies.
- ◆ A wilderness management plan will be developed that will guide the preservation, management, and use of the wilderness area. The plan will, among other elements, address user capacity indicators and standards and establish a monitoring program.
- ◆ The wilderness will be monitored to ensure that management actions and visitors do not unacceptably impact wilderness resources, values, and character as specified in standards and conditions in the park's wilderness plan.
- ◆ Insofar as possible, natural processes will be allowed to shape and control the wilderness ecosystems.

- ◆ Wilderness educational programs will be expanded to inform visitors about wilderness ethics and how to minimize their impacts on the park. "Leave No Trace" practices will be emphasized.
- ◆ Efforts will be expanded to ensure that wilderness features, such as natural soundscapes and night skies, are not degraded.

Managing and Protecting Cultural Resources

- ◆ The protection of the park's cultural resources is essential for understanding the past, present, and future relationship of people with the area. The strategies mentioned below will enable the National Park Service to protect the park's cultural resources. At the same time, these strategies will encourage visitors and employees to recognize and understand the value of the park's cultural resources and allow their integrity to be preserved unimpaired.

Archeological, Historic Structures, Cultural Landscapes, and Ethnographic Resources.

The strategies for managing archeological, historic, and ethnographic resources will be as follows:

- ◆ The park staff will continue to survey and document or inventory cultural resources in accordance with the National Historic Preservation Act and other applicable regulations.
- ◆ Field data regarding archeological resources will be gathered to develop a more accurate predictive model of prehistoric site distribution and to address related research questions.
- ◆ All identified resources will continue to be evaluated in accordance with the eligibility criteria for the National Register of Historic Places.
- ◆ Avoidance techniques and other measures will be used to prevent impacts on known

significant sites from visitors and project-related disturbances.

- ◆ The park staff will continue to support research and consultation to increase the understanding of all cultural resources.
- ◆ As appropriate, federally recognized tribes and the state historic preservation officer will continue to be consulted on surveys, studies, excavations, and actions that potentially could affect cultural resources.
- ◆ Interpretive and curricula-based programs and media will continue to educate visitors and the public about cultural and historic issues relating to Badlands National Park.

Museum and Archival Collections. The strategies for managing museum and archival collections will be as follows:

- ◆ The park staff will continue to maintain a diverse, substantial museum collection according to NPS policies. The collection contains historic artifacts; biological, paleontological, and geological specimens; historic images; archival materials; and prehistoric and historic archeological specimens and artifacts.
- ◆ The park staff will continue to improve the conditions of artifact and specimen exhibits and storage according to NPS museum standards.
- ◆ The park staff will maintain and continue to expand opportunities for researchers to use the artifacts, specimens, and archival materials in the museum collection.

Orientation, Interpretation, and Education

A variety of methods are used to orient visitors to Badlands National Park, to provide information about the park, and to interpret the park's resources. The National Park Service will continue to pursue strategies to ensure that information is available so that visitors can plan a rewarding visit to the park. Increasing outreach and educational programs will help connect diverse audiences

to the park's resources, build a local and national constituency, and gain public support for protecting the park's resources. Continuing to provide interpretation opportunities will build emotional, intellectual, and recreational ties with the park and its cultural and natural heritage.

The strategies for managing orientation, interpretation, and education will be as follows:

- ◆ Emphasis will continue to be placed on providing information, orientation, and interpretive services in the most effective manner possible. Appropriate techniques and technologies will be used to increase the visibility of the national park system and its programs and to make people aware of issues facing Badlands National Park.
- ◆ Interpretive and curricula-based education programs and media will continue to be grounded in key resource issues, management priorities, and public safety while providing opportunities for visitors and the public to connect park resources with national and global issues.
- ◆ Cooperative efforts and partnerships with local communities, public and private agencies, tribes, organizations, stakeholders, and land managers in the region will be enhanced so that visitors can be better informed about the abundance, variety, and availability of the region's recreational and interpretive opportunities. This information will orient visitors about what to do (and what not to do), attractions to see, and how to enjoy the park in a safe, low-impact manner.
- ◆ The park staff will strengthen partnerships with state parks and other national parks, educational institutions, and other organizations to enrich interpretive and educational opportunities regionally and nationally.

Commercial Services

Commercial services provide valuable visitor services at Badlands National Park. NPS authorization is necessary for all commercial services at Badlands. Permits have been issued to all existing commercial services because they are both necessary and appropriate to provide valuable visitor services. Similar facilities and services are not outside the park, and these services are necessary to achieve the goals and objectives of the park. These services have beneficially added to visitors' use and enjoyment of the park. The Park Service has determined that all the existing commercial services are necessary and appropriate. This determination was based on the fact that similar facilities and services are not conveniently located outside the park, and the services are necessary to achieve the goals and objectives for the park. Strategies and objectives for managing commercial services will be as follows:

- ◆ All commercial operations serving park visitors are managed through appropriate types of authorizations such as concession contracts and commercial use authorizations.
- ◆ All commercial activities in the park provide high-quality visitor experiences while protecting important natural, cultural, and scenic resources.
- ◆ Levels of commercial use are consistent with resource protection and high-quality visitor experiences.
- ◆ Only those necessary and appropriate commercial operations not conveniently located outside the park are authorized.

- ◆ The commercial services program in the park can be managed efficiently and effectively.

A commercial services plan is currently being prepared that will describe in detail the actions required to achieve NPS goals for commercial services and related visitor experiences. The commercial services plan will further refine the levels and types of commercial services to be provided in the park.

IMPLEMENTING THE APPROVED PLAN

The implementation of the approved plan will depend on future funding. The approval of a plan does not guarantee that the funding needed to implement the plan will be forthcoming. Full implementation of the approved plan could be many years in the future.

The implementation of the approved plan also could be affected by other factors. Once the *General Management Plan* has been approved, additional legislation, additional feasibility studies and more detailed planning and appropriate environmental documentation may be required before any proposed actions can be carried out. These more detailed plans would tier off this plan, describing specific actions managers intended to take to achieve desired conditions and long-term goals. Some of these implementation plans are prepared for parks in response to NPS policies.

ISSUES AND OTHER PLANS

ISSUES AND CONCERNS

The American public and the National Park Service need to make many important and often difficult decisions about the future of Badlands National Park — its resources, uses, and management. How should non-renewable paleontological resources be protected? For what conditions should the Badlands wilderness be managed? What should be done to ensure that the park’s resources are protected for present and future generations? What levels and types of use are appropriate for the park? These are complex issues, with no easy answers. People who care deeply about this park often hold sharply divided opinions about how the National Park Service should resolve the issues. In addition, tight budgets combined with increased visitation have put an increased strain on the ability of the National Park Service to maintain facilities, to protect natural and cultural resources, to provide interpretive and other visitor services, and to enforce rules and regulations.

The breadth of issues and concerns facing Badlands National Park illustrates the complexity and difficulty in determining how to manage park resources and visitors in the 21st century. This plan focuses on major issues of managing resources and the use of the park by visitors.

The public and National Park Service identified a number of issues facing Badlands National Park. The issues and concerns generally involve protecting resources, appropriate types and levels of use within the park, maintaining access to the park, and the level of development of facilities in the park. Some of the major issues are as follows:

- ◆ Badlands National Park is world renowned for its paleontological resources. The loss of fossils from the park through poaching is a major concern.

Paleontological resources are nonrenewable, and the loss of fossils could inhibit the ability of the National Park Service to further understanding of the ancient environment.

- ◆ The Loop Road crosses a major landslide at Cedar Pass. The National Park Service has worked with the Federal Highway Administration to stabilize the road; however, this is not a long-term solution (also see the discussion on p. 30). This 28-mile, two-lane asphalt road, which extends from the Northeast entrance to the Pinnacles entrance, is the main artery of the park, providing access to many overlooks and trails in the North Unit. It also is a regional “farm-to-market” road. This planning effort will provide broad guidance for the future of the Loop Road. It was included as a concern primarily to facilitate the development of an overall management strategy for the park. Further planning, design, and environmental analysis will be necessary before the realignment of the road can be finalized. The future environmental document will fully analyze all of the feasible alignments for the Loop Road (including potentially other alignments that have not been analyzed) and address mitigation measures. (For additional information on the Loop Road, see p. 30)
- ◆ Most visitors spend less than 4 hours in the park. Typically, a visitor travels along the Loop Road. This drive-through visitation pattern challenges the park staff’s ability to offer visitors a good understanding of the park and its unique resources.
- ◆ The park’s facilities are aging and do not meet the demands of park visitors, nor do they meet the needs of the staff to manage the park. The old planning documents do not provide clear guidance about the current facility needs of the park.

- ◆ During the planning process concerns have been expressed by the Oglala Sioux Tribe about the management and uses of the South Unit. Because of the nature and sensitivity of these concerns, and due to the ongoing negotiations between the parties, these issues will be addressed in a future plan for the South Unit.
- ◆ Also during the planning process, the need arose for a comprehensive look at the Prairie Homestead property for potential addition to the park. A separate study of the area will be conducted to further evaluate the property. Upon approval of the GMP, we will be seeking additional funding to prepare this study. (See also the description of alternative B.)

RELATIONSHIP TO OTHER PLANNING EFFORTS

Several plans have influenced or would be influenced by this *General Management Plan* for Badlands National Park.

Minuteman Missile National Historic Site General Management Plan

Minuteman Missile National Historic Site is a new unit of the national park system that is near Badlands National Park. A general management plan is currently being prepared for this national historic site.

The plan for the Minuteman Missile National Historic Site will provide overall direction for this unit, and it will result in the selection of a location for the visitor center for the site.

This unit of the national park system may result in an increase in visitation to the region. It is anticipated that visitors drawn to the region to visit Minutemen Missile National Historic Site might result in a slight increase in visitation to Badlands National Park.

Sage Creek Development Concept Plan / Environmental Assessment

Prior to starting the GMP, Badlands National Park was preparing a development concept plan for the Sage Creek campground in the North Unit of the park. This plan looks at infrastructure improvements such as pack stock facilities. The design for this site has been completed. The redevelopment of Sage Creek Campground is consistent with the alternatives developed in this general management plan.

Ben Reifel Visitor Center Rehabilitation and Expansion Environmental Assessment

The Ben Reifel Visitor Center is located in the Cedar Pass complex, which is about 8 miles from the Northeast entrance station. Year-round visitor services and facilities are available. The visitor center underwent an extensive renovation and expansion in 2005, reopening to the public in February, 2006, with the addition of a theater, public classroom, and research library, as well as the installation of new exhibits. The redevelopment of the visitor center is consistent with all the alternatives developed in this plan.

Lakota Heritage and Education Center Development Concept Plan / Environmental Assessment

Prior to starting the GMP, the National Park Service and the Oglala Sioux Tribe began partnering in an effort to create a Lakota Heritage and Education Center in the South Unit of the park. The origins of the Lakota Heritage and Education Center is derived from congressional authorization (16 U.S.C. §441o). This project is further discussed in the agreement between the tribe and the National Park Service, will involve a mixture of federal and tribal development. The federal funds involved in the project will help to create the center, which will offer educational opportunities for tribal members and will interpret the Lakota people and their culture for the public. Additional tribal involvement may

include tourism infrastructure such as a hotel and a campground, which could result in economic development for the tribe.

The site selected by the Oglala Sioux Tribe, with concurrence from the National Park Service, is partly within the South Unit and partly on lands outside the park boundary. The current plan for development of this site calls for the center to be constructed on lands within the park boundary and the economic development portions of the project to be developed outside the park boundary. A separate development concept plan and environmental analysis document is being prepared for this project.

Development of the Lakota Heritage and Education Center will create an additional attraction and increase visitation within the region. This anticipated increase is expected to result in an increase in visitation to the park.

Nebraska National Forest Land and Resource Management Plan (USFS 2001b)

The U.S. Forest Service prepared the *Nebraska National Forest Land and Resource Management Plan* to provide overall management direction for the national forest, including the Buffalo Gap National Grassland. The plan establishes several land management prescriptions and calls for action that could affect the park. The National Park Service reviewed this plan and submitted comments to the Forest Service. For the most part, the Forest Service plan is compatible with the zoning proposed in the alternatives of this general management plan. However, alternative D proposes the realignment of the Loop Road to the east on lands administered by Forest Service, which they have identified as a backcountry nonmotorized recreation area. Consultation with the Forest Service indicated this is a feasible alternative but would require an amendment to the Forest Service Plan.

The U.S. Forest Service also proposed the Indian Creek area, which abuts the west side

of the park by Sheep Mountain, for wilderness designation.

Rails to Trails

The state of South Dakota is exploring the conversion of the Chicago Northwestern Railroad to a bicycle path. The abandoned rail line generally parallels Highway 44 and passes through the park for approximately 2 miles. The railroad corridor is within the boundary, but the lands are not administered by the National Park Service. Currently, this project is not being funded by the National Park Service. However, the park has been supportive of the effort.

This trail would provide another visitor opportunity in the region and could increase visitation in the region. The general management plan has taken this proposal into consideration as part of the alternative development and looked at providing visitor opportunities near this route.

Scenic Byways

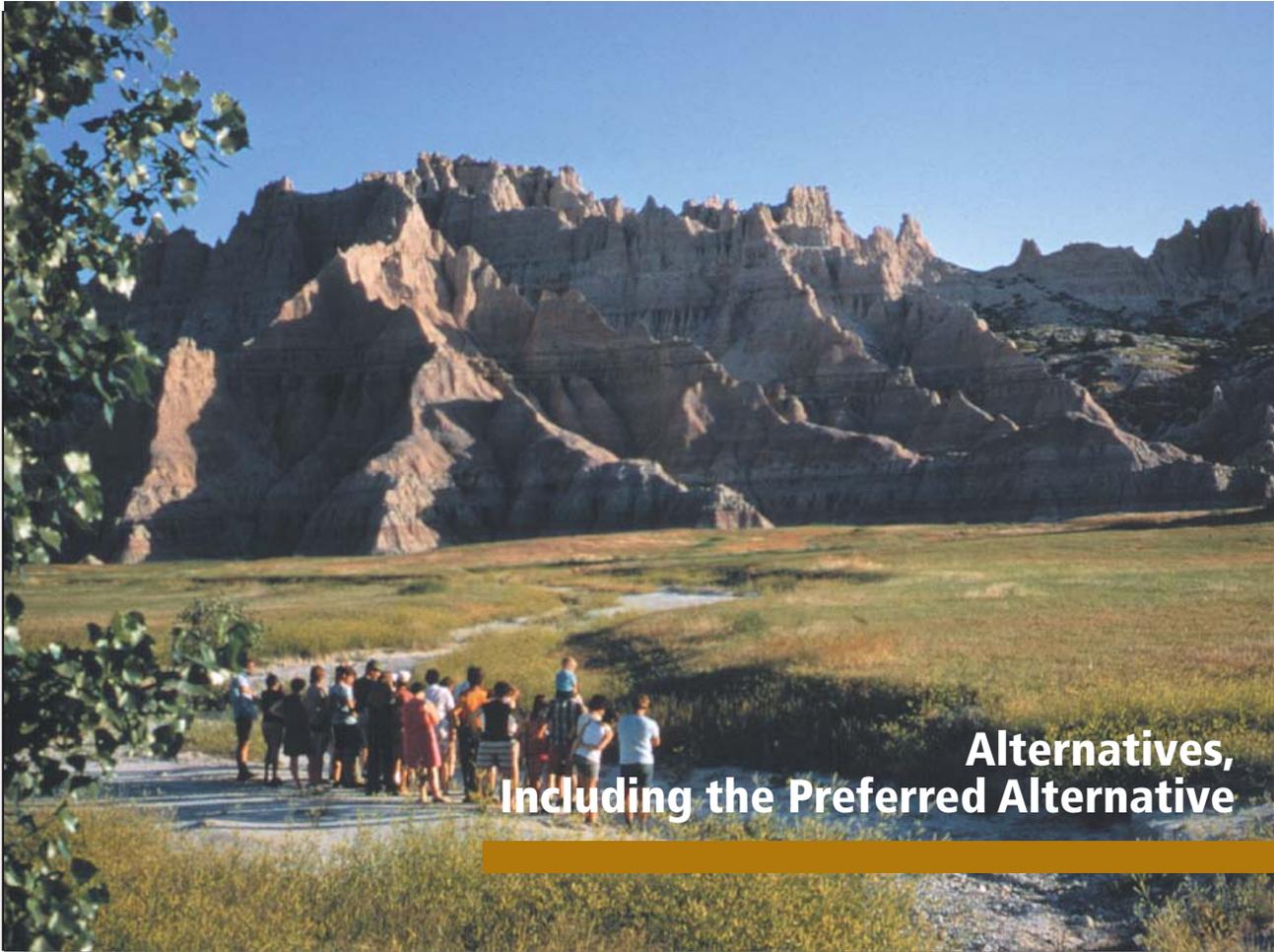
The Wall-Badlands Area Chamber of Commerce prepared a proposal for the creation of Badlands Loop Scenic Byway. The National Park Service supported the designation of that scenic byway, which the state of South Dakota reviewed and approved. The scenic byway starts at Cactus Flats and travels south and west along the Loop Road through the park to the Pinnacles entrance at the park's west end.

The Oglala Sioux Parks and Recreation Authority has prepared and submitted a proposal for the creation of the Crazy Horse Scenic Byway. The state has not approved that proposal. The state's main concern is that part of the proposed route is a gravel-surfaced road. However, the Bureau of Indian Affairs is planning to pave that section of road.

The tribe's proposed 133-mile route would enter the park at exit 131 of I-90 (at Cactus Flats), go south through the town of Interior, then go west on South Dakota Highway 44 to

the town of Scenic. From there it would go south on Bureau of Indian Affairs (BIA) Highway 27, intersecting BIA 2 near the White River Visitor Center. It then would continue west, intersecting BIA 41, and then go north to the town of Red Shirt, on west to Hermosa,

and on into the Black Hills. It also would go to the entrance of Custer State Park. Effectively, the scenic byway would circle the Stronghold area (Oglala Sioux Parks and Recreation Authority 2000).



**Alternatives,
Including the Preferred Alternative**

INTRODUCTION

This *Final General Management Plan / Environmental Impact Statement* presents four alternatives for the future management of the North Unit of Badlands National Park. The four alternatives are alternative A, continue current management (the no-action alternative), alternative B, expand the visitor experience (the preferred alternative); alternative C, emphasize resource protection and visitor education, and alternative D, emphasize resource protection and research.

The alternatives, which are based on the park's mission, purpose, and significance, present different ways to manage the resources and visitor use and to improve the park's facilities and infrastructure. The no-action alternative is included as a baseline for comparing the environmental consequences that could result from implementing each alternative. Regardless of what alternative is selected and approved for implementation, the park still would be managed according to the servicewide mandates and policies and special mandates.

Again, as discussed in detail in the "Purpose and Need" section, the alternatives presented focus only on the North Unit of the park. Due to the ongoing negotiations with the Oglala Sioux Tribe and BIA, planning for the South Unit has been delayed.

This chapter contains a description of the process used by the National Park Service, as well as tables that summarize the key differences between the alternatives and the impacts that could be expected from implementing each alternative. The "Comparison of Environmental Consequences" table (table 8, p. 67) is based on the analyses in the "Environmental Consequences" chapter.

HOW THE ALTERNATIVES WERE DEVELOPED

Many aspects of the desired future conditions for Badlands National Park are defined in the establishing legislation, the park's mission goals, the purpose and significance statements, and the servicewide mandates and policies that were described earlier. Within these parameters, the National Park Service solicited input from the public, the park staff, government agencies, tribal officials, and other organizations regarding issues and desired conditions for the park.

Planning team members gathered information about the park's resources, visitor activities, and the condition of the park's facilities. They considered which areas of the park attract visitors and which areas have sensitive resources. Using that information, the planning team developed six prescriptions for guiding the management of Badlands National Park and its resources. The management prescriptions are applied in varying combinations and locations in the alternatives. These prescriptions, described below, form the basis of the plan's alternatives.

The National Park Service developed three "action" alternatives and the no-action alternative to reflect the range of ideas proposed by the park staff and the public. Each alternative consists of the following elements:

- ◆ an overall management concept and general management strategies
- ◆ a description of how different areas of the park would be managed
- ◆ a description of a road corridor to replace the Loop Road over Cedar Pass, if the current road should fail
- ◆ proposed boundary adjustments

The National Park Service would continue to follow existing agreements and servicewide

mandates, laws, and policies. Those mandates and policies are not repeated in this chapter. However, other actions proposed in the alternatives do differ; they are discussed in this chapter.

The alternatives focus on what the resource conditions at Badlands National Park should be and what visitor experiences and opportunities should be available, rather than on the details of how these conditions and experiences should be achieved. Thus, the alternatives do not include details of the techniques of managing resources or visitors' use of the park. More detailed plans or studies would be necessary before the developments proposed in the alternatives could be built.

The four alternatives presented here embody the range of what the public and the National Park Service want to see accomplished with regard to the visitor experience, natural resource conditions, and cultural resource conditions at Badlands National Park. The alternatives were created by management prescriptions being placed to meet the various management goals. In some cases, all action alternatives apply the same management prescription to the same area.

None of the alternatives would limit tribal access to or traditional uses of park lands in accordance with agreements or NPS policies.

THE LOOP ROAD

As was described on page 22, the Loop Road serves as the primary travel route to and through Badlands National Park. The current road alignment over Cedar Pass crosses a landslide. In the recent past, the National Park Service and the Federal Highway Administration (FHWA) have taken actions to slow the movement of the landslide so that the life of the road might be extended, but this is not a long-term solution. The Federal Highway Administration has advised the National Park Service that the road will fail, most likely during the life of this plan. Furthermore, there is no long-term solution for maintaining the

road in the current corridor. On the basis of this information, the National Park Service continues to work with the Federal Highway Administration to find a long-term solution.

In 2002 the Federal Highway Administration presented the results of a study to identify potential corridors for realigning the Loop Road. The study presents three corridors that are viable locations for constructing a road. To facilitate overall planning for the park, these corridors have been included in the action alternatives of this plan. They are broad corridors more than 1,000 feet wide, and final alignments will be evaluated in the future in a subsequent NEPA document. The corridors are included in this plan primarily to facilitate the zoning of the park, because the location of the proposed road corridor is a key factor in determining the most appropriate management strategy for the park.

The National Park Service believes that moving forward with the *General Management Plan* would be difficult without this information. The approved plan will result in the selection of a corridor that is consistent with the overall management scheme selected for the park.

MANAGEMENT PRESCRIPTIONS

A management prescription defines specific resource conditions and visitor experiences to be achieved and maintained in each specific area of the park under each "action" alternative. Each prescription includes a description of the types of activities and facilities that are appropriate in that management prescription. Although prescriptions describe the type of development that is allowed, they do not dictate the developments that will occur. Management prescriptions were developed as part of this planning effort and were presented to the public in newsletters and public meetings, then modified in response to public comments. Because they were a part of this planning effort to create alternatives for managing the park, they have not been included in the no-action alternative.

In formulating the alternatives, the management prescriptions were placed in different locations or configurations on the map according to the overall concept of each alternative. That is each management alternative represents a different way to apply the six management prescriptions to the park. For example, an alternative whose overall concept includes having as much research as possible will have more of the research management prescription than an alternative whose overall concept is to increase access to the entire park.

The six management prescriptions for Badlands National Park are presented in table 1. In the table, resource conditions, visitor experience, appropriate activities, management, and facilities are described for each prescription.

The management prescriptions address carrying capacity qualitatively. The resource conditions and visitor experience described in the prescriptions are currently being met in the park. If monitoring by park staff determines that resource conditions are deteriorating, or visitor feedback indicates their experiences are becoming unacceptable, a more scientific process will be implemented. The process will be used to collect additional data on visitor experiences and resource conditions, establish detailed indicators and standards for each zone, and set up a formal monitoring program to determine whether conditions are acceptable or unacceptable. This process will allow management to take action to ensure that resources and visitor experiences do not deteriorate to an unacceptable level.

The six management prescriptions have been applied to the entire North Unit. Within the 64,000 acres of designated wilderness, three of these prescriptions have been applied — Preservation, Natural Area Recreation, and Research Emphasis. All three of these management prescriptions are compatible with the legal requirements associated with wilderness. Furthermore, as discussed in the

“Guiding Management Principles and Strategies” section of this document, management decisions will be made in accordance with the minimum requirement concept outlined in the Wilderness Act and NPS policies.

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The development of a preferred alternative involves evaluating the alternatives with the use of an objective analysis process called “choosing by advantages” or CBA. Through this process, the planning team identifies and compares the relative advantages of each alternative according to a set of factors. The benefits or advantages of each alternative are compared for each of the following CBA factors:

1. protecting resources and natural processes
2. providing orientation and education for visitors
3. providing visitor access and recreational opportunities
4. protecting the health, safety, and welfare of the public and park employees
5. improving park operational efficiency and sustainability
6. ensuring compatibility of the park’s actions with its neighbors and the surrounding ecosystem and the Oglala Sioux Tribe
7. improving the knowledge of park resources through research

The relationships between the advantages and costs of each alternative are established. This information is used to combine the best attributes of the initial alternatives into the preferred alternative. This alternative gives the National Park Service the greatest overall

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

benefits for each point listed above for the most reasonable cost.

This process indicated that alternative B provides the greatest advantages and therefore was selected as the preferred alternative for this document. The difference between alternatives B and C were relatively

slight. However, factors 2 and 3 were the main points of difference between the two alternatives. The zoning in alternative B would result in greater access for the visitors to explore and learn about the resources of the Badlands. In addition the creation of additional visitor facilities would provide better orientation and education of the visitor.

TABLE 1: MANAGEMENT PRESCRIPTIONS FOR BADLANDS NATIONAL PARK

Management Prescription (zone)	Resource Condition	Visitor Experience	Kind and Level of Visitors' Use of Park	Kind and Level of Management Activities	Kind and Level of Development
Research Emphasis	Maximum preservation of irreplaceable or unique resources of high scientific, cultural, or ecological value; such resources often are exposed and vulnerable to loss or damage, so they will be preserved in the most appropriate way — in situ or by extraction; very low tolerance for resource degradation related to visitor use or facility development.	Access restricted, but visitors could benefit from learning that particularly sensitive resources are preserved for future generations.	Access restricted and limited by permit or agreement for research purposes, American Indian traditional uses, or other well-justified special uses.	Management actions focus on resource values and research benefits.	Development temporary; done to support safety of researchers and scientific research or preservation of the resource.
Preservation	Emphasis on preserving or restoring a full complement of native species and natural processes where feasible; archeological and historic resources possibly allowed to molder; paleontological resources actively maintained, monitored, and protected; natural sound, pristine night skies, good visibility, and unobstructed views prevail; very low tolerance for resource modifications and degradation related to visitor use.	Visitors' experience nonmotorized and self-directed; no designated trails; high level of solitude, self-reliance; minimal interaction with park staff or other visitors; many opportunities for independence, closeness to nature, challenge, and adventure.	Access by hiking or pack stock; camping possibly allowed; possible limits on visitation and length of stay to protect resources and maintain desired visitor experiences. Appropriate commercial services could be permitted.	"Minimum tool" principle used in research and management activities; evidence of management activities minimal and subtle.	Trails and other facilities not developed or maintained.
Developed	Possible modification of natural environment for visitor access, park operations, and administrative needs in a way compatible with natural environment; developed zones not placed in areas with sensitive natural or cultural resources if adequate protection of such resources not possible.	Visitor services and orientation focused on an overview of park's purpose and significance; visitors have access to concessions, developed campgrounds, restrooms, lodging, food service, and sales; high level of interaction with other visitors, groups, and park staff; visitors could encounter many human sounds and activities; visitor education self-directed or ranger-led; visitor use in this zone generally highly structured.	Sightseeing walks, educational programs, viewing resources, organized activities would be common; camping would be in designated areas. Appropriate commercial services could be permitted.	Management activities focused on visitor orientation, education, and safety; infrastructure maintained.	Orientation and interpretation facilities like visitor center, kiosks, wayside exhibits, and interpretive media appropriate; restrooms and picnic facilities present; access to public areas easy; public access to housing, maintenance, and administration might be restricted.

Management Prescription (zone)	Resource Condition	Visitor Experience	Kind and Level of Visitors' Use of Park	Kind and Level of Management Activities	Kind and Level of Development
Driving/Sightseeing	Area intensively managed to protect resources and ensure public safety (fences, intensive law enforcement, restrictions on visitor activities); paving, boardwalks, erosion control, stormwater management possibly used to modify resources for essential visitor and park operational needs; any modifications minimized as much as possible with appropriate mitigation strategies and restoration of natural resources.	Roadways and associated developments used for touring park, enjoying scenic overlooks and interpretive media, gaining access into other park areas; visitor attractions convenient and easily accessed; visitor experience generally linear/sequential, by vehicle or bicycle driving on maintained dirt, gravel, or paved roads; observing natural environment important, giving a sense of adventure, but little need for outdoor skills; high probability of encountering other visitors; moderate probability of encountering NPS staff.	Access mostly by vehicles touring along improved roads, typically paved; no camping allowed. Possible limits on visitation and length of stay to protect resources and maintain desired visitor experiences. Appropriate commercial services could be permitted.	Zone intensively managed and impacts mitigated.	Roads, pullouts, picnic areas, parking areas, overlooks and associated short trails, and other facilities to support visitor use; most facilities and some trails accessible.
Semiprimitive	Emphasis on preserving and restoring, as appropriate, a full complement of native species, natural processes, and paleontological resources; emphasis on preserving cultural resources, archeological and historic resources possibly allowed to molder; pristine night skies, good visibility, and unobstructed views prevalent here; moderate tolerance for resource modifications and degradation related to visitor use or facility development.	Visitors can see and hike through remote and spectacular natural scenery; interpretation minimal; visitors can experience a sense of adventure and solitude requiring one or more days; travel at own risk; a high level of self-reliance or backcountry skills needed; low probability of encountering other visitors and NPS staff.	Access by foot or pack stock; hiking and stock use self-directed and dispersed all over zone; camping would be allowed. Possible limits on visitation and length of stay to protect resources and maintain desired visitor experiences. Appropriate commercial services could be permitted.	Management focus on resource protection and public safety.	Development limited to trails picnic sites, wildlife handling facilities, and research sites.

Management Prescription (zone)	Resource Condition	Visitor Experience	Kind and Level of Visitors' Use of Park	Kind and Level of Management Activities	Kind and Level of Development
Natural Area / Recreation	<p>Emphasis on preserving native species and natural processes while offering a moderately structured visitor experience; all management actions in the wilderness area, such as manipulation of vegetation, would be subject to the minimum requirement concept —</p> <ul style="list-style-type: none"> • low tolerance for resource impacts related to visitor use or facility development; • trails designed, sited, and maintained to accommodate visitor safety and minimize effects on resources; • paleontological resources actively maintained, monitored, and protected; • emphasis on preserving cultural resources; archeological and historic resources possibly allowed to molder. 	<p>Emphasis on experiencing a moderate (half day to whole day) encounter with natural setting, intimate and away from vehicles; opportunities for visitors to interact personally with natural surroundings on unpaved designated trails, where developed; moderate probability of encountering other visitors; limited onsite interpretation and interaction with park staff.</p>	<p>Access by hiking or pack stock use; pack stock not allowed on designated hiking trails; camping allowed. Possible limits on visitation and length of stay to protect resources and maintain desired visitor experiences.</p> <p>Appropriate commercial services (i.e., guiding) could be permitted.</p>	<p>Management actions focused on preventing resource impacts and providing for visitor safety.</p>	<p>Development limited to unpaved trails</p>

ALTERNATIVE A: CONTINUE CURRENT MANAGEMENT (NO-ACTION ALTERNATIVE)

CONCEPT AND GENERAL MANAGEMENT STRATEGIES

Under alternative A, the National Park Service would continue to manage Badlands National Park as at present. As required by the National Environmental Policy Act, this alternative provides a baseline for evaluating the changes and impacts of the other alternatives (see the Alternative A map).

Existing operations and visitor facilities would remain in place, concentrated at Cedar Pass, and Pinnacles. Previously planned construction would move forward. The park would continue to offer a diversity of visitor facilities: campgrounds, primitive trails, boardwalks; unpaved to paved roads, self-directed interpretation, and ranger-led programs.

The management of the park would continue to be aimed at perpetuating and protecting the natural environment and preserving cultural resources. Natural ecological processes still would be allowed to occur, and restoration programs would continue to be initiated where necessary.

PROPOSED BOUNDARY ADJUSTMENTS

The no-action alternative would not include any boundary adjustments.

MANAGEMENT OF SPECIFIC AREAS

Most of the park's visitation would continue to be concentrated along the Loop Road. The concession operations would remain at Cedar Pass, where lodging, food service, and a gift

store are available. Campgrounds would remain at Cedar Pass and Sage Creek. The ongoing planning for the redevelopment of Sage Creek campground would move forward.

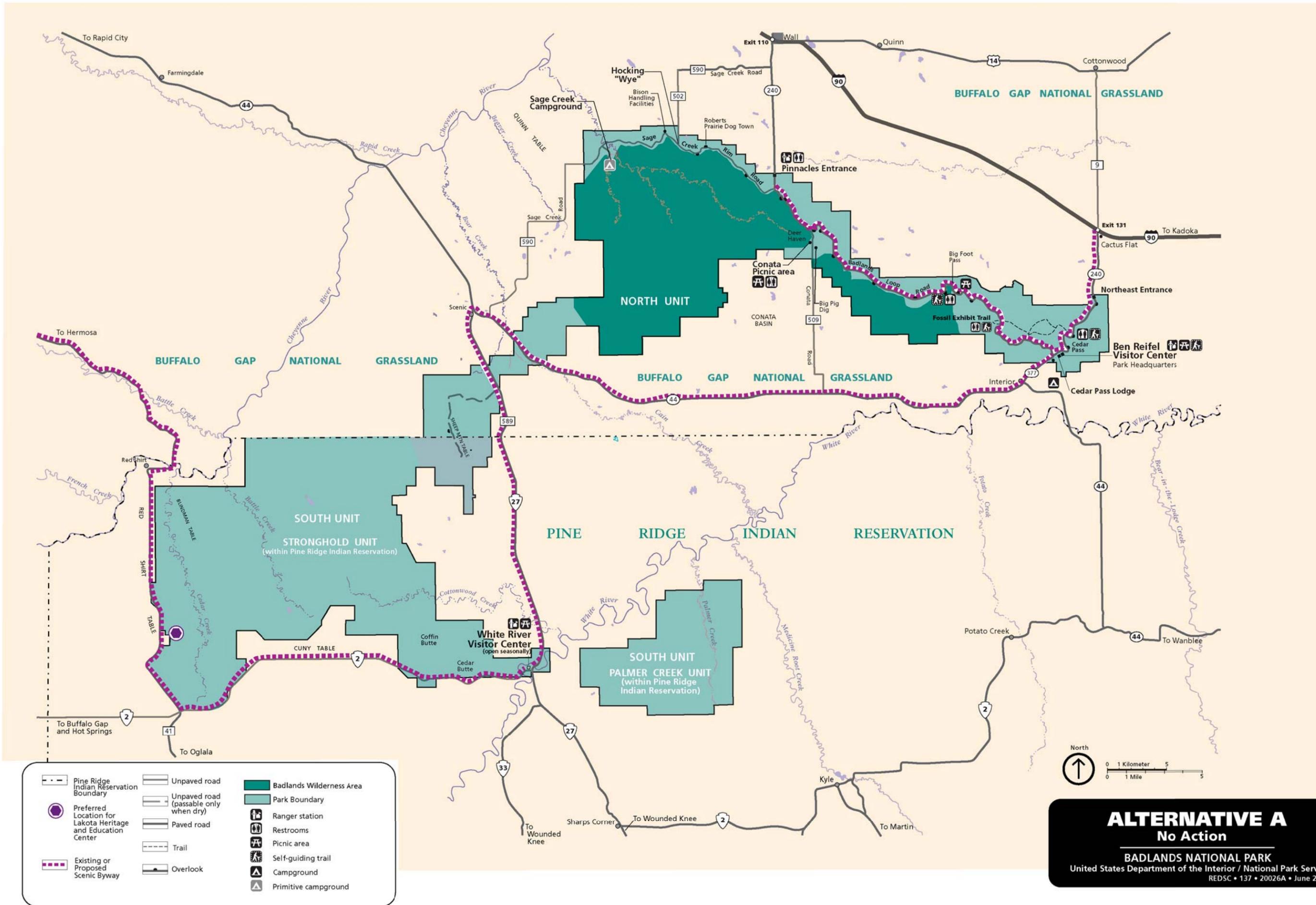
The Ben Reifel Visitor Center at Cedar Pass would continue to offer orientation and information. The existing parking areas and trails along the Loop Road would be retained. Park headquarters would remain at the current location at Cedar Pass, as would other park operations.

Planning and design of a storage facility for the museum objects is underway. The construction of this building would proceed under all alternatives. This structure, which will provide a secure and stable environment for long-term curation of museum materials, will be consistent with current NPS standards as identified in 36 CFR 79, "Curation of Archaeological Collections."

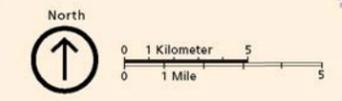
The development area at Cedar Pass would not be expanded by this construction. The Pinnacles administrative area would continue to be used for a ranger station, a maintenance area, and office space for several park employees.

The Loop Road

The National Park Service would continue to maintain the Loop Road in its existing alignment. When travel on the road became unsafe, the road would be closed, and visitors would be directed to alternative routes.



Pine Ridge Indian Reservation Boundary	Unpaved road	Badlands Wilderness Area
Preferred Location for Lakota Heritage and Education Center	Unpaved road (passable only when dry)	Park Boundary
Existing or Proposed Scenic Byway	Paved road	Ranger station
	Trail	Restrooms
	Overlook	Picnic area
		Self-guiding trail
		Campground
		Primitive campground



ALTERNATIVE A
No Action
 BADLANDS NATIONAL PARK
 United States Department of the Interior / National Park Service
 REDSC • 137 • 20026A • June 2006

ALTERNATIVE B: EXPAND VISITOR OPPORTUNITIES (PREFERRED ALTERNATIVE)

CONCEPT AND GENERAL MANAGEMENT STRATEGIES

Under alternative B, opportunities for visitors to use the park would be expanded. A visitor survey (Simons and Gramann 2001) revealed that most park visitors (more than 70%) spend 4 hours or less in the park. The survey also indicated that most visitors are driving through the park on the Loop Road to see the scenery, entering the Ben Reifel Visitor Center and stopping at waysides and overlooks.

In this alternative the National Park Service would improve the visitor experience by increasing visitor opportunities within the park. The number of locations where visitors could obtain park information and orientation would be increased, with two new visitor contact stations added; one in the park near the Pinnacles entrance, and one along SD 44 in the vicinity of Scenic (see the Alternative B map). This alternative would result in an increase in information available to the public for “pre-visit” planning to allow visitors to plan for additional time on their trip to take advantage of these new opportunities.

Various aspects of the park would be emphasized for each area, resulting in a thematic visitor experience that might encourage visitors to explore. Themes such as prairie ecology, paleontology, geology, and wildlife would be covered.

MANAGEMENT PRESCRIPTIONS AND RELATED ACTIONS

Alternative B would result in placing about 53% of the park in the preservation zone and 27% in the natural area / recreation zone. These management prescriptions would allow for a range of visitor experiences and

activities. The approximate acreages and percentages of the park in that would be in each zone under alternative B are shown in table 2.

TABLE 2: MANAGEMENT PRESCRIPTIONS IN ALTERNATIVE B

Zone	Acreage	%of Park
Semiprimitive	5,520	5
Preservation	64,479	53
Natural Area / Recreation	32,127	27
Driving/Sightseeing	16,981	14
Development	1,311	0.9
Research	238	0.1

The management of the park and the actions that would be taken by the National Park Service in the next 20 years under alternative B are described in the following paragraphs. The development zone would be placed in previously disturbed areas where feasible. Whenever possible, the National Park Service would avoid or mitigate any disturbance of sensitive areas such as habitat for threatened and endangered species, paleontological sites, or archeological sites.

PROPOSED BOUNDARY ADJUSTMENTS

An NPS general management plan is required by 16 U.S.C. §1a-7(b)(4) to identify any potential changes to the park boundaries and to give reasons for the changes.

Boundary adjustments may be recommended to protect significant resources and values or to enhance opportunities for public enjoyment related to park purposes, address operational and management issues, or otherwise protect park resources that are critical to fulfilling park purposes. In addition, all recommendations for boundary

changes must be feasible to administer, and a determination must be made that other alternatives (outside of the National Park Service) for managing the lands and protecting the resources are not adequate.

For alternative B, two areas have been identified for purchase from a willing seller, donation, or transfer. Such boundary changes would be intended to protect natural resources, protect wilderness values, and support visitors' use of the park. If this alternative was selected, the National Park Service would recommend to Congress that the boundary of the park be expanded.

A total of 5,400 acres along South Dakota Highway 44 would be recommended for addition to the park under alternative B. These lands are a mix of private and federal lands, and have been assessed and found to meet the criteria for addition to Badlands National Park. The private landowners (3,400 acres) have expressed interest in a potential federal acquisition. The federal land (2,000 acres) is managed by the U.S. Forest Service, which has agreed that a land transfer would be appropriate if the National Park Service acquired the private lands. The added land, if acquired, would be managed in the natural area / recreation zone. In this area, the ranch buildings on the property would be adaptively reused for park administration and management.

The other boundary adjustment would be about 4,500 acres of privately owned land along the west side of the North Unit adjacent to the designated wilderness. The owners of this property have indicated their willingness to work with the NPS on this proposal. The lands are adjacent to prairie dog habitat, where the endangered black-footed ferret has been reintroduced and if acquired, would provide more habitat for prairie dogs and ferrets. An area would be provided for expansion of the park's bison range with year-round water sources for bison. Acquiring this land would also allow

access for management activities in the wilderness area.

Additional information about the lands recommended for inclusion into the park is in appendix E, which includes information about specific criteria for boundary adjustments in NPS *Management Policies* (2001).

The National Park Service also would prepare a study to further evaluate if about 240 acres along SD 240 south of Cactus Flats, including the Prairie Homestead, should be added to the park. Upon approval of the general management plan, additional funding would be sought to prepare this study.

MANAGEMENT OF SPECIFIC AREAS

Semiprimitive Zone

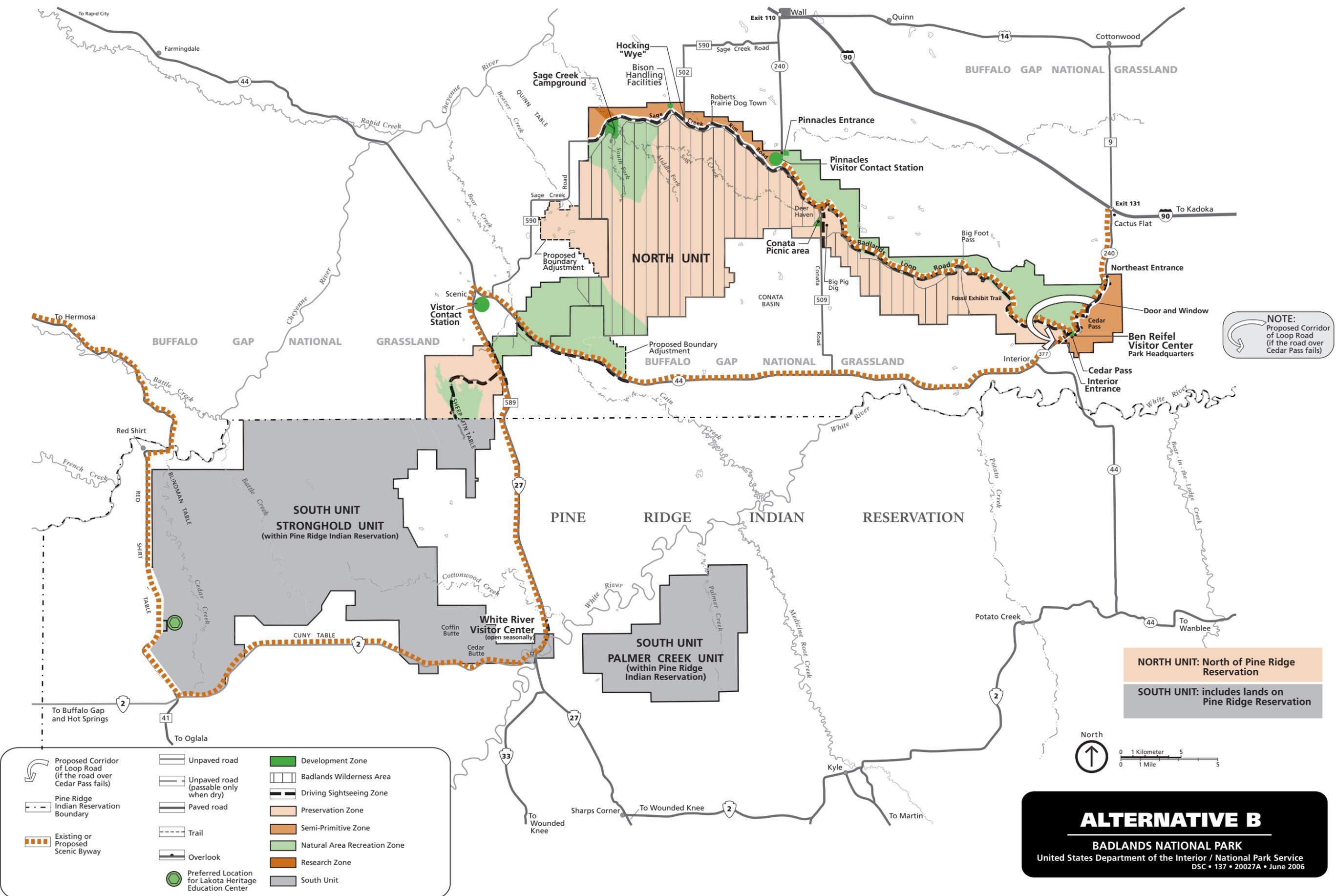
The area east of the Loop Road to the park boundary would be zoned as semiprimitive. This would give visitors an opportunity to observe the area's geology and allow them to discover the area on their own.

This zone would include the area west of Pinnacles and north of Sage Creek Rim Road. Hiking or use of pack stock would be allowed in this area. The area west of Pinnacles is primarily prairie, part of it inhabited by bison. The bison management corrals would remain where they are.

Preservation Zone

The preservation zone would encompass most of the park's designated wilderness. Natural conditions and special resources associated with the wilderness area would be maintained, and there would be no major change from the current management of these areas.

Also in the preservation zone would be the area south of the Loop Road, west of Cedar Pass, and east of Connate Road, which is



primarily prairie. It also would include the area around the north end of Sheep Mountain Table. There would be no change in the current management of these areas, which visitors would be allowed to use for self-directed exploration.

Natural Area / Recreation Zone

The natural area / recreation zone would include the north side of the Loop Road from the Northeast entrance to the Pinnacles entrance and parts of the wilderness area. More designated trails would be added north of the Loop Road to offer visitors a variety of hiking opportunities. The trails would be designed for a half-day to a full day of hiking.

This zoning would allow for the designation of routes in the wilderness area, in particular from the Conata picnic area and the Sage Creek campground. Trails in these areas would include loops and “pass-through” trails that would go into the part of the wilderness area in the preservation zone. The designation of trails in these areas would concentrate users for these main wilderness access points and would help prevent or eliminate the creation of “social” (informal, user-created) trails to popular destinations.

The area north of SD 44 to the wilderness boundary and the area south of SD 44 to Bureau of Indian Affairs (BIA) Highway 27 also would be in the natural area / recreation zone. Trails could be designated, and the park could coordinate with the “Rails to Trails” effort to convert the existing railroad grade along SD 44 to a bicycling trail. If this effort was successful and the bicycle trail was completed, short designated hiking routes could be established from the railroad grade into the park.

Sheep Mountain Table also would be zoned natural area / recreation. Vehicle access onto the mountain would be available as described under “Driving/Sightseeing Zone”

below. Hiking trails would be designated to offer an opportunity for a more focused visitor experience.

Driving / Sightseeing Zone

In the driving/sightseeing zone would be the Loop Road and existing parking areas, along with Big Badlands, Door and Window, Cliff Shelf, Prairie Winds and Big Foot. In these locations, various interpretive themes could be introduced to visitors and short interpretive trails would be improved. Boardwalks could be built to focus visitors’ attention and eliminate impacts on resources from “social” trails.

The use of the Big Foot picnic area would be expanded and an “outdoor classroom” would be added to increase the available interpretation. The “outdoor classroom” would be an open-air pavilion similar to the ones already existing in the park. In addition, the waysides at the site would be improved and expanded. An outdoor classroom also would be added at the Prairie Winds overlook to expand the interpretation available there. More signs would be added to the existing boardwalk trail.

The Sage Creek Rim Road would be in the driving/sightseeing zone. Its maintenance as an all weather road leading to the northwest part of the park would continue. Along this road, the bison herd can be observed and travelers would have opportunities to view the wilderness area.

The length of SD 44 that crosses through the park would be included in this zone. The park would work with the South Dakota Department of Transportation to develop small waysides along the road giving information about the park. The waysides would provide safe places for visitors to leave the highway and observe the park, seeing badland features, prairie dog towns, and possibly bison.

The access road to Sheep Mountain Table also would be in the driving/sightseeing zone. The road would be improved and maintained for about 4 miles to a point known as the “bottleneck” near the center of the table. A small parking area would be developed at the new end of the road.

Development Zone

The Cedar Pass area would be included in the development zone. It still would be the principal area for visitor contact and park administration. The park headquarters, the Ben Reifel Visitor Center, and the campground would remain as they are now. In addition, the concession-operated Cedar Pass Lodge, consisting of the store, a restaurant, and cabins, would remain.

The Conata picnic area would be included in this zone. A pavilion would be added for use as an outdoor classroom, which would provide a more formal setting for interpretation. The trailhead would be formalized, and a designated route to the Deer Haven area would start from this location. The existing footprint of development would not be increased.

The Pinnacles area also would be in the development zone. The existing facilities would remain, and more housing for park staff (up to four housing units) could be added. The need for additional staff housing was identified in the *Badlands National Park Housing Management Plan* (NPS 2003)

A visitor contact station would be constructed near the intersection of Sage Creek Rim Road and the Loop Road. At this location, orientation to the park would be offered for visitors. At present, visitors enter at the western end of the park travel through most of the park before they have an opportunity to get visitor information. The contact station also would serve as an orientation center for the Badlands wilderness area.

In the bison handling facility area, west of County Road 502, an education pavilion, comfort station, and a group campground would be developed under alternative B. The education pavilion would be used for programs and lectures for groups. Trailer pads would be added in this area to accommodate volunteers and cooperators working in the park.

The Sage Creek campground would be in the development zone. This area offers a place for a more primitive camping experience than the Cedar Pass campground. It would continue to be a popular point of access to the wilderness area.

Research Zone

In this alternative a 238-acre area along Sage Creek would be included in this zone to protect sensitive resources.

The Loop Road

Recent work to stabilize the Loop Road at Cedar Pass is not a long-term solution to preserving the road. If monitoring indicates that the Loop Road was becoming unsafe, another road would be developed. The Federal Highway Administration has studied three alignments (FHWA 2002) and determined the routes are feasible. However, this study is preliminary, and more studies and subsequent NEPA documentation would be necessary. The public would have additional opportunities to review the road alignments and provide input on the project.

For purposes of analysis this alternative assumes that the corridor would be developed along a corridor that goes west from the Northeast entrance, down the Badlands Wall, and connects near the Interior entrance. The entire alignment would be within the park boundary. However, other road alignments may be evaluated in future studies and NEPA documents.

ALTERNATIVE C: FOCUS ON RESOURCE PROTECTION AND PUBLIC EDUCATION

CONCEPT AND GENERAL MANAGEMENT STRATEGIES

The focus of alternative C would be on maximizing protection of natural and cultural resources and providing a resource-focused educational visitor experience. The National Park Service would try to encourage visitors to prevent or minimize damage to the resources. Educational efforts would be made to help visitors understand the significance of the park. Protecting natural and cultural resources would be emphasized at park facilities.

MANAGEMENT PRESCRIPTIONS AND RELATED ACTIONS

The majority of the park would be managed under the preservation prescription. The focus of this zone would be on preserving resources rather than on visitors' use of the park. The approximate acreages and percentages of the park that would be in each zone under alternative C are shown in table 3.

TABLE 3: MANAGEMENT PRESCRIPTIONS IN ALTERNATIVE C

Zone	Acreage	%of Park
Semiprimitive	6,558	6
Preservation	85,662	73
Natural Area / Recreation	7,213	6
Driving/Sightseeing	16,877	14
Development	1,311	1
Research	0	0

The management of the park and the actions that would be taken by the National Park Service in the next 20 years under alternative C are described in the following paragraphs. Whenever possible, the National Park Service would avoid or mitigate any disturbance of

sensitive areas such as habitat for threatened and endangered species or archeological sites.

The alternative would include a demonstration transportation system in the North Unit serving the Castle Trail complex. The shuttle system would operate along the Loop Road between the existing trailheads that provide access to the hiking trails. A detailed study was completed in 2003; it is included in this document as appendix B. The shuttle would allow hikers to travel along the trails to the various trails heads and use the shuttle to return to their original departure point. The demonstration would determine if this would be an effective system.

PROPOSED BOUNDARY ADJUSTMENTS

An NPS general management plan is required by 16 U.S.C. §1a-7(b)(4) to identify any potential changes to the park boundaries and to give reasons for the changes.

Boundary adjustments may be recommended to protect significant resources and values or to enhance opportunities for public enjoyment related to park purposes, address operational and management issues, or otherwise protect park resources that are critical to fulfilling park purposes. In addition, all recommendations for boundary changes must be feasible to administer, and a determination must be made that other alternatives (outside of the National Park Service) for managing the lands and protecting the resources are not adequate.

For alternative C, three areas have been identified for purchase from a willing seller, donation, or transfer. Such boundary changes would be intended to protect cultural resources, expand the interpretive themes being presented at the park, protect wilder-

ness values, and support visitors' use of the park. If this alternative was selected, the National Park Service would recommend to Congress that the boundary of the park be expanded.

A total of 5,400 acres along SD 44 would be recommended for addition to the park under alternative C. These lands are a mix of private lands and federal lands managed by the U.S. Forest Service. The owners of the private lands (3,400 acres) have expressed interest in seeing their lands added to the park. If the private lands were added to the park, the Forest Service land (2,000 acres) would be surrounded by NPS lands.

The Forest Service has agreed that the transfer of this parcel to the National Park Service would be in the best interest of both agencies. These lands would be managed according to the preservation management prescription. Management activities would focus on restoring natural processes. The area consists of the access road and the existing ranch buildings. The National Park Service would adaptively reuse the existing ranch facilities, if acquired, for park management administrative support. Before such use would be undertaken, the National Park Service would comply with the National Environmental Policy Act, the National Historic Preservation Act (36 CFR 800), and the servicewide programmatic agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers.

Also recommended for addition to the park is approximately 240 acres along SD 240 south of Cactus Flats. This includes the Prairie Homestead, a privately managed museum that interprets a sod house from the homesteading era of the Great Plains. The sod house is listed in the National Register of Historic Places. As with the other parcel, this owner is interested in seeing these lands added to the park. The area near the Prairie Homestead would be included in the development zone. The existing visitor facility would be removed.

Visitors would be led through the area on a self-directed interpretive trail. The rest of the added land from this transaction would be in the natural area / recreation zone.

The final boundary adjustment would be approximately 4,500 acres of privately owned land along the west side of the North Unit adjacent to the designated wilderness. The owner of this property would like to see these lands added to the park. The lands are adjacent to prairie dog habitat, where the endangered black-footed ferret has been reintroduced. This tract of land, if acquired, would provide more habitat for prairie dogs and ferrets. The property also has a year round water supply and adequate forage to expand the bison range. In addition, acquiring this land would allow access for management activities in the wilderness area.

Additional information about the lands recommended for inclusion into the park is provided in appendix E. This includes information addressing the specific criteria for boundary adjustments in NPS Management Policies (2001).

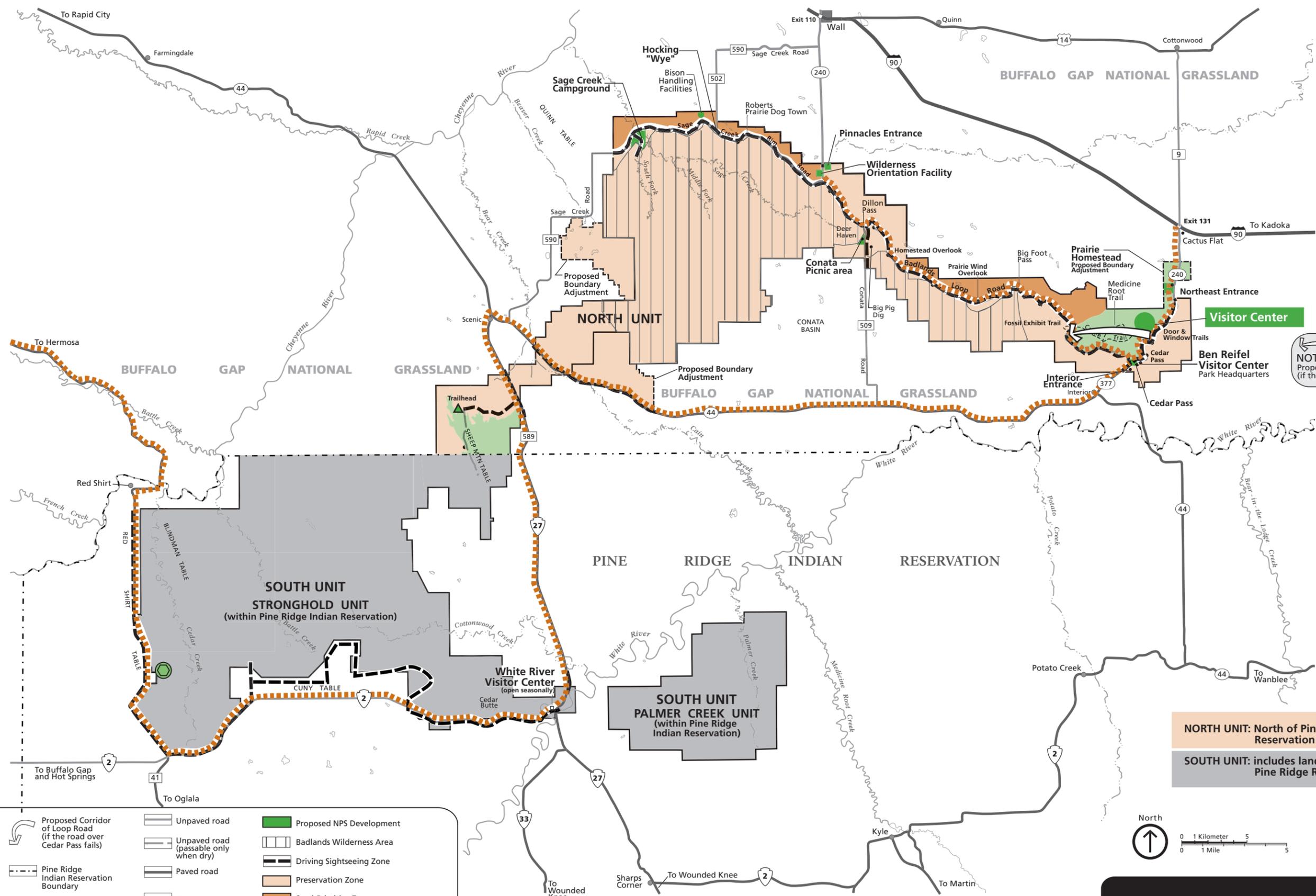
MANAGEMENT OF SPECIFIC AREAS

Semiprimitive Zone

An area north of the Loop Road and north of Sage Creek Rim Road would be included in the semiprimitive zone. Visitors could continue to explore the areas by foot and pack stock. Limited facilities could be developed in these areas. The park's bison handling facility would remain.

Preservation Zone

In this alternative all the North Unit south of the Loop Road, including all of the designated wilderness area, would be in the preservation zone, as would an additional area north of the Loop Road and east of Pinnacles. The visitor experience in this zone would be self-directed, and management would be focused

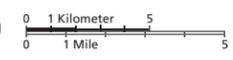


NOTE:
Proposed Corridor of Loop Road
(if the road over Cedar Pass fails)

NORTH UNIT: North of Pine Ridge Reservation
SOUTH UNIT: includes lands on Pine Ridge Reservation

Proposed Corridor of Loop Road (if the road over Cedar Pass fails)	Unpaved road	Proposed NPS Development
Pine Ridge Indian Reservation Boundary	Unpaved road (passable only when dry)	Badlands Wilderness Area
Existing or Proposed Scenic Byway	Paved road	Driving Sightseeing Zone
	Trail	Preservation Zone
	Overlook	Semi-Primitive Zone
Preferred Location for Lakota Heritage Education Center		Natural Area Recreation Zone
		Research Zone
		South Unit

Note: Visitor Center would be developed if road fails. Exact location would be dependent on final road alignment.



ALTERNATIVE C

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on protecting resources. Limits on visitation might be imposed to protect resources or to maintain desired visitor experience.

Natural Area / Recreation Zone

The natural area / recreation zone would include the Castle Trail region, which would give visitors an opportunity to explore the park on designated trails. Trails would be maintained and could be rerouted to protect resources or improve the visitor experience.

Sheep Mountain Table would be zoned natural area / recreation. The road onto Sheep Mountain Table would be closed at the base of the table, approximately 3 miles west of BIA Highway 27. Visitors would be allowed to hike or use pack stock to go to Sheep Mountain Table. Ending the road at the base of the table would eliminate the section road, which is at a steep grade and has a high rate of erosion. The section of road going onto the mountain would be rehabilitated and a trail would be established to access the mountain.

Driving / Sightseeing Zone

As in alternative B, the Loop Road and the existing parking areas would be in the driving/sightseeing zone, continuing to provide access to the park and an overview of the park's natural and cultural resources. The zone would include the existing waysides: Big Badlands, Door and Window, Cliff Shelf, Prairie Winds, and Big Foot. The waysides at those sites would be improved and focused on resource protection.

The Sage Creek Rim Road also would be in the driving/sightseeing zone, continuing to be maintained as an all-weather road. Also in the driving/sightseeing zone would be the access road to Sheep Mountain, which would be improved and maintained to the base of the mountain, approximately 3 miles west of BIA 27. Vehicles no longer would be able to go onto Sheep Mountain Table. A small parking area would be developed at the new end of the

road. From there, visitors could hike or use pack stock to get to Sheep Mountain Table.

Development Zone

The Cedar Pass area would be included in the development zone. It still would be the principal area for visitor contact and park administration. The park headquarters, the Ben Reifel Visitor Center, and the campground would remain as they are at present, and the concessioner-operated Cedar Pass Lodge, consisting of the store, a restaurant, and cabins, would remain.

A visitor contact station would be constructed near the intersection of Sage Creek Rim Road and the Loop Road. At this location, orientation to the park would be offered for visitors. At present, visitors enter at the western end of the park travel through most of the park before they have an opportunity to get visitor information. The contact station also would serve as an orientation center for the Badlands Wilderness Area.

The Sage Creek campground also would be in the development zone. This area offers a place for a more primitive camping experience than the Cedar Pass campground. It would continue to be a popular point of access to the wilderness area.

The Pinnacles area would be included in this zone. The existing facilities would remain, and more housing for park staff (up to four housing units) could be added.

The development zone would include trailer pads for researchers at the bison handling facility, west of County Road 502, with trailer campsites for researchers working in the park. A maximum of four trailer pads would be constructed at the site.

Research Zone

No areas would be included in the research zone under alternative C.

The Loop Road

Recent work to stabilize the Loop Road at Cedar Pass is not a long-term solution to preserving the road. If monitoring indicated that the Loop Road was becoming unsafe, another road would be developed.

The Federal Highway Administration has studied three alignments (FHWA 2002) and has determined that the routes are feasible. However, this study is preliminary, and additional studies and subsequent NEPA documentation would be needed. The public

would have more opportunities to review the road alignments and comment on the project.

For purposes of analysis this alternative assumes that the corridor would be developed along a corridor that goes west from the Northeast entrance. The road would not descend the Badlands Wall but would cross the prairie above the wall intersecting the Loop Road near the Fossil Exhibit Trail. However, other road alignments may be evaluated in future studies and NEPA documents.

ALTERNATIVE D: PROTECT RESOURCES AND USE RESEARCH TO FURTHER KNOWLEDGE OF THE PARK

CONCEPT AND GENERAL MANAGEMENT STRATEGIES

The focus of alternative D would be to protect resources and to further knowledge of the park’s resources through research. The visitor experience offered would be education through observation of research in the park, as in the Big Pig Dig (p. 87). To protect the resources and allow research to proceed, parts of the park would be closed to the public.

MANAGEMENT PRESCRIPTIONS AND RELATED ACTIONS

Most of the park would be managed under the research and preservation prescriptions. The approximate acreages and percentages of the park that would be in each zone under alternative D are shown in table 4.

TABLE 4: MANAGEMENT PRESCRIPTIONS IN ALTERNATIVE D

Zone	Acreage	%of Park
Semiprimitive	6,274	5
Preservation	55,054	45
Natural Area/Recreation	11,590	9
Driving/Sightseeing	19,604	16
Development	1,191	1
Research	28,686	23

The management of the park and the actions that would be taken by the National Park Service in the next 20 years under alternative D are described in the following paragraphs. Whenever possible, the National Park Service would avoid or mitigate any disturbance of sensitive areas such as habitat for threatened and endangered species or archeological sites.

PROPOSED BOUNDARY ADJUSTMENTS

An NPS general management plan is required by 16 U.S.C. §1a-7(b)(4) to identify any potential changes to the park boundaries and to give reasons for the changes.

Boundary adjustments may be recommended to protect significant resources and values or to enhance opportunities for public enjoyment related to park purposes, address operational and management issues, or otherwise protect park resources that are critical to fulfilling park purposes. In addition, all recommendations for boundary changes must be feasible to administer, and a determination must be made that other alternatives (outside of the National Park Service) for managing the lands and protecting the resources are not adequate.

For alternative D, two areas have been identified for purchase from a willing seller, donation, or transfer. Such boundary changes would be intended to protect cultural resources, expand the interpretive themes being presented at the park, protect wilderness values, and support visitors’ use of the park. If this alternative was selected, the National Park Service would recommend to Congress that the boundary of the park be expanded.

A total of 5,400 acres along SD 44 would be recommended for addition to the park under alternative D. These lands are a mix of private and federal lands. The owners of the private lands (3,400 acres) have expressed interest in seeing their lands added to the park. The federal land (2,000 acres) is managed by the U.S. Forest Service, which has agreed that the transfer of the management of that land to the National Park Service would be in the best interest of both agencies if the National Park

Service acquired the private lands. These lands would be managed in the natural area / recreation zone and research zone. The existing access road and ranch buildings would be adaptively reused for park management and administration.

The other boundary adjustment would be approximately 4,500 acres of privately owned land along the west side of the North Unit adjacent to the designated wilderness. The owner of this property would like to see these lands added to the park. The lands are adjacent to prairie dog habitat, where the endangered black-footed ferret has been reintroduced. This tract of land, if acquired, would provide more habitat for prairie dogs and ferrets. These lands would provide an area for expansion of the park's bison range and would provide year round water sources for bison. In addition, acquiring this land would allow access for management activities in the wilderness area.

Additional information about the lands recommended for inclusion into the park is provided in appendix E. This includes information addressing the specific criteria for boundary adjustments in *NPS Management Policies* (2001).

MANAGEMENT OF SPECIFIC AREAS

Semiprimitive Zone

Two areas in the North Unit would be included in the semiprimitive zone: an area north of Sage Creek Rim road and west of the Pinnacles entrance, and an area north of the Loop Road west of Big Foot Pass. The first area is important to managing the park's bison herd. The bison handling corrals would remain where they are. In the second area, visitors could explore relatively close to the Loop Road.

Preservation Zone

Most of the designated wilderness area in the park would be in the preservation zone. In the wilderness, visitors could explore, be self-reliant, and seek solitude. Wilderness values would be retained.

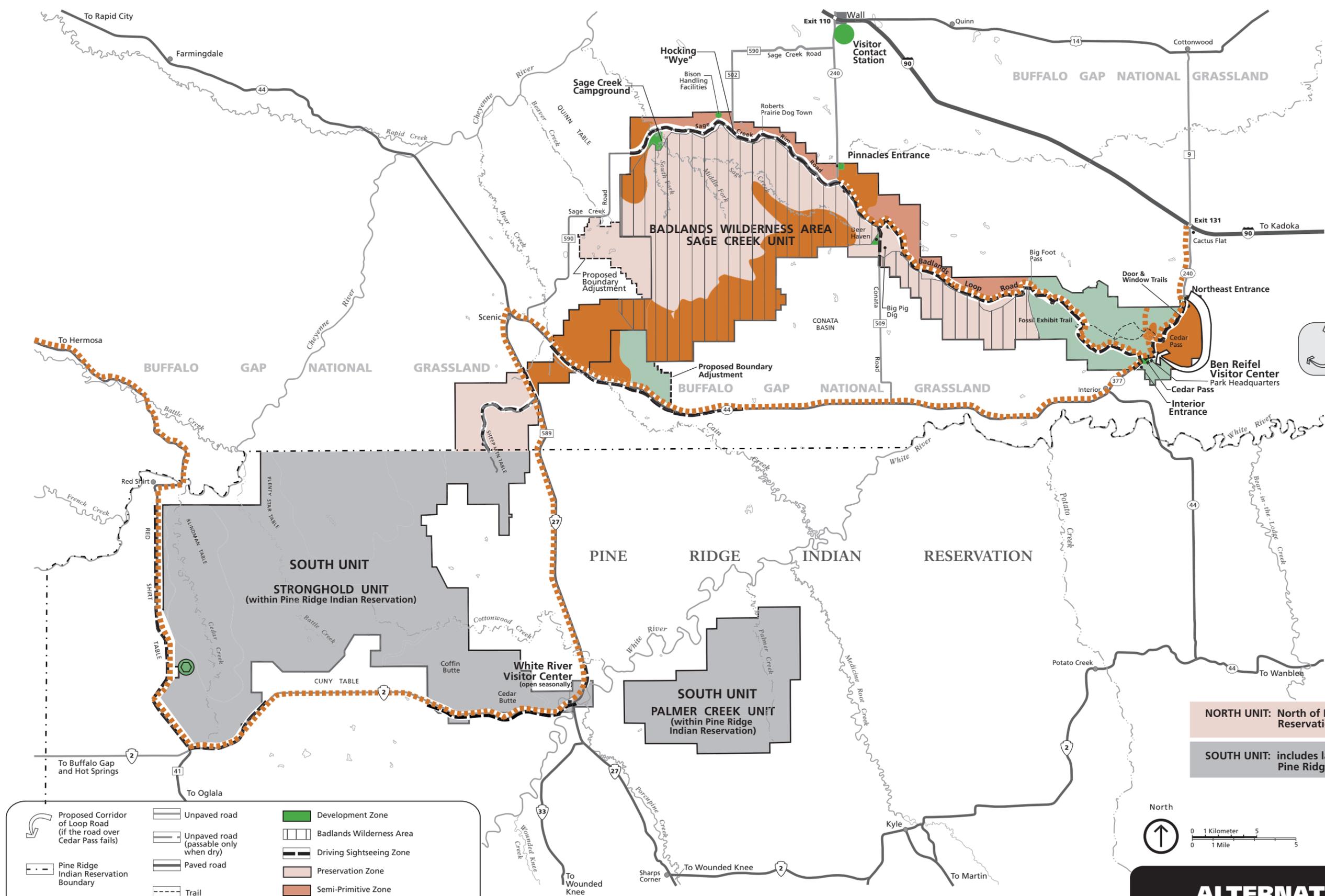
Natural Area / Recreation Zone

Both the north and south sides of the Loop Road from the Northeast entrance to Big Foot Pass would be included in the natural area / recreation zone. This would include the existing designated trails such as the Castle Trail. Other designated trails could be developed in this area.

Driving / Sightseeing Zone

As in alternatives B and C, the Loop Road and the existing parking areas would be in the driving/sightseeing zone, continuing to provide access to the park and an overview of the park's natural and cultural resources. Also in the zone would be Big Badlands, Door and Window, Cliff Shelf, Prairie Winds, and Big Foot. The waysides at those sites would be improved, focusing on resource protection and research.

The Sage Creek Rim Road would be in the driving/sightseeing zone, and would continue to be maintained as an all-weather road. This road would allow visitors to travel at a slower pace than on the Loop Road, and they would have an opportunity to observe the park's bison herd. Also in the driving/sightseeing zone would be the access road to Sheep Mountain, which would be improved and maintained for about 4 miles to a point locally known as the "bottleneck" near the center of the table. The road beyond this point would be revegetated. A small parking area would be developed at the new end of the road.

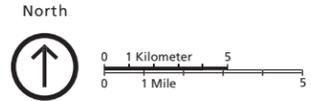


NOTE:
 Proposed Corridor
 of Loop Road
 (if the road over
 Cedar Pass fails)

NORTH UNIT: North of Pine Ridge
 Reservation

SOUTH UNIT: includes lands on
 Pine Ridge Reservation

Proposed Corridor of Loop Road (if the road over Cedar Pass fails)	Unpaved road	Development Zone
Pine Ridge Indian Reservation Boundary	Unpaved road (passable only when dry)	Badlands Wilderness Area
Existing or Proposed Scenic Byway	Paved road	Driving Sightseeing Zone
Preferred Location for Lakota Heritage Education Center	Trail	Preservation Zone
	Overlook	Semi-Primitive Zone
		Natural Area Recreation Zone
		Research Zone
		South Unit



ALTERNATIVE D

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Development Zone

The Cedar Pass area would be included in the development zone. It still would be the principal area for visitor contact and park administration. The park headquarters, the Ben Reifel Visitor Center, and the campground would remain as they are at present, and the concessioner-operated Cedar Pass Lodge, consisting of a store, a restaurant, and cabins, would remain.

The Pinnacles area would be in this zone and would be managed as it is at present. No changes would occur to the existing facilities.

The Sage Creek Campground would be included in the development zone. The campground would provide a camping opportunity on the western side of the park.

A visitor contact station would be established in the town of Wall to offer orientation to the park. No new construction would be involved; the contact station would be established by leasing an existing facility or partnering with another agency or organization.

The development zone also would include a trailer pads for researchers at the bison handling facility, west of County Road 502, with trailer campsites for researchers working in the park. A maximum of four trailer pads would be constructed at the site.

Research Zone

Four areas in the North Unit would be in the research zone:

- an area east of the Loop Road from the Northeast entrance to Cedar Pass
- an area north of the Loop Road east of Pinnacles
- an area in the northwest corner of the park near Sage Creek campground
- the southern part of the wilderness area and the lands extending south to BIA Highway 27

Any research activities in the wilderness area would be limited to those consistent with the intent of wilderness.

American Indian traditional uses or other well justified uses by American Indian groups in this zone would not be altered from current practices as defined by existing special agreements.

The Loop Road

Recent work to stabilize the Loop Road at Cedar Pass is not a long-term solution to preserving the road. If monitoring indicates that the Loop Road was becoming unsafe, another road would be developed. The Federal Highway Administration has studied three alignments (FHWA 2002) and has determined that the routes are feasible from a road construction perspective. The FHWA study is preliminary, and additional studies and subsequent NEPA documentation would be needed. The public would have more opportunities to review the road alignments and comment on the project.

For purposes of analysis this alternative assumes that the corridor would be developed along a corridor that goes east from the Northeast entrance, down the Badlands Wall, and ends near the Interior entrance. This corridor crosses private lands and federal lands administered by the U.S. Forest Service. Landownership issues would need to be resolved before construction could begin. The most recent planning effort for the Buffalo Gap National Grassland zones this area as a nonmotorized recreation area. This designation does not preclude the Park Service from proposing the new road alignment (USFS 2004). However, it would require an amendment to the most recent *Buffalo Gap National Grassland Management Plan*. It also should be noted that other road alignments may be evaluated in future studies and NEPA documents.

COST OF ALTERNATIVES

General cost estimates for the four alternatives in 2002 dollars are presented in table 5. The table presents the current operating budget of the park, identified unmet needs, capital improvement cost included in each alternative, preliminary cost estimates on the realignment of the Loop Road, and the cost of the personnel needed to implement the alternatives.

These estimates are preliminary, and they are based on the broad concepts outlined in each alternative. NPS cost estimating guidelines (NPS 2001b) were used to

develop the costs, along with information from recent and ongoing projects in the park. The cost of the capital improvements will be refined as the projects work through the design process.

The estimates were used to give the *relative* costs of the alternatives. The estimates are general and should not be used for budgeting purposes. The actual cost to the federal government could vary according to various factors such as the final design of each facility, opportunities for partnerships, and current economic conditions.

TABLE 5: RELATIVE COSTS OF THE ALTERNATIVES

Cost Item	Alternative A	Alternative B	Alternative C	Alternative D
Current operating budget FY 2004 ¹	\$ 3,116,000	\$ 3,116,000	\$ 3,116,000	\$ 3,116,000
Annual cost of staff needed to implement this alternative	0	450,200	328,400	367,000
Subtotal Annual Operating Cost	3,116,000	3,566,200	3,444,400	3,483,000
Present Value of Operating Costs	30,018,000	34,354,683	33,181,000	33,553,183
Alternative capital improvement cost	0	4,418,000	12,442,000	3,334,000
Realignment of the Loop Road ²	0	13,000,000	6,000,000	39,000,000
Total NPS operating cost of this alternative for the life of the plan (15 years)	30,018,000	38,773,000	45,623,000	36,887,000
Increase of implementing alternative over no-action alternative		8,775,000	15,606,000	6,870,000
Percentage of increase		29.2%	52.0%	22.9%

1. Direct Congressional Funding (Greenbook FY 2004)
2. Badlands National Park Alternative Alignment Study (FHWA 2001)

MITIGATING MEASURES

The following mitigating measures would be used to avoid or minimize potential impacts on natural and cultural resources from construction activities, use by visitors, and NPS operations. These measures would apply to all alternatives.

NATURAL RESOURCES

Air Quality

The best available clean fuel technology and exhaust equipment would be applied (as it becomes available) on construction equipment to the extent feasible.

A dust abatement program would be used, including watering or otherwise stabilizing soils, covering haul trucks, employing speed limits on unpaved roads, minimizing vegetation clearing, and promptly revegetating after the completion of construction.

Water Quality

Best management practices such as the use of silt fences would be followed to ensure that construction-related effects were minimal and to prevent long-term impacts on water quality, wetlands, and aquatic species.

The park's spill prevention and pollution program for hazardous materials would be used and would be updated on a regular basis. Standard measures could include storage and handling procedures for hazardous materials; containment, cleanup, and reporting procedures for spills; and limitations of refueling and other hazardous activities to upland/nonsensitive sites.

Whenever possible new facilities would be built to avoid water resources, including wetlands, drainages, and riparian areas. Any new structures would be placed outside of floodplains.

Soils and Vegetation

Roadside mowing would be timed to help prevent the spread of noxious weed species.

Efforts to prevent soil loss would be undertaken, as appropriate, for all excavation, grading, construction, and other soil-disturbing activities. These actions could include the following:

- ◆ covering or seeding disturbed areas
- ◆ imposing speed limits for construction vehicles in unpaved areas
- ◆ covering trucks hauling dirt and debris
- ◆ salvaging and reusing native soils

Work on campsites, roads, and other facilities in and outside of the park would continue to be planned to reduce impacts on vegetation. Site-specific surveys would identify areas to be avoided because of terrain or resource concerns. Proposed locations for picnic sites or campsites would be surveyed for possible special status plant species, and such sites would be designed and maintained to discourage the development of "social" trails.

Revegetation plans would be developed for areas affected by major construction activities. The use of native plant species would continue to be required, as would the salvage of plants and topsoils. Revegetation plans still would specify such features as seed and plant sources, seed mixes, soil preparation, fertilizers, and mulching. As much as possible, salvaged vegetation would be used rather than new planting or seeding.

To maintain genetic integrity, an attempt would be made to restore vegetation by using seed of native genotype collected in the Northern Great Plains. Consideration would be given to using plant material propagated from seeds or plant stock collected in the project area. The use of nonnative species or

genetic materials would be considered only where deemed necessary to maintain a cultural landscape or to prevent severe resource damage. Any such use would be approved by the park's resource management personnel.

Restoration activities would be instituted immediately after construction was completed. Monitoring would be carried out to ensure that revegetation would be successful, plantings would be maintained, and unsuccessful plant materials would be replaced.

Wildlife

To the extent possible, new or rehabilitated facilities would be sited to avoid sensitive wildlife habitats such as major wildlife travel areas or corridors, feeding and resting areas, or nesting areas.

Construction activities would be timed to avoid sensitive periods such as nesting or calving seasons. Ongoing use by visitors or park operations could be restricted if their potential to cause damage or disturbance warranted doing so.

Measures would be taken to reduce the potential for wildlife to get food from humans. The park would continue educating visitors about the need to refrain from feeding wildlife. This would be done through signs attached to picnic tables and posted on kiosks in campgrounds and picnic areas.

Special Status Species

The National Park Service would conduct surveys for special status species before taking any action that might cause harm. In consultation with the U.S. Fish and Wildlife Service and the state of South Dakota, the National Park Service would take measures to protect any sensitive species, whether they were identified through surveys or presumed to be present.

Paleontological Resources

All ground-disturbing undertakings would be assessed for the presence of paleontological resources, and surveys would be conducted before the selected alternative was implemented. During construction in areas considered to have potential for undisturbed resources, monitoring would be conducted to ensure that sites would be avoided and to evaluate uncovered resources. If paleontological resources were identified and could not be avoided by project redesign, data recovery excavations would be completed before construction.

If unknown paleontological resources were discovered during construction, work in that location would be stopped until the resources were properly recorded and evaluated. Measures would be taken to avoid further resource impacts or to mitigate their loss or disturbance.

Because of the continued loss of resources from illegal collecting, the National Park Service would increase its efforts to protect fossil resources. These efforts would include increased emphasis on interpretive messages about the fossils and more signs advising visitors that fossil collecting is illegal. It is expected that these efforts would reduce illegal collection by park visitors. In addition, NPS law enforcement efforts would be increased to reduce poaching of fossils for commercial interests.

CULTURAL RESOURCES

In consultation with the South Dakota state historic preservation office, tribal officials, the Advisory Council on Historic Preservation, and other interested parties, under all the alternatives the park staff would continue to apply the following measures to avoid or minimize impacts on historic properties, archeological resources, and ethnographic resources.

All ground-disturbing undertakings would be assessed for the presence of archeological resources, and surveys would precede ground-disturbing activities. To ensure that sites would be avoided and to evaluate undiscovered resources, archeological monitoring would be continued during construction in areas considered to have potential for undisturbed resources. If archeological resources were identified and could not be avoided by project redesign, mitigating measures developed in consultation with the state historic preservation office and associated Indian tribes would be completed before construction.

If unknown archeological resources were discovered during construction, work in that location would be stopped until the resources were properly recorded and evaluated. Measures would be developed in consultation with the state historic preservation officer and associated Indian tribes to avoid further resource impacts or to mitigate their loss or disturbance. In compliance with the American Indian Graves Protection and Repatriation Act of 1990, the park staff would notify and consult with concerned tribal representatives regarding the treatment of human remains and funerary and sacred objects, should those be discovered.

The National Park Service would consult tribal officials before taking actions that could

affect ethnographic resources. The National Park Service would continue to abide by existing cooperative agreements and would pursue additional agreements with culturally affiliated tribes to avoid resource impacts, allow access for traditional gathering and other approved activities, and minimize potential use conflicts in culturally sensitive areas. The park would develop and accomplish its programs in a manner respectful of the beliefs, traditions, and other cultural values of the Oglala Sioux Tribe.

All undertakings affecting historic buildings and other structures and cultural landscapes would be carried out in accordance with the park's design guidelines and *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (USDI 1996).

If adverse effects on historic buildings, or other structures and contributing cultural landscape elements could not be avoided, appropriate documentation would be carried out in accordance with the standards and guidelines of the Historic American Buildings Survey and the Historic American Engineering Record. Other possible mitigating measures would be developed and implemented as necessary in consultation with the South Dakota state historic preservation office, the Advisory Council on Historic Preservation, tribal officials, and other interested parties.

THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferable alternative is defined as the alternative that will promote the national environmental policy as expressed in section 101 of the National Environmental Policy Act. That section indicates that it is the continuing responsibility of the federal government to do the following:

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
2. ensure safe, healthful, productive, and esthetically and culturally pleasing surroundings for all Americans
3. attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and a variety of individual choices
5. achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources

A description of how each alternative would or would not achieve the requirements of sections 101 and 102(1) of the National Environmental Policy Act is shown in table 6. Although all the alternatives in this plan rated well, elements that were not environmentally sound were eliminated from consideration.

Three of the above goals did not make a difference in determining the environmentally preferable alternative. Goal 1 is satisfied by all of the alternatives. Badlands National Park is a

unit of the national park system and as the trustee of this area the National Park Service would continue to fulfill its obligation to protect this area for future generations. All the alternatives would fulfill goal 2, ensuring safe, healthful, productive, and culturally pleasing surroundings for all Americans. Goal 6 is to enhance the quality of renewable resources and maximize the recycling of depletable resources. All of the alternative would result in enhancing the quality of the renewable resources through NPS management.

The environmentally preferable alternative for Badlands National Park's *General Management Plan / Environmental Impact Statement* is alternative B, the alternative preferred by the National Park Service. Alternative B would surpass the other alternatives in realizing the full range of national environmental policy goals in section 101. In particular, the preferred alternative attains the widest range of beneficial uses without degradation (goal 3); preserve natural and cultural resources while providing a diversity and a variety of individual choices (goal 4); and achieve a balance between population and resource use (goal 5). Alternative C is similar to alternative B in its provisions for resource protection; however, it would not provide the opportunity for as wide a range of acceptable visitor uses. Thus, alternative C would not meet policy goal 3 as well as alternative B.

Alternatives A and D would similarly protect resources as alternatives B and C. However alternative D would restrict access to visitors, would restrict visitor choices, and would not achieve a balance (goals 3, 4, & 5) as well as alternative B. Alternative A would not provide the balance between resource protection and providing a high standard visitor experience.

The balance of resource protection and the improvements to the visitor experience provided by alternative B would result in fully

meeting the goals of the National Environmental Policy Act and therefore was

chosen as the environmentally preferable alternative.

TABLE 6: ENVIRONMENTALLY PREFERABLE ALTERNATIVE ANALYSIS

CRITERIA	ALTERNATIVES			
	A	B	C	D
Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.	2	2	2	2
Ensure safe, healthful, productive, and aesthetically and culturally pleasing surroundings for all Americans.	2	2	2	2
Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.	1	2	1	1
Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and a variety of individual choices.	1	2	2	1
Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities	1	2	2	1
Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources	2	2	2	2
Total Points*	9	12	11	9

* 2 points given to the alternative if it fully meets the criteria, 1 point to the alternative that somewhat meets the criteria, and 0 points if alternative does not meet the criteria.

ACTIONS AND ALTERNATIVES CONSIDERED BUT DISMISSED

The planning team considered other actions and alternative concepts for managing the park, but those ideas were eliminated from further analysis. In the alternative development stage of this planning effort, four action alternative concepts were developed. As the alternatives were refined, the team determined that the fourth concept, increasing Badlands' presence in the region, was not a distinct alternative; rather, that increasing the park's presence in the region should be accomplished regardless of which alternative was selected. Therefore, this concept was not pursued as a distinct alternative.

Several other actions were not analyzed in detail because they were found not to be viable or feasible under current conditions or they would result in unacceptable impacts, so they were dropped from further consideration. Those rejected concepts are discussed below.

ESTABLISH A JOINT VISITOR CENTER WITH MINUTEMAN MISSILE NATIONAL HISTORIC SITE

General management plans are being developed for both Minuteman Missile National Historic Site and Badlands National Park. The idea of a combined visitor center was discussed, but a good location that would accommodate both parks efficiently could not be located. The stories of the two parks are extremely different, so that it would be difficult to present both in one facility. In particular, the visitor center for Minuteman Missile National Historic Site will be a major part of that national historic site's visitor

experience because of the nature of the site and the limited number of visitors that could be accommodated to visit the missile command center.

ESTABLISH A VISITOR CONTACT STATION IN RAPID CITY

The idea of establishing a contact station in Rapid City was discussed, but the logistics of operating the facility would have been difficult. The planning team determined that the park could expand its presence in the Rapid City area through partnerships; therefore, the idea of establishing a NPS visitor center in Rapid City was not pursued.

ESTABLISH A BICYCLE LANE ALONG THE LOOP ROAD

An increasing number of visitors to Badlands National Park are looking for bicycling opportunities. The idea of constructing a bicycle lane along the Loop Road was explored, but after preliminary review it was determined that widening parts of the road to accommodate bicycles would require extensive excavation. There was great concern about the adverse effects on resources (such as fossils) that could result from this action. In addition, a preliminary estimate of the cost of this action was that it would be more than \$3 million. After reviewing the potential impacts and the costs, the planning team decided not to include a possible bicycle lane along the Loop Road in the alternatives.

TABLE 7: COMPARISON OF ALTERNATIVES

Alternative A: Continue Current Management (No Action)	Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Alternative C: Focus on Resource Protection and Public Education	Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
<i>Concept and General Strategies</i>			
Current management continued; operations, visitor opportunities, and facilities as at present; Ben Reifel Visitor Center renovation and expansion done as planned.	Natural and cultural resources protected. Visitor opportunities expanded in the park; availability of information about park increased by adding new contact stations in the park near Pinnacles and along SD 44 near Scenic.	Natural and cultural resources protected, visitors educated about park significance and encouraged to prevent damage to resources; access to some areas limited; parts of park closed to public.	Focus on protecting resources and allowing visitors to learn about park by observing research.
<i>Proposed Boundary Adjustments</i>			
Current boundary would remain without change.	Approximately 5,400 acres of private and USFS land along SD Hwy 44 would be added to the park; existing ranch facilities would be used for administrative support (development zone); the remainder would be managed under a natural area / recreation zone.	Approximately 5,400 acres of private and USFS land along SD Hwy 44 would be added to the park; existing ranch facilities would be used for administrative support (development zone); the remainder would be managed to restore natural processes under a preservation zone.	Approximately 5,400 acres of private and USFS land along SD Hwy 44 would be added to the park; existing ranch facilities would be used for a wilderness orientation facility and primitive campground (development zone); remainder would be managed under a natural area / recreation zone.
Following completion of the general management plan, the National Park Service would prepare a study to determine if about 240 acres along SD 240 south of Cactus Flats, including the Prairie Homestead, should be added to the park.	About 240 acres along SD 240 south of Cactus Flats, including the Prairie Homestead, would be recommended for addition to the park (development and natural area / recreation zones).	About 240 acres along SD 240 south of Cactus Flats, including the Prairie Homestead, would be recommended for addition to the park (development and natural area / recreation zones).	Current boundary would remain without change.
About 4,500 acres of private land along the west side of the North Unit, next to the wilderness area and prairie dog and black-footed ferret habitat, would be added to the park (preservation zone).	About 4,500 acres of private land along the west side of the North Unit, next to the wilderness area and prairie dog and black-footed ferret habitat, would be added to the park (preservation zone).	About 4,500 acres of private land along the west side of the North Unit, next to the wilderness area and prairie dog and black-footed ferret habitat, would be added to the park (preservation zone).	About 4,500 acres of private land along the west side of the North Unit, next to the wilderness area and prairie dog and black-footed ferret habitat, would be added to the park (preservation zone).

Alternative A: Continue Current Management (No Action)	Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Alternative C: Focus on Resource Protection and Public Education	Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
<i>Management of Specific Areas</i>			
<p>Most visitation concentrated along the Loop Road, limited to North Unit; food, lodging, and gifts still available from Cedar Pass concessioner; Ben Reifel Visitor Center rehabilitated and expanded; Sage Creek and Cedar Pass campgrounds redeveloped; parking, trails, headquarters unchanged; new museum storage at Cedar Pass.</p>	<p>See management of various zones below.</p>	<p>See management of various zones below.</p> <p>Implement a demonstration shuttle system on the Loop Road from Door and Window to fossil exhibit.</p>	<p>See management of various zones below.</p>
<i>The Loop Road</i>			
<p>Maintenance of the Loop Road in present alignment continued; if road became unsafe it would be closed and visitors directed to other routes.</p>	<p>If the current road failed, a new route would be developed in a corridor looping west down to Interior; new route would require further study and NEPA compliance.</p>	<p>If the current road failed, a new route would be developed in a corridor west along the “top of the wall” (no connection to Interior); new route would require further study and NEPA compliance.</p>	<p>If the current road failed, a new route would be developed in a corridor looping east through private and USFS lands down to Interior; new route would require further study and NEPA compliance.</p>
<i>Management Prescriptions — General</i>			
<p>No management prescriptions in this alternative.</p>	<p>Percentage of park in each prescription: Semiprimitive 5% Preservation 53% Natural Area Recreation 27% Driving / Sightseeing 14% Development 0.9% Research 0.1%</p>	<p>Percentage of park in each prescription: Semiprimitive 6% Preservation 73% Natural Area Recreation 6% Driving / Sightseeing 14% Development 1% Research 0%</p>	<p>Percentage of park in each prescription: Semiprimitive 5% Preservation 45% Natural Area Recreation 9% Driving / Sightseeing 16% Development 1% Research 23%</p>
SEMIPRIMITIVE ZONE			
<p>No management prescriptions in this alternative.</p>	<p>Zone would contain area east of the Loop Road to boundary, allowing visitors to disperse through area and observe geologic features; also would include area west of Pinnacles and north of Sage Creek Rim Hiking, camping, and pack stock use allowed.</p>	<p>Area north of the Loop Road and Sage Creek Rim Road also in this zone, available for hiking and pack stock use.</p>	<p>Area north of the Loop Road and bison area north of Sage Creek Rim Road in this zone.</p>

Alternative A: Continue Current Management (No Action)	Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Alternative C: Focus on Resource Protection and Public Education	Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
<p>PRESERVATION ZONE</p> <p>No management prescriptions in this alternative.</p>	<p>Zone would include most of the designated wilderness, where natural conditions maintained, and prairie area south of the Loop Road west of Cedar Pass and east of Conata Road, and area around north end of Sheep Mountain Table, which visitors could use for self-directed exploration.</p>	<p>Zone would encompass all of North Unit south of Loop Road (including all wilderness) and an area north of Loop Road, east of Pinnacles; focus on protecting resources; number of visitors allowed might be limited.</p>	<p>Most of wilderness area in park in this zone; visitors could explore and find solitude; wilderness values retained.</p>
<p>NATURAL AREA / RECREATION ZONE</p> <p>No management prescriptions in this alternative.</p>	<p>North side of Loop Road from NE entrance to Pinnacles entrance in this zone; also parts of Sage Creek Unit in wilderness, area north of SD 44 to wilderness and south of SD 44 to BIA 27, Sheep Mountain Table; more trails added to offer a variety of half-day to full day hiking opportunities; routes could be designated to eliminate social trails; park could coordinate with Rails-to-Trails to convert rail route along SD 44 to a bicycle trail.</p>	<p>Castle Trail area in this zone so visitors could explore on designated trails; also Sheep Mountain Table — road closed about 3 miles west of BIA 27; hiking and pack stock use allowed.</p>	<p>Zone would encompass north and south sides of Loop Road from NE entrance to Big Foot Pass, including designated trails; other trails also might be developed.</p>
<p>DRIVING / SIGHTSEEING ZONE</p> <p>No management prescriptions in this alternative.</p>	<p>Zone would contain the Loop Road and parking areas, Big Badlands, Door and Window, Cliff Shelf, Prairie Winds, Sage Creek Rim Road, Sheep Mountain Table approach road, and Big Foot, along with SD 44 where it crosses through park; access road to Sheep Mountain Table would be improved and maintained for about 4 miles to a point known as the “bottleneck” near the center of the table — a small parking area would be developed at the new end of the road; interpretive trails improved and maybe boardwalks added to eliminate social trails; Big Foot picnic area expanded and outdoor classrooms added there and at Prairie Winds overlook.</p>	<p>The Loop Road and parking areas, Big Badlands, Door and Window, Cliff Shelf, Prairie Winds, and Sage Creek Rim Road all in this zone; road to Sheep Mountain Table — road closed about 3 miles west of BIA 27; small parking area added at road’s end.</p>	<p>The Loop Road and parking areas, Big Badlands, Door and Window, Cliff Shelf, Prairie Winds, and Sage Creek Rim Road all in this zone; road to Sheep Mountain improved to the bottleneck; no vehicles past that point; small parking area added there.</p>

Alternative A: Continue Current Management (No Action)	Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Alternative C: Focus on Resource Protection and Public Education	Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
DEVELOPMENT ZONE			
No management prescriptions in this alternative.	Zone would encompass Cedar Pass area the main visitor contact area, and park headquarters, Conata picnic area (with added pavilion for classes and interpretation), Pinnacles area, a new visitor station at intersection of Sage Creek Rim road and the Loop Road, new education pavilion, comfort station, and group campground t in the bison handling facility area west of County Road 502	Zone would encompass Cedar Pass area, still the main visitor contact area, and park headquarters, Ben Reifel Visitor Center, campground, also Pinnacles area, new wilderness orientation facility at intersection of Sage Creek Rim road and the Loop Road, trailer pads to support researchers at the bison handling facilities.	Zone would encompass Cedar Pass area, still the main visitor contact area (Ben Reifel Visitor Center) and park headquarters, Pinnacles area, new visitor contact station in Wall.
RESEARCH ZONE			
No management prescriptions in this alternative.	No research areas.	No research areas.	Research zone would contain four areas: <ul style="list-style-type: none"> • east of the Loop Road from the Northeast entrance to Cedar Pass • north of the Loop Road • northeast corner of park near Sage Creek campground • south part of wilderness area and land going south to BIA 27

TABLE 8: COMPARISON OF ENVIRONMENTAL CONSEQUENCES

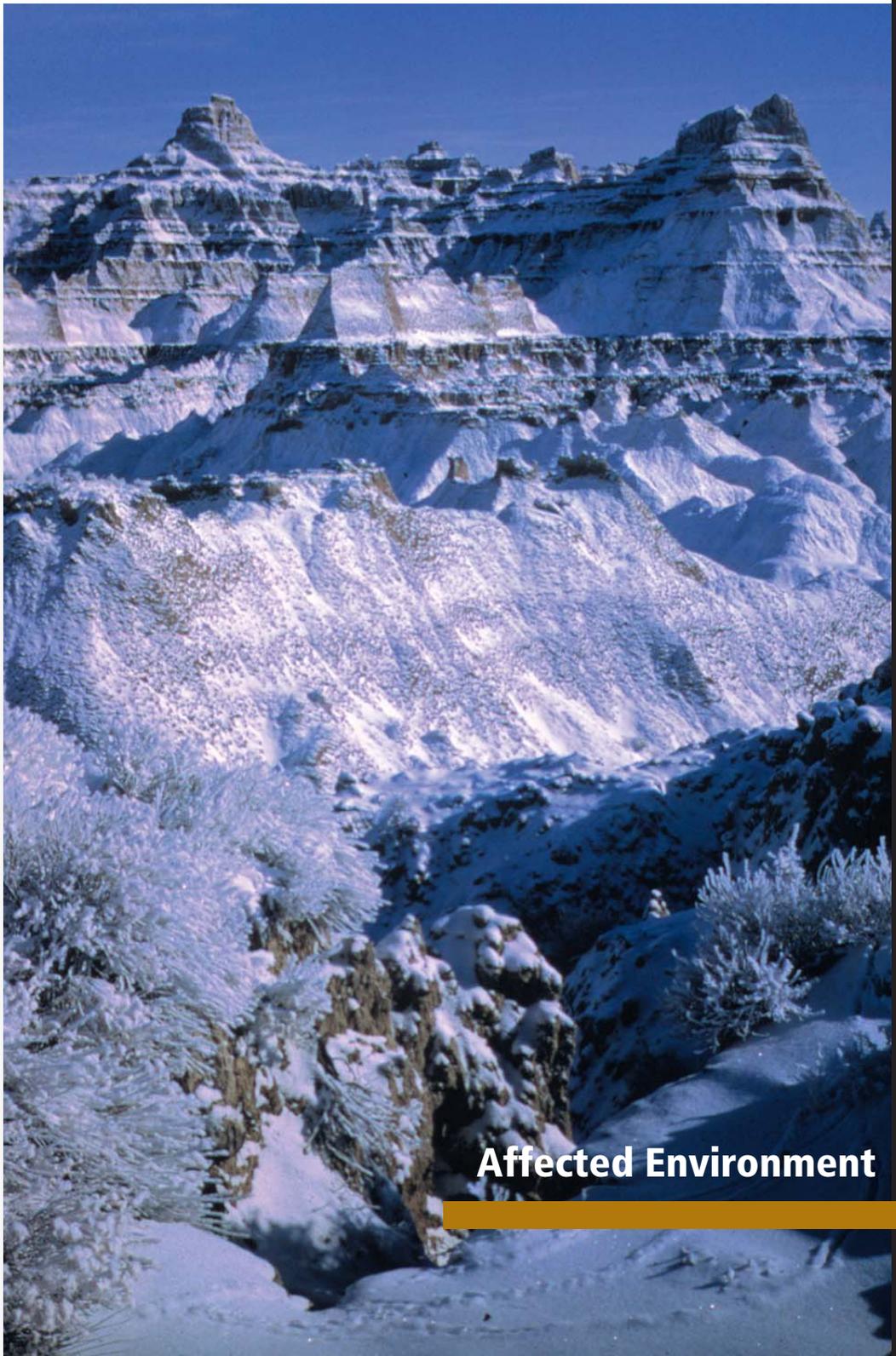
Effects from Alternative A: Continue Current Management (No Action)	Effects from Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Effects from Alternative C: Focus on Resource Protection and Public Education	Effects from Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
<i>Effects on Natural Resources</i>			
AIR QUALITY			
Long-term, minor adverse effects from vehicle emissions.	Short- and long-term, minor to moderate adverse effects on park's air quality in local areas, primarily from construction and use of new facilities.	Same effects as in alternative B.	Same effects as in alternative B.
SOUNDSCAPE			
Long-term minor adverse effects in park from visitors.	Short-term and long-term, minor adverse noise effects from constructing park facilities and from more visitors and vehicles in local areas; short-term and long-term, moderate to major adverse effects in a small part of park due to construction and use of a new section of the Loop Road.	Same effects as alternative B.	Same effects as alternative B.
GEOLOGIC FEATURES, INCLUDING SOILS			
Soils compacted by hiking and horseback riding; erosion from continuing visitor use would cause long-term minor to moderate adverse effects in local areas.	Long-term, minor to moderate adverse impacts due to new or improved trails in local areas; potential for moderate to major, long-term adverse effects to geologic features and soils along the corridor of the new Loop Road segments; long-term, minor to moderate beneficial effects in local areas due to improvements to the Sheep Mountain Table road, trail use restrictions and more education and interpretation.	Long-term, minor to moderate adverse impacts to soils in local areas due to construction and use of new facilities; potential for moderate to major, long term, adverse impacts to geologic features and soils along the corridor of the new Loop Road segment; long term minor to moderate beneficial effects in local areas due to ending the road at the base of Sheep Mountain Table and to adding education and interpretation.	Long-term, minor adverse impacts to soils in local areas due to construction and use of new facilities, and minor to moderate adverse impacts due to increased use in the Castle Trail area; potential for long-term, moderate to major adverse effects on soils and geologic features from the new Loop Road segment, long-term, minor to moderate beneficial impacts due to improvements to the Sheep Mountain Table road and increased education efforts.

Effects from Alternative A: Continue Current Management (No Action)	Effects from Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Effects from Alternative C: Focus on Resource Protection and Public Education	Effects from Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
PALEONTOLOGICAL RESOURCES			
Moderate long-term adverse effects from visitors and collectors illegally removing fossils.	Some minor beneficial effects from more staff and visitor education; more potential for adverse effects than alternative A, mostly from building new Loop Road segment and better access to parts of park could lead to more fossil collecting; even with mitigation efforts, could be long-term, moderate to major adverse effects.	Some beneficial effects from more staff and visitor education, research, and closing part of the Sheep Mountain Table road; potential for a long-term, minor to moderate adverse impact primarily due to building the new Loop Road segment.	Some beneficial effects from increased staffing, educational efforts, and research; potential for a long-term, moderate to major adverse impact primarily due to construction of the new Loop Road segment.
VEGETATION			
Long-term minor adverse effects from continuing visitor uses.	Long-term, minor to moderate, adverse impacts in local areas due to construction or improvement of facilities and visitor use; long-term, minor to moderate beneficial impacts in local areas due to designation of trails and routes, improvements to Sheep Mountain Table road, new education facilities and interpretation, and boundary adjustments.	Long-term, minor to moderate, adverse impacts in local areas due to new facilities, use; long-term, minor to moderate, beneficial impacts in local areas due to closing part of the Sheep Mountain Table road, converting the Sage Creek campground to a day use area, increased research and education efforts, and boundary adjustments.	Long-term, minor to moderate, adverse impacts in local areas due to new facilities, the new Loop Road segment, and to increased visitor use in the Castle Trails area; long-term, minor to moderate beneficial impacts in local areas due to improvements to the Sheep Mountain Table road, increased research efforts, and boundary adjustments.
WILDLIFE			
Negligible to minor short-term adverse effects on wildlife, primarily in developed areas, from disturbance by visitors and administrative activities.	Most wildlife populations and habitats in park not affected; negligible to minor long-term adverse impacts due to new facilities and visitor use in local areas; construction of the new Loop Road segment could have a moderate adverse effect on bighorn sheep in North Unit. Increased education/interpretive efforts and boundary adjustments would have long-term minor to moderate beneficial effects on wildlife.	Most wildlife populations and habitats in park not affected; negligible to minor long term adverse wildlife impacts due to new facilities and visitor use in local areas; new Loop Road segment could have a moderate adverse impact on bighorn sheep and deer populations in North Unit; minor to moderate long term beneficial impacts on wildlife in local areas due to closing part of the Sheep Mountain Table road, converting the Sage Creek campground to a day use area, increased research and education efforts, and boundary adjustments.	Most wildlife populations and habitats in park not affected; negligible to minor long-term adverse wildlife impacts due to new facilities and visitor use in local areas; new Loop Road segment could have a minor to moderate adverse impact on wildlife; minor to moderate long-term beneficial impacts on wildlife in local areas due to boundary expansions, and increased research.

Effects from Alternative A: Continue Current Management (No Action)	Effects from Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Effects from Alternative C: Focus on Resource Protection and Public Education	Effects from Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
SPECIAL STATUS SPECIES			
No effects on black-footed ferrets or swift fox.	May affect, but would not be likely to adversely affect, black-footed ferret and swift fox populations and habitat in the North Unit. Before taking any action that might affect federally listed species in the park, NPS would consult with the U.S. Fish and Wildlife Service to ensure impacts were identified and avoided.	Same as alternative B.	Same as alternative B.
<u>Effects on Cultural Resources</u>			
HISTORIC BUILDINGS AND OTHER STRUCTURES			
No historic structures are known to exist in the park, so no effects on historic structures.	Same as alternative A.	Adding Prairie Homestead to park and removing visitor contact facility there would contribute to restoring structure's historic conditions; federal protection would stabilize structure.	Same as alternative A.
ETHNOGRAPHIC RESOURCES			
No effect on ethnographic resources; no change in American Indians' access for traditional uses.	Long-term, minor to moderate adverse effects on ethnographic resources in park caused mostly by limits on American Indians' vehicle access to traditional use sites for religious practices.	Same effects as in alternative B.	Same effects as in alternative B.
<u>Effects on Visitation and the Visitor Experience</u>			
ACCESS			
No change in visitors' access to park.	Access improved by designating hiking routes and creating trailheads.	Not allowing vehicles on Sheep Mountain would cause some minor adverse effects on visitor access.	Access more limited than in other alternatives by having more areas in research zone, but effects on visitors minor because affected areas are not visited much.
AVAILABILITY OF INFORMATION			
Existing minor adverse effects on visitor experience would continue, especially for visitors entering from west; if changes in visitation patterns continue, effects could become more severe.	Long-term, moderate beneficial effects on availability of information about park; visitor experience improved by adding visitor contact stations near Pinnacles and at Scenic, along with a new learning center; having park information available from outside sources would help visitors.	Long-term, moderate beneficial effects on availability of information about park; visitor experience improved by new information facility at west side of North Unit.	Long-term, moderate beneficial effects on availability of information about park; visitor experience improved by new information facility in Wall; in-depth look at resources and research available from new learning center.

Effects from Alternative A: Continue Current Management (No Action)	Effects from Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Effects from Alternative C: Focus on Resource Protection and Public Education	Effects from Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
RANGE AND ENJOYMENT OF VISITOR ACTIVITY			
Vehicle Use — No change in driving opportunities.	Vehicle Use — Adding waysides along SD 44 in park would give visitors information about park; improving road and facilities at Sheep Mountain Table would let more visitors experience the area; improving access to Blindman and Cuny Tables would open more recreational opportunities; reducing areas open to ORV's would cause a minor to moderate adverse effect on visitors seeking that experience; overall, moderate to major beneficial effects on driving/sightseeing.	Vehicle Use — New opportunities for visitors seeking a driving/sightseeing experience, resulting in minor to moderate beneficial effects; long-term negligible to minor adverse effects on visitors seeking an ORV experience, but ORV travel still available on designated two-track routes in east part of Stronghold area; however, overall area open to this activity would be reduced.	Vehicle Use — No change in opportunities for driving and sightseeing in this alternative; improving road and facilities at Sheep Mountain Table would let more visitors experience the table.
Hiking and Pack Stock Use — Long-term negligible adverse impacts because designated routes limited; lack of corrals and loading ramps would cause long-term negligible adverse effect on pack stock users.	Hiking and Pack Stock Use — Hiking opportunities increased by adding trailheads and designating trails.	Hiking and Pack Stock Use — Hiking and pack stock opportunities increased by adding trailheads and designating trails; negligible adverse effects from zoning Palmer Creek and part of Stronghold area for research.	Hiking and Pack Stock Use — Fewer hiking and pack stock opportunities available than in other alternatives because of restrictions in larger research zone.
Camping — Cedar Pass and Sage Creek campgrounds unchanged; rehabilitation would continue.	Camping — Camping opportunities improved by adding a small campground in boundary expansion area along SD 44 and a group campground at bison handling facility.	Camping — Changing Sage Creek campground to a day use area would eliminate opportunity for quiet primitive camping, a long-term minor to moderate adverse effect.	Camping — Camping opportunities same as in alternative A.
Picnicking — Limited picnic areas would continue to cause long-term negligible adverse impacts.	Picnicking — New picnic area at Cedar Pass.	Picnicking — Same as alternative B.	Picnicking — Picnicking opportunities same as in alternative A.
SCENIC RESOURCES			
Existing facilities would continue to cause long-term, minor adverse effects on scenic resources; construction of Lakota Heritage and Education Center also would cause long-term minor adverse impacts.	Building new park facilities would cause long-term, moderate adverse impacts on scenic resources; existing facilities would continue to cause minor adverse effects.	Alternative C would result in long-term, minor to moderate adverse impacts on scenic resources; existing facilities would continue to cause minor adverse effects.	No new effects on scenic resources from alternative D; existing facilities would continue to cause minor adverse effects.

Effects from Alternative A: Continue Current Management (No Action)	Effects from Alternative B: Expand Visitor Opportunities (Preferred Alternative)	Effects from Alternative C: Focus on Resource Protection and Public Education	Effects from Alternative D: Protect Resources and Use Research to Further Knowledge of the Park
Increased funding and staffing under this alternative would improve park operations but not address all serious problems.	More employment opportunities with park and short-term construction employment from alternative B; minor socioeconomic benefits for region; major benefits for park visitors.	<p align="center"><u>Effects on the Socioeconomic Environment</u></p> More employment opportunities with park and short-term construction employment from alternative C; minor socioeconomic benefits for region.	More employment opportunities with park and short-term construction employment from alternative D; minor socioeconomic benefits for region.



Affected Environment

INTRODUCTION AND IMPACT TOPICS

In this chapter, the existing environment of Badlands National Park and the surrounding region are described. The description is focused on the resources, uses, facilities, and socioeconomic characteristics that potentially could be affected by the alternatives if they were implemented. Some features discussed, such as threatened and endangered species, must be addressed in an environmental impact statement; others provide context. There are many sources of information on the environment of Badlands National Park, including the park's Web site at <http://www.nps.gov/badl>. Other sources of information are cited throughout this document, with complete bibliographical references in the "Selected References" list beginning on page 302.

RELEVANT IMPACT TOPICS

The Council on Environmental Quality (CEQ) regulations (40 C.F.R. Part 1500) for implementing the National Environmental Policy Act require that the description of the affected environment focus on describing the resources and people that could be affected by the alternatives. For this *General Management Plan / Environmental Impact Statement*, impact topics were developed to focus the environmental analysis and to ensure that each alternative was evaluated against relevant topics. The topics, which are listed below, have been based on federal laws, regulations, and orders; on NPS *Management Policies 2001*; and on public and other agency concerns identified during scoping. A brief rationale is given for selecting each impact topic.

Natural Resources

Air Quality. Badlands National Park is a class I air quality area. The Clean Air Act requires federal land managers to protect air quality related values. Air quality impacts in

the park have been caused primarily by external sources. Changes in visitor use patterns and access in the alternatives also could affect the park's air quality.

Soundscape. *NPS Management Policies 2001* and Director's Order (DO) 47, *Soundscape Preservation and Noise Management*, recognize that natural soundscapes are a park resource and call for the National Park Service to preserve, to the greatest extent possible, the natural soundscapes of parks. The policies and director's order further state that the National Park Service is to restore degraded soundscapes to the natural condition whenever possible and protect natural soundscapes from degradation due to noise (undesirable human-caused sound). The natural soundscape of Badlands (sometimes called natural quiet) is one resource that makes this park a special place. Noise can cause direct or indirect adverse effects on the natural soundscape and other resources. It also can adversely affect the visitor experience. Visitors to Badlands have the opportunity to experience solitude and tranquility in an environment of natural sounds. Actions in the alternatives that could potentially increase noise levels would be of concern to park managers, visitors, and the public.

Geologic Features and Processes. The National Park Service is required by both the Organic Act of 1916 and *NPS Management Policies 2001* to protect and conserve geologic resources, including soils and paleontological resources that could be affected by visitors and NPS employees. Badlands National Park was established to protect its geologic resources, among other reasons. The park's geologic features and processes make Badlands distinctive and attract people to visit the park. Any actions that would affect these resources would

concern visitors, park managers, and the public.

Vegetation. One of the primary natural resources in Badlands National Park is its vegetative communities. The National Park Service is required by the Organic Act and *NPS Management Policies 2001* to protect and conserve native plants and vegetative communities that could be affected by visitors, park employees, and external sources. Actions in the alternatives that could alter or adversely affect vegetation would be of concern to many people, including park managers.

Wildlife. Badlands National Park supports a diverse wildlife population, including small mammals, ungulates, birds, reptiles, amphibians, and invertebrates. The park's big game, including bison and bighorn sheep, is an important park resource and an attraction that adds to the quality of the visitor experience. As with the above resources, the National Park Service is required by the Organic Act and NPS management policies to protect and conserve native wildlife populations that could be affected by visitors, park employees, and external sources. The loss of wildlife habitat or decreases in wildlife populations caused by actions of the alternatives would be of concern to visitors, the public, and park managers.

Special Status Species. The Endangered Species Act of 1973, as amended, requires an examination of impacts on all federally listed threatened or endangered plant and animal species. *NPS Management Policies 2001* repeat this requirement and add the further stipulation that the analysis examine impacts on state-listed endangered, threatened, or rare species and on species proposed for federal listing. Badlands National Park supports populations of federally listed and state-listed endangered species (black-footed ferret), state-listed threatened species (swift fox), and state-listed rare species. The park also supports several rare plant species that could be affected by this plan. The

spread of exotic species also is a growing concern in Badlands.

Cultural Resources

Ethnographic Resources. Ethnographic resources, such as a site, structure, landscape or natural resource feature assigned traditional, legendary, subsistence religious or other significance in addition to traditional cultural properties, exist in the area and are generally acknowledged as part of the historical territory of the Lakota branch of the Sioux. Traditional cultural properties are ethnographic resources that can be associated with cultural practices or beliefs and that are either eligible for inclusion in, or are listed on, the National Register of Historic Places. Such properties could be sites regarded as sacred, locations for gathering resources, activity areas, or other areas of ongoing traditional use. The park contains evidence of continuing Lakota traditional spiritual uses such as the presence of prayer banners. Current ethnographic information provided by the Oglala Sioux Tribe has indicated that there are several areas known to have special spiritual significance for the Oglala Sioux. In addition, an ongoing study to document and analyze historic and contemporary resource use of the Badlands National Park area by American Indian groups will contribute to a better understanding of the Lakota use of park lands.

Historic Buildings. In 2001 the South Dakota State Historic Preservation Office determined that the Ben Reifel Visitor Center was eligible for inclusion in the National Register of Historic Places. To date this is the only building that has been determined eligible. This plan contains an alternative that recommends the expansion of the park to include land near the Northeast entrance. These lands include the Prairie Homestead, which was listed in the National Register of Historic Places on January 11, 1974.

Visitor Experience

This impact topic relates to the quality of the visitor experience, which is significant to park managers and visitors. One of the purposes of Badlands is to provide for the public enjoyment. The analysis will focus on the following elements relating to visitor experience.

Access. Actions in the alternatives could result in changes in where and how visitors can gain access to different parts of the park. Therefore, this impact topic was included in the analysis of the alternatives.

Availability of Information. Actions in the alternatives could result in changes in where and how information is provided to visitors. Therefore, this impact topic was included in the analysis of the alternatives.

Range and Enjoyment of Visitor Activity. Actions in the alternatives could result in changes in opportunities for vehicle use, hiking and pack stock use, camping, and picnicking. Therefore, this impact topic was included in the analysis of the alternatives.

Scenic Resources. Actions in the alternatives could result in changes to the scenic resources of the park. Therefore, this impact topic was included in the analysis of the alternatives.

Socioeconomic Environment

Badlands National Park affects land uses adjacent to the park, the economy of local communities, and recreational opportunities on adjacent lands. Local residents and others are concerned about changes in the management of the park that could affect their lives and socioeconomic environment.

IMPACT TOPICS CONSIDERED BUT NOT ANALYZED IN DETAIL

Several potential impact topics were dismissed because they would not be

affected, or the potential for impacts under all of the alternatives would be negligible. These topics are listed below, with an explanation of why they were not considered in detail.

Prime and Unique Agricultural Lands

According to the Natural Resources Conservation Service, U.S. Department of Agriculture, there are no prime or unique agricultural soils in Badlands National Park (NCRS Huron, SD, Dan Shurtliff, pers. com. May 2, 2002).

Water Quality

Surface water is scarce in Badlands National Park, and very little data is available on water quality. Water that does occur in the park is usually ephemeral, occurring after storms and spring melt, and it is not potable due to naturally occurring dissolved minerals and very fine sediment. Water quality is believed to vary seasonally and from stream to stream, although the causes of these fluctuations are unknown (Black & Veatch 1998). The new developments proposed in the alternatives would not be in the vicinity of surface water, or would be built to avoid areas that may have water. The application of mitigation measures and best management practices, such as the use of silt fences and the erosion control materials, would reduce the potential for water quality impacts. Building some of the developments proposed in the alternatives would likely increase erosion in areas, even with mitigative measures and best management practices. In turn, the increased erosion would temporarily increase sediment loading of surface waters during construction, but the increase would be negligible given the naturally high rates of erosion and sediment loading that characterize the Badlands landscape — that is, the additional sediments that are temporarily added as a result of construction would be a small increment in what are normally turbid, sediment-laden

waters. No long-term adverse impacts on water quality would be expected as a result of the alternatives being considered; consequently, water quality was dismissed as an impact topic.

Floodplains

Badlands National Park has relatively few perennial drainages and thus few floodplains. The North Unit's facilities are outside regulatory 100-year floodplains, and none of the developments proposed in the alternatives would fall within 100-year floodplains.

Wetlands and Riparian Areas

Wetlands and riparian areas are rare in the Badlands because of the area's topography and low precipitation. Most wetlands are along or adjacent to streams, seeps, springs, old stock ponds, and ephemeral washes. Riparian shrublands and riparian/wet meadows all can be considered wetlands. The park also has artificial wetlands that developed near human-made ponds and dugouts. However, none of the developments in any alternative would be built in wetland areas, with the possible exception of the changed route of the Loop Road segment in the Cedar Pass area. Construction of the new Loop Road segment would avoid wetlands and riparian areas to the extent possible. However, depending on the corridor selected for the new Loop Road segment and the detailed road design, it is possible that some wetlands could be affected. If necessary, the National Park Service will prepare a wetlands statement of findings, as required under NPS policy and guidelines, when it prepares a detailed NEPA environmental document for the construction of the road segment.

Threatened and Endangered Species

Except for black-footed ferret, and swift fox, the environmental effects on state-listed and

federally listed threatened or endangered species will not be analyzed in this document. (The scientific names for all the plants and animals mentioned in this document are listed in appendix C.) It has been determined that none of the alternatives would adversely affect any of the species listed below; however, the park staff would conduct site-specific surveys before any ground disturbance took place to be sure that sensitive species would not be affected. If any of these species were found to be present, the park staff would undertake actions to reschedule, reroute, or relocate the actions to mitigate the effects.

Bald Eagle. The bald eagle is federally listed as threatened and listed by the state of South Dakota as threatened species. Bald eagles are known to inhabit Badlands National Park, but only 27 observations have been documented in the park since 1960 (Badlands NP natural history database 2002). Most of these observations have been between December and April, near water sources or near prairie dog towns. Consequently, bald eagles' use of the park is considered sporadic, uncommon, and unpredictable. Large congregations do not occur in this area, and there are no known regularly used winter perch sites, roost sites, or nest sites in the park. Given the limited, sporadic use of the park by bald eagles, it is unlikely that they would be affected by the actions of any of the alternatives.

Whooping Crane. The whooping crane, listed as endangered federally and by the state, is a migrant that occasionally uses the park's shallow, sparsely vegetated wetlands, wet meadows, and agricultural fields. No actions of any alternative would detrimentally affect the areas that the cranes use. With their limited use of the park, there would be no impacts on whooping cranes under any of the alternatives.

Peregrine Falcon. The peregrine falcon is listed by South Dakota as endangered; however, the park's database indicates that

there never has been a documented record of a peregrine falcon in the park, and the possibility that a pair would try to nest in the park is believed to be remote. Thus, the actions in the alternatives would not affect any rare migrant peregrine falcons passing through the park.

Natural or Depletable Resource Requirements and Conservation Potential

None of the alternatives being considered would result in the extraction of resources from the park. Under all alternatives, ecological principles would be applied to ensure that the park's natural resources would not be impaired.

Archeological Resources

Although Badlands National Park never has been systematically surveyed for archeological resources, a number of archeological surveys have been conducted since 1953. This has resulted in the identification of more than 200 sites. No known archeological sites that are currently considered eligible for the National Register of Historic Places are in areas that could be affected by the actions of any alternative.

In compliance with the 1995 programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, archeological sites in Badlands National Park will be identified, inventoried, and documented, and their eligibility for the national register will be evaluated. In areas proposed for development, surveys or monitoring would precede all ground-disturbing activities. If disturbance or deterioration would be the inevitable result, mitigation of any adverse effects would be carried out by qualified professional archeologists in consultation with the South Dakota state historic preservation officer. American Indian tribes also would be consulted.

Cultural Landscapes

The National Park Service recognizes four categories of cultural landscapes: historic designed landscapes, historic vernacular landscapes, historic sites, and ethnographic landscapes. Within Badlands National Park both historic and ethnographic landscapes seem to possess the qualities and have been identified as probable candidates for consideration as cultural landscapes — the site of prolonged Ghost Dances during the fall of 1890; Big Foot Pass along the Badlands Loop Road (believed to be the place where Chief Big Foot and his band, fleeing the U.S. Army, crossed the Badlands Wall on Christmas Eve, 1890); the fossil collecting sites of early paleontologists; and the Sage Creek Road, Sage Creek homesteads, and remnant sections of the Fort Pierre and Fort Laramie Road. However, no formal assessment of these landscapes has taken place.

In July of 2004 the South Dakota State Historic Preservation Office concurred that the Cedar Pass developed area is eligible for inclusion in the National Register of Historic places as a historic district. The Cedar Pass developed area possesses significance under national register criteria A and C for (1) early tourism associated with western landscapes and parks; (2) CCC development and New Deal master planning; and (3) the National Park Service's Mission 66 initiative within the areas of Architecture, Landscape Architecture, Social History/Tourism, Community Planning and Development, and Recreation, during the period from ca. 1928 through 1966. Despite the fact that Mission 66-era Cedar Pass development is less than 50 years old, Cedar Pass appears to meet the eligibility requirements of criterion consideration G as a relatively complete example of a Mission 66 developed area with a high degree of integrity, which remains rare and unusual within the state of South Dakota.”

Although all the potential landscapes face degradation from the endemic erosion that

characterizes the Badlands, there would be no effects on those potential cultural landscapes from the actions of any of the alternatives.

Museum Collections

Construction of a new storage and curation facility was recently (2005) completed. This facility will expand the available space for museum and associated archival collection storage. Located in the Cedar Pass developed area the facility meets current NPS museum standards for storage (36 CFR 79 - Curation of Federally-Owned and Administered Archeological Collections). All collections not currently used for display purposes will be housed and curated in this new facility. None of the alternatives proposed are expected to impact the facility building or the museum collections in any way. Therefore, the topic of collections will be dismissed.

Wilderness Values

Badlands National Park contains 64,000 acres of designated wilderness. The National Park Service will manage the wilderness for the use and enjoyment of the American people in a manner that will leave the values of the wilderness unimpaired for their future use and enjoyment as wilderness. There would be no adverse impacts on wilderness values in the park from any of the alternatives. The zoning proposed for the wilderness area is compatible with the mandates of the Wilderness Act and NPS policies relating to wilderness.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by agencies of the Department of the Interior be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United

States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources in the North Unit of Badlands National Park. The lands comprising the North Unit are not held in trust by the secretary of the interior for the benefit of Indians due to their status as Indians. Nothing being proposed in this plan would affect the federal government's trust responsibilities in the park's South Unit. Therefore, the impact topic, Indian trust resources, was dismissed.

Environmental Justice

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed by President Clinton on February 11, 1994. This order requires that all federal agencies incorporate environmental justice into their missions by identifying and addressing any disproportionately high and adverse human health or environmental effects that their programs and policies may have on minorities and low-income populations and communities. The secretary of the interior established Department of the Interior policy under this order in a memorandum dated August 17, 1994, which directs all bureau and office heads to consider the impacts of their actions or inaction on minority and low-income populations and communities, to consider the equity of the distribution of benefits and risks of those decisions; and to ensure meaningful participation by minority and low-income populations in the department's wide range of activities where health and safety are involved.

During the planning process, the planning team assessed the alternatives of this plan in the interest of fulfilling EO 12898 in the context of the National Environmental Policy Act. The team determined that none of the alternatives would result in

appreciable direct or indirect negative effects on any minority or low-income population or community as defined in the U. S. Environmental Protection Agency's *Environmental Justice Guidance* (1998). The following information contributed to this conclusion:

- ◆ The developments and actions in the alternatives would not result in any identifiable human health effects. Therefore, there would be no direct or indirect effects on human health within minority or low-income population or community.
- ◆ The impacts on the physical environment that would result from the

alternatives would not substantially and adversely affect minority or low-income population or community or be specific to such populations or communities.

- ◆ The planning team actively solicited public participation as part of the planning process and has given equal consideration to input from persons regardless of age, race, income status, and other socioeconomic factors.

Therefore, the National Park Service dismissed environmental justice as an impact topic in this document.

NATURAL RESOURCES

AIR QUALITY

Because of the 64,000-acre Badlands Wilderness Area, Badlands National Park is considered a class I air quality area, as defined in the Clean Air Act of 1977. A class I designation affords the greatest level of air quality protection provided under the Clean Air Act. Minimal deterioration of air quality is allowed under this designation.

Two air quality monitoring stations in the North Unit have been collecting data since 1988. One station monitors nitrogen oxides, sulfur oxides, volatile organics, and particulates (PM₁₀); the other station monitors visibility in the park. Passive ozone also is monitored in the summer.

The air quality in Badlands National Park generally is good. There are no major population centers near the park, and ranching and farming are the primary industries in the region; therefore, emissions of pollutants in the immediate vicinity are relatively low. Historically, the park has experienced only occasional, short-term air pollution from transient wildland fire smoke and blowing dust.

Wet deposition data collected in the late 1980s and early 1990s indicate that Badlands does not receive much deposition of sulfur and nitrogen, and thus does not face an apparent threat of acid precipitation (NPS 1998). Low sulfur dioxide values were recorded in the park, with mean values ranging from 0.10 parts per billion by volume (ppbv) in 1988 to 0.38 ppbv in 1993. The clean air baseline is estimated to be 0.19 ppbv (NPS 1998).

Ozone also is not a major pollutant in Badlands. Data collected from 1988 to 1992 showed the park had some of the lowest average ozone concentrations in the NPS monitoring network. Ozone levels were far

below those found to damage sensitive plants.

Visibility at Badlands sometimes is affected by haziness caused by fine particulates and gases. Historically, changes in weather patterns, winds, and smoke from fires have affected visibility in the area. Photography was used to monitor visibility from 1987 through 1995. The photographs indicate that on a clear day one often can see from a point in the park for 199 to 236 miles (320–380 km), whereas on a hazy day views can typically decline to only 37 to 50 miles (60–80 km). On an “average” day the visual range in the park is typically 62 to 81 miles (100–130 km) (NPS 1998). Interestingly, it is believed that pre-settlement visibility was lower than current levels because of frequent fires in the area in summer (NPS 1998).

There are a few minor sources of air pollution in and near the park — vehicle emissions in summer, dust (both natural and from agricultural operations), and smoke from fires (including prescribed burns in the park and on adjacent Forest Service lands and burning of agricultural waste on private lands). The pollutants include smoke, particulates, and carbon monoxide.

Most air pollution in Badlands National Park is believed to be from human-caused sources and fires within and outside the region. Small quantities of emissions from Rapid City power and industrial plants reach the park. Emissions of nitrogen oxides and sulfur dioxide from industrial facilities and electric utilities in western South Dakota (the Black Hills) and eastern Wyoming (the Powder River Basin) are of the greatest concern. Emissions of large quantities of nitrogen oxides in Wyoming reach the Badlands’ airshed. Westerly winds also transport nitrogen oxides, sulfur dioxide,

and volatile organic compounds eastward over the Black Hills and Badlands. Smoke from fires also contributes to regional haze. The amount of haze and other pollutants that affect the park's airshed depends on several factors, including the speed and direction of winds, the season, and the time of day.

Although Badlands National Park generally has good air quality, the overall trend is downward, which is primarily due to external sources. The emission of pollutants could be increased by various future developments being considered in the region, including several new coal-fired power plants, coalbed methane production, oil and gas production facilities, and railroads. If these plans are carried out, some pollutants would be blown into Badlands by the wind, and the park's air quality will deteriorate.

SOUNDSCAPE

Little quantitative information about sound levels in Badlands is available, but the park generally is considered to be a relatively quiet place. There is little noise caused by people in most of the park. Vehicles generate noise on the paved Loop Road and on unpaved roads used for recreation and as farm-to-market routes (park neighbors hauling livestock and grain through parts of the park). The traffic mix includes recreational vehicles of all sizes, commercial trucks, and local residents' cars. Other sound disruptions are created by visitors talking and shouting, park administrative operations, and aircraft overflights (including military flights and commercial tour helicopters). In addition to road corridors, the primary developed areas where these sounds can be heard are visitor and administrative facilities, such as those at Cedar Pass.

Most of the sound heard in Badlands National Park probably comes from wind blowing through the prairie and badlands

formations. Sounds from wildlife (such as bison and birds) also are often heard. Interestingly, Badlands' ambient soundscape is believed to be "louder" than that of other parks in the Rocky Mountains and Colorado Plateau. This is probably due to the open landscape and the prevailing winds that blow through the Badlands area (Foch Assoc., Dr. James D. Foch, pers. com., Dec. 19, 2001).

One noise study was conducted near Cedar Pass from mid-April to mid-October, 1999 (Foch 2000). The minimum sound level recorded was 25.8 dBA (A-weighted decibels), which is comparable to leaves rustling. The maximum sound was 94.3 dBA (95 dBA is comparable to a power lawnmower). Thunder probably was the loudest sound (Dr. James Foch, pers. comm.). Sound levels were less than 27 dBA for only 2.5 hours during the six-month study and greater than 60 dBA for only 16 hours.

Sound levels varied appreciably during an average day and from month to month. For example, the median sound level in June was highest during the day (48 dBA, equivalent to a quiet house in the evening) and lowest at night (36 dBA, equivalent to a soft whisper). But in July the median sound level was highest during the night (41 dBA) and lowest during the day (32 dBA). The reasons for this are unknown, but it is possible that the sound was caused by insects (Dr. James Foch, pers. com.).

Tour helicopter overflights were the dominant human noise recorded at the monitoring site during the six-month study. The helicopter most frequently flew in the range of 2,600 feet over the park, but it sometimes flew under 1,000 feet. A total of 499 events recorded in which the maximum sound levels exceeded background sound levels by 30 dBA or more for at least 10 seconds (excluding thunder). Of these, 475 were tour helicopter overflights.

GEOLOGY AND TOPOGRAPHY

Badlands National Park's geologic features are one of the primary reasons the park was established. In particular, as previously mentioned, the park's scenic landforms and paleontological resources are of special significance. But soils and ongoing geologic processes also affect the park's biota, visitors, and management. The park's geology and topography set the area apart from other prairie areas. The pinnacles, canyons, spires, and tables are a product of two basic geologic processes: deposition and erosion.

Background

Understanding the geology of Badlands requires going back to the late Cretaceous Period, 68 to 75 million years ago, when a vast shallow inland sea covered the area known today as the Great Plains. Material filtered through the seawater to form layers of sediment on the sea floor. These muddy sea floor sediments subsequently hardened; today they make up the Pierre Shale and Fox Hills Formations, which are visible in the Badlands Wilderness Area.

In the early Tertiary Period, about 65 million years ago, the Rocky Mountains and the Black Hills were uplifted due to plate tectonics. The uplifting of the Black Hills also caused a rise in the Badlands region, which caused the inland sea to recede, leaving layers of sediments behind. The sea was replaced by a riverine floodplain. Throughout the Late Eocene and Oligocene Epochs, 37 to 25 million years ago, waters draining from the Black Hills deposited more sediment. Today these sediments are known as the Chadron, Brule, and Sharps Formations. Most of the Badlands Wall – the prominent ridge that runs through the park – is composed of the Brule Formation.

Between 1 million and 500,000 years ago the Cheyenne River captured the streams and rivers flowing from the Black Hills, starving

the Badlands of any major sediment source. This event ended the major period of sediment deposition in the Badlands. Erosion became the dominant force that created the landforms seen today.

The White River, Cheyenne River, and Bad River drainage basins, which are all directly adjacent to the Badlands Wall, play a major role in the erosion of the badlands. Many small streams flowed away from the Wall and eventually intersected to create the Badlands topography. Each rainstorm over the next 500,000 years chewed away at the Wall, making its crest recede away from the rivers at its base.

Today's serrated Badlands terrain did not exist until about 500,000 years ago. The rocks of the Badlands are largely mudstone, claystone, and siltstone. These rocks are easily eroded by wind and rain. When water began to cut down through the rock layers, over time canyons, pinnacles, buttes, spires, and hoodoos were carved out.

Landforms

Three distinctive major landforms are present in the park today. Badlands walls, consisting of eroding walls, buttes, and escarpments, are the most prominent landform. Badlands basins are below the walls, where soils form in terracelike benches and wide gentle slopes. Gullied drainages cutting through these benches give them the appearance of low mesas. Plateaus and tablelands are the third landform. Erosion has left these isolated remnants of the once-higher plain.

The Badlands area is one of the fastest eroding landscapes on the planet. Rain, frost, snow, and wind are continuing to cut out and wash away the land, forming new canyons, cliffs, gullies, and other landforms. Every time it rains, more sediments are washed from the buttes. Evidence suggests that they will erode completely away in another 500,000 years, giving them a life of 1

million years (NPS n.d.-2). On average, Badlands buttes erode one inch each year, but change can occur more slowly or faster, depending on the location and type of rock.

Minerals

There are few minerals of economic interest in Badlands National Park. Mineral rights in the park have not been fully researched and identified; however, with a few exceptions the federal government does not own subsurface mineral rights in the park. The subsurface rights were not acquired when the park was established because there were no known commercially exploitable mineral deposits. There are outstanding mineral interests, including oil rights, gas rights, coal rights, and other mineral rights (most likely aggregate or gravel reserves) in the North but at present no mineral rights are being exercised (NPS 1992).

Geologic Hazards

The primary geologic hazards in Badlands National Park are landslides and slumps due to active erosion. Landslides always need to be considered in planning the construction of any road or facility in the park. Parts of cliffs and other badlands features can break off and slump away. Landslide areas often are associated with fault zones. Deep pits and holes can form in slump areas as erosion when rains occur or snow melts. Some of the largest slumps in the park are Cliff Shelf, Cedar Pass, and the Sage Creek Rim Road slump. These slumps are active during unusually wet seasons. The Cedar Pass landslide was stabilized by a large buttress built in autumn 2000. Another possible geologic hazard is rock falls from steep cliffs.

SOILS

Soils in the Badlands region consist primarily of altered sedimentary deposits of clay, silt, gravel, and volcanic ash. The badlands formations (and thus much of the park) generally lack soil because of active erosion.

Soils in the badlands basins have textures ranging from very fine sandy loam to clay, depending on the sediment source. Soils of the plateaus and tablelands differ by the ages of landscapes, the sources of materials, and the textures. Some sites have developed in mostly clayey residuum; other sites have loamy and sandy soils mostly transported by wind or water. Silty loess soils have formed on Sheep Mountain Table, where stable surfaces allow for the most sediment accumulation and soil development.

The Natural Resources Conservation Service has conducted soil surveys in the two counties covering the North Unit (SCS 1987; NRCS 1996). Most of the soil associations in the North Unit are classified as Badlands-Interior-Cedarpass and Norrest-Cedarpass-Interior in Jackson County and Cedarpass-Denby-Interior, Orella-Fairburn-Badlands, and Orella-Hisle-Whitewater in Pennington County. The Badlands-Interior-Cedarpass Association occurs in the Cedar Pass area. Aside from the badlands, soils in this association are found on uplands, fans, and floodplains and are deep, well-drained, loamy and silty soils.

The Norrest-Cedarpass-Interior Association consists of moderately deep and deep, well-drained silty and loamy soils on uplands, fans, and floodplains. The three other soil associations cover most of the North Unit and are scattered through the unit. The Orella-Fairburn-Badlands Association covers the badlands and dissected plains. These soils are shallow, well-drained, clayey, and loamy. The Orella-Hisle-Whitewater Association also is found on dissected plains and other plains. The soils of this association are shallow and moderately deep, well-drained, clayey, and silty.

The Cedarpass-Denby-Interior Association is on alluvial fans and terraces along the base of Badlands. These soils are deep, well-drained, loamy and clayey. Intermingled with the barren badlands, clayey and loamy

soils occur on mesas, escarpments, buttes, tablelands, and in basins.

The expansive nature of most of the park's badlands soils limits their suitability for recreational developments and other buildings. All of the park's soils associations are subject to water and wind erosion. Controlling erosion in areas with these soils can be a major concern

Soils in the park area have been removed to build visitor centers, park roads, parking areas, administrative offices, and other facilities. Historically, agricultural practices have increased the erosion rates of prairie soils. Hikers, backpackers, visitors driving vehicles off roads, and horseback riders also have affected the park's soils compaction and erosion rates through trampling. Although impacts have not been documented, it is probable that surface organic horizons have been lost, that erosion and compaction have increased, and that porosity and infiltration rates have been reduced (Hammit and Cole 1998).

PALEONTOLOGICAL RESOURCES

The White River Badlands region, which encompasses the park, contains the largest known assembly of late Eocene and Oligocene mammal fossils in North America. Since the description of a titanotherium mandible by Dr. Hiram Prout in 1846, the Badlands has played a major role in the development of the science of paleontology in North America. Many important finds from the area have served to define the North American Land Mammal Ages in the Late Eocene and Oligocene Epochs. Paleontological resources were a major reason for establishing Badlands National Monument in 1939 and designating the monument a national park in 1978. Thousands of legitimately collected specimens are housed in museums and collections around the world.

The history of the White River Badlands as a significant paleontological resource goes back to the traditional American Indian knowledge of the area. The Lakota found large fossilized bones, fossilized seashells, and turtle shells. Paleontological interest in the area began in the 1840s, when trappers and traders traveling along the Fort Pierre to Fort Laramie trail occasionally collected fossils. Alexander Culbertson, an agent of the American Fur Company, made the first collection from the area. Culbertson sent a fossilized jaw fragment to Dr. Hiram A. Prout in 1843. Since then, scientists from major universities, museums, and the government have been attracted to this area. Hundreds of scientific papers on the White River Badlands have been published.

Fossils from the area have provided valuable information for understanding mammalian evolution and diversity, paleoecology, and paleoclimates. Erosion has exposed both mammal and marine fossils in the park. Marine fossils are found in the deposits of an ancient sea that existed in the region some 75 million to 68 million years ago, during the Cretaceous Period. Fossils that have been found in the Pierre Shale and Fox Hills Formations include ammonites, nautiloids, fish, marine reptiles, marine turtles, plesiosaurs (large water reptiles), and mosasaurs (giant marine lizards).

During the Eocene and Oligocene Epochs, 25 million to 37 million years ago, a great variety of animals lived in the Badlands. Untold numbers of those that died in the rivers, streams, swamps, floodplains, and lakes were preserved by layers of sediments. Oligocene fossil remains that have been found in the park are camels, three-toed horses, oreodonts (a sheeplike animal, the most common mammal found), antelope-like animals, brontotheres (or "titanotheres," large grazing animals that resembled a rhinoceros), rhinoceroses, false deer, rabbits, beavers, creodonts (predatory animals), saber-toothed cats, land turtles, rodents, and birds.

All of the North Unit potentially contains fossils, but only a small percentage of the area has been surveyed for fossil resources. Most of these areas consist of historic research sites (Clark, Beerbower, and Kietzke 1967) and small-scale projects completed by individual contracts and paleontological interns (Cicimurri 1995; Lala 1996; Martin and McConnell 1997; Martin and DiBenedetto 1997, 1998). A preconstruction survey was completed along the Badlands Loop Road in 1996–1998 (Benton 1998). A three-year baseline survey of fossil bone beds in the Scenic Member of the Brule Formation began in the summer of 2000.

In 1993 the Big Pig Dig site was discovered along the Conata Road. Some remains found in the site are *Subhyracodon* (early rhinoceros), a partially complete *Archaeotherium* (a piglike mammal), *Mesohippus* (early horse), *Leptomeryx* (a deerlike mammal), saber-tooth cat, oreodont, and a rodent incisor. This major paleontological discovery is significant for the following reasons:

- ◆ It may be the largest concentration of early Oligocene mammals ever uncovered.
- ◆ The preservation of the materials is excellent.
- ◆ The individuals are relatively complete.

More than 5,000 bones have been collected from the site. Other significant bone beds have been found in the park and are being documented.

The geologic nature of Badlands allows fossils to disintegrate within a few years after emergence. Exposed surface materials are often lost before they can be recorded, collected, or preserved.

Fossil collecting without a research permit, although illegal in national parks, is a popular pastime. Visitors pick up an

unknown amount of material every year, and an unknown amount of illegal commercial and private collecting also occurs in the park. The park initiates 20 to 25 cases a year, which typically results in three to four citations / prosecutions a year.

VEGETATION

Badlands National Park is at the western edge of what was once the mixed-grass prairie ecosystem. The mixed-grass prairie of the central United States was a transition zone between the arid short-grass prairie to the west and the moist tall-grass prairie to the east. Today the park supports one of the largest contiguous native mixed-grass prairies under federal protection in the United States, and it is part of one of the largest remaining mixed-grass prairies in North America.

The vegetation of Badlands was mapped in 1999 as part of a nationwide vegetation mapping project of the United States Geological Survey and the National Park Service (Bureau of Reclamation 1999). Outside of sparsely vegetated areas, nine major vegetative communities were identified: dry mixed-grass prairie, mesic mixed-grass prairie, introduced grasslands, riparian / wet meadows, dry plains shrublands, mesic plains shrublands, riparian shrublands, dry coniferous forest and woodlands, and riparian deciduous forests and woodlands. With the elimination of livestock grazing in the North Unit and farming, and with NPS management efforts to eliminate nonnative species, the park's current vegetative mix is believed to approach what naturally existed before the influx of European settlers.

Botanical Studies and Native Plants

A number of botanical studies have been done in the North Unit. The park's plant inventory is estimated to be about 90% complete. A total of 457 vascular plant species, representing about 70 families, have been documented in the park. About 38

more species are believed to inhabit the park but have not yet been documented. The largest numbers of species present are in the Asteraceae (sunflower) family. There is also an inventory of lichens: a total of 128 lichen and lichenicolous fungi species were recorded in the North Unit (Will-Wolf 1998). Little information is available on other nonvascular plants in the park.

Grasses are the dominant plants in Badlands. Forty-one species of native grasses have been recorded in the park. Among the most important are buffalo grass, blue grama, western wheat grass, and needle-and-thread grass. The grasses are well-adapted to environmental conditions, able to withstand high winds, long periods of dry weather, and frequent fires. They also furnish food and habitat for wildlife, add humus and fertility to the topsoil as they decay, and hold the soil from being blow or washed away.

Vegetative Communities

Grasslands. Grasslands are the dominant vegetative community in the park, covering about 54,000 acres, or 49% of the North Unit. Many natural and anthropogenic factors have influenced the park's current grasslands, including soil type and depth, moisture levels, fires, and grazing. As a result, the park has a diverse grassland mixture that intermingles in small units across the landscape.

Western wheatgrass mixed-grass prairie, the most common vegetative community in the park, covers about 300 acres, or 5% of the park. Dry mixed-grass prairies are found throughout the park. Western wheatgrass (see appendix C for the scientific names of plant and animal species), blue grama, needle-and-thread, threadleaf sedge, little bluestem, side-oats grama and buffalo grass dominate this plant community. Other forbs and grasses are commonly present as well, including prairie coneflower, white milkwort, and prairie dropseed. In wetter spots on selected hills, slopes, and buttes can

be found mesic mixed-grass prairie, dominated by western wheatgrass and green needlegrass.

Riparian/wet meadows are a rare grassland community, covering about 1% of the park. They are found along the bottoms of drainage channels. Switchgrass and prairie cordgrass are two grasses commonly found in these wet areas.

Other Vegetative Communities.

Shrublands cover about 2,800 acres, or 3% of the park. They are mainly along river and creek floodplains and on sand deposits, mesic slopes, and draws. The shrublands most widespread in the park, dominated by silver sagebrush, are regularly found on floodplains and adjacent slopes. Sand hills support extensive stands of sand sagebrush shrubland, particularly in the southern half of the park. Yucca stands typically are found along the margins of buttes, on low sandy ridges, and on dry canyon sides. Mesic draws, swales, slopes, and drainages support patches of various broad-leaved shrubs, including silver sagebrush, western snowberry, American plum, and three-leaved sumac.

Woodlands are uncommon in Badlands, covering less than 1,000 acres, or 1% of the North Unit. They generally are restricted to floodplains, drainage bottoms, the toes of sand hills, draws associated with eroding buttes, and slumps on butte and cliff faces. Rocky Mountain juniper forms the most common woodland in the park, growing on drier slopes and slumps, along butte edges, and in upper draws. Hardwoods are found in more mesic sites, including the bottoms of draws, stream floodplains, and the toes of sand hills, with green ash and American elm being the most common trees. Extremely mesic sites, along river floodplains, minor streams, seeps, springs, and ponds, support stands of eastern or plains cottonwood and peachleaf willow.

About 46% of Badlands (500 acres) is sparsely vegetated or barren. The Badlands formations provide a harsh, inhospitable environment for vegetation. Moisture is usually scarce, and what is there rapidly runs off the steep slopes instead of soaking into the ground. Surface temperatures are often extreme. Sparse vegetation grows on the park's pinnacles, cliffs, mounds, outwash fans, intermittent drainages, and low hills covered by chalcedony (a flat, crystalline rock with properties similar to quartz). Drought-tolerant shrubs such as silverscale saltbush and broom snakeweed can be found in these areas, together with annual forbs. Sparse vegetation also is found in areas of established prairie dog towns. Constant prairie dog use of these areas results in a weedy, forb-dominated community.

Approximately an additional 1% of the park is covered by other largely nonvegetated features, including developments, roads, utilities, drainages, ponds, and quarries.

Special Status Species — Rare Plants

There are no federally listed plant species in Badlands National Park. However, several plants are listed as rare by the state. Three rare species endemic to the region are found primarily in sparsely vegetated badland areas: Barr's milkvetch, Dakota buckwheat, and sidesaddle (or Secund) bladderpod. Two state-listed rare plants are found in the park's prairies but are not endemic to the region, Easter daisy and largeflower Townsend daisy. Another rare plant, Parry's rabbitbrush, was documented in 2003 growing in the park's dry open plains.

Exotic Plants

Exotic (nonnative) plants can be found throughout the park on lands that have been disturbed by human activities. Grazing and dryland farming introduced exotic plants into Badlands. Seeds from lands outside the park also have blown in or have been carried

into Badlands inadvertently. A total of 71 exotic plant species are known to grow in the park. The distribution of most annual exotic plants is limited; they are found primarily in disturbed areas. Most of the species have been in the area for a long time and are likely to continue to exist in disturbed areas, posing little threat to native species.

Two exotic annual grasses, Japanese brome and downy brome are very common along foot and game trails. These species usually are present to some degree in all the park's grasslands, especially the western wheatgrass stands. Other relatively common exotic species found in various disturbed sites are smooth brome, crested wheatgrass, Kentucky bluegrass, alfalfa, Canada thistle, and giant ragweed.

A biennial yellow sweetclover is widespread through the North Unit. During peak growing years, this plant can grow to about 4 feet tall, covering native grasslands. This plant is of concern because it may be causing ecological damage by its soil chemistry changes.

Four of the annual exotics are of special concern for park managers. Japanese brome and downy brome both have demonstrated an ability to spread into native prairie, where they directly compete with native species. Halogeton, which is common on badlands features in the Cedar Pass area, is poisonous to ungulates. At high density this plant could pose a risk to the park's bighorn sheep population. Puncture vine, common along the edges of park's gravel-surfaced roads, frequently causes flat tires on visitors' bicycles, interfering with the visitor experience.

Noxious weeds in the park that have been designated by the county and state are the puncture vine mentioned above, field bindweed, spotted knapweed, Russian knapweed, houndstongue, perennial sow thistle, and Canada thistle. Infestations of Canada thistle are present, with the plant

growing in almost 5,000 acres are in the North Unit. Canada thistle primarily grows adjacent to roads and along watercourses, in wooded draws and swales, adjacent to wildlife water impoundments, and in prairie dog towns. It also is invading native grasslands. The plant has greatly altered riparian vegetative communities, excluding native vegetation.

Three other noxious species, leafy spurge, hoary cress and Dalmatian toadflax, are not known to be in the park at present but are expected to invade during the life of this plan. Leafy spurge can be found immediately west, east, and south of the park.

Tamarisk also is known to be present in the Cheyenne River and its tributaries; therefore, it may be present in Sage Creek.

The staff has several ongoing efforts to control the spread of exotics in the park. Most of the effort has focused on stopping the spread of Canada thistle, with both chemical and biological controls being used. In addition, much work has been done in the past five years to manage knapweeds. Cool-season exotic grasses have been experimentally treated since 2000 with spring prescribed fires, followed by interseeding with native species.

Vegetation and People

Farming, grazing, the elimination and reduction of native wildlife, and fire suppression have substantially affected the grasslands in Badlands National Park. Little of the land now in the park was plowed, but dryland farming was practiced in scattered areas throughout the park. Horses, cattle, and sheep also grazed on much of the native grasslands now in the park. Livestock grazed all of Badlands from 1942 to 1962 (Langer 1998). Domestic livestock grazing stopped in the North Unit in the 1960s.

The agricultural activities in the park introduced exotic plants and changed the

distribution and extent of the natural vegetative communities. Introduced grasslands dominated by smooth brome, crested wheatgrass, and Kentucky bluegrass now occupy about 2% of the park. These grasslands cover several old fields and pastures in the North Unit. In the past, the National Park Service also planted nonnative grasses along road corridors, around facilities, and at overlooks.

Frequent low to moderate intensity fires formerly maintained the prairie ecosystem, but since the early 20th century, nearly all fires within park boundaries were extinguished before they could spread far. Without fire, the density and variety of plant species, particularly forbs, were altered — without fires, there are fewer annual forbs. However, starting in the early 1980s (and more often in the 1990s) prescribed burning has been used in the park to substitute for natural wildland fires. About 5,000 acres are burned annually in the North Unit. With livestock grazing ended and the reintroduction of native plants and fires, the condition of the prairies in the North Unit has improved.

The primary impact of visitors on park vegetation probably is the unintentional transport of exotic plants into and around the park. Seed can be transported in on vehicles and clothing, resulting in the introduction and spread of exotic plants. Other visitor impacts on park vegetation have not been documented. However, trampling of vegetation has been observed, particularly at overlooks along the Loop Road. Much vegetative disturbance has been caused on Sheep Mountain Table by off-road vehicle (ORV) travel and frequent human-caused fires.

WILDLIFE

A variety of wildlife species occupy Badlands' woodlands, shrublands, and grasslands. There are small mammals,

ungulates, birds, reptiles, amphibians, and invertebrates. A total of 56 mammal species have been documented in the park; 8 others may be there but have not been documented. A total of 112 bird species have been documented (6 other species are thought to be there), and 17 reptile and amphibian species (2 more are thought to be there) (NPS 2001f). In addition, there are probably several fish species in drainages like Sage Creek and in stock ponds in the North Unit, although the number and type of species have not been documented. There also are numerous arthropod and other insect species in the park.

Ungulates

White-tailed deer generally are restricted to scarce riparian habitats and are seen infrequently. Pronghorn and mule deer are commonly seen. Both deer and pronghorn move in and out of the park and are hunted on lands adjacent to the park. Two species of special interest in the park are bison and bighorn sheep. Both of these species were extirpated from the park in the late 1800s and early 1900s.

Bison. Bison were restored to the park in 1963, and more were released in 1983. The healthy herd now numbers about 700 head of bison. Excluding the badlands area in the range, the herd has access to roughly 40,000 acres in the North Unit. They roam primarily in the Sage Creek and Tyree Basins. Bison management requires that parts of the park be fenced to prevent animals from moving onto surrounding private and public grazing lands. Water supplies and available forage require that the herd be limited to around 650 animals. Periodically, surplus bison are rounded up and transferred to tribal governments and other agencies.

The potential exists to expand the bison range along the Loop Road in the North Unit, which would increase public viewing opportunities and enlarge the area that is

subject to a more natural grazing regime. The park staff is examining possible range expansions as part of a bison management plan that is being prepared.

Bighorn Sheep. Rocky Mountain bighorn sheep were restored to the park in 1964 to fill the ecological niche formerly occupied by the now extinct Audubon's bighorn sheep. The sheep now number between 58 and 74 animals. They are found primarily near the Pinnacles and Cedar Pass in the North Unit. A key migratory route for the bighorns (and other wildlife) is the narrow neck at the southwest end of the North Unit, which is bisected by South Dakota Highway 44. However, much of the historic bighorn sheep habitat in the park remains unoccupied. In addition, the sheep population suffered a major decline between 1994 and 1996. The cause of the decline is not known, but an epizootic disease is suspected. As a result, the sex ratios are skewed in the park, and the Pinnacles subpopulation is in immediate danger of extirpation. Thus, the long-term survival of Badlands' bighorn sheep population is uncertain.

In late September 2004 the Park Service, in cooperation with the New Mexico Game and Fish and South Dakota Game, Fish and Parks departments, translocated 23 Rocky Mountain bighorn sheep in the Pinnacles area to supplement the existing population of 50 -70 animals. It is hoped that the new animals will increase the genetic diversity and viability of the park's bighorn sheep population.

Carnivores

Twelve carnivore species inhabit Badlands National Park, but only the coyote and the bobcat are common. Since 1960 there have been 30 documented records of badger in the park and 16 documented records of the red fox; therefore, these species are considered uncommon (NPS 2002a).

Small Mammals

Small mammal species common in the park are least chipmunk, eastern and desert cottontail rabbit, black-tailed prairie dog, deer mouse, muskrat, and several other smaller rodents.

Black-tailed Prairie Dog. The state of South Dakota classifies the black-tailed prairie dog as a species of management concern. This herbivorous, social, ground squirrel is considered a keystone species of the Great Plains.

Black-tailed prairie dogs live in large communities called colonies or towns. Groups of colonies make up a complex. Historically, prairie dogs lived in large, interconnected colonies that contained thousands of individuals and extended for miles. Most black-tailed prairie dog colonies today are smaller than 100 acres, disjunct, and geographically isolated from other colonies.

Black-tailed prairie dogs alter their environment, forming a microhabitat in mixed grass prairies. They alter the soil structure by digging burrows and alter the type and density of plant cover, providing sites for forbs that generally are less common in prairie communities. They reduce the height of vegetation and change the density and abundance of other wildlife, including birds and small mammals (Agnew 1983; Colo. State Univ. 1982; Cincotta, Uresk and Hansen n.d.).

A number of species depend on prairie dogs to varying degrees for their survival. At least nine species depend directly on prairie dogs or their activities to some extent, and 137 more species are associated opportunistically (Kotliar et al 1999). Prairie dog burrows provide shelter for burrowing owls, rattlesnakes, swift foxes, and many other animals. The prairie dogs themselves are prey for blackfooted ferrets, ferruginous hawks, golden eagles, and many other

predators. Sharps and Uresk (1990) found that at least 40% of all vertebrates west of the Missouri River are associated with prairie dog towns.

Today black-tailed prairie dogs inhabit 95% less of the area they occupied at the previous turn of the century (1900) (USFWS n.d.). In South Dakota, occupied prairie dog habitat declined from more than 1,757,000 acres in 1918 to about 147,000 acres in 1999 (*Federal Register* Feb. 4, 2000, 5481). According to the USFWS (n.d.) the three primary causes of the decline in the Great Plains are conversion of prairie to farmland; large-scale poisoning efforts by ranchers and governmental agencies; and the spread of sylvatic plague. In some localities, shooting of individuals may be limiting populations (USFWS n.d.). The vulnerability of prairie dogs to further reductions in population may be related to the number or size of colonies in which they exist, the spatial relationship of colonies to one another, existing barriers to colonization and dispersal to other areas, and the number and nature of direct threats to the species.

The historic extent of black-tailed prairie dogs within the boundaries of Badlands National Park is unknown. It is estimated that in 2003 active prairie dog towns covered approximately 4,000 acres in the North Unit. These towns are spread out over the entire park in low-lying, flat, grassy regions that are separated by badland formations and drainages. Most of the towns are small and fragmented, but the North Unit still supports large prairie dog complexes, including a 1,000-acre complex made up of 14 towns.

It is estimated that only about 5% of suitable habitat in the North Unit is occupied by prairie dogs. This could indicate that the prairie dogs in the park have the ability to expand. However, the limited amount of grazing by wild ungulates that occurs in the North Unit does not produce the ideal

conditions for prairie dog expansion that is seen in heavily grazed areas.

Information from five years of mapping and density estimates of the population indicates that the Badlands prairie dog population is stable or increasing slightly. Some towns have decreased because of the invasion of Canada thistle and clover, but most towns are stable. The reason that prairie dog numbers are not increasing and towns are not expanding may be related to 5 to 6 years of above-normal precipitation, with corresponding vegetation growth and less grazing pressure. For prairie dog towns to expand vegetation resources must be low.

Birds

Badlands provides habitat for a diverse bird population, including raptors, waterfowl, shorebirds, herons, cranes, woodpeckers, and songbirds. Most of the park's bird species are either summer residents or migrants. Approximately 68 bird species have been observed nesting in the park. Birds frequently seen in the park are barn swallow, cliff swallow, horned lark, lark bunting, mourning dove, grasshopper sparrow, red-winged blackbird, and western meadowlark. Other common bird species include northern harrier, red-tailed hawk, prairie falcon, black-billed magpie, killdeer, mountain bluebird, and American robin.

The sharp-tailed grouse, another common resident species, is representative of the prairie ecosystem. It is suspected that grouse leks ("dancing grounds," where courtship "dances" occur) are in the park. Golden eagles are fairly common in the park in winter, and they nest in the park.

Loggerhead shrikes also are common in the summer. Other birds of special interest that are summer or winter park residents are long-eared owl, barn owl, burrowing owl, snowy owl, ferruginous hawk, Swainson's hawk, and wild turkey.

Reptiles and Amphibians

The boreal chorus frog is an abundant amphibian in Badlands National Park. Other common amphibians are Woodhouse's toad and the Great Plains toad. Some common reptiles are western plains garter snake, bullsnake, and prairie rattlesnake (Smith et al 1998).

Insects

Common butterfly species found in Badlands are eastern tiger swallowtail, checkered white, cabbage white, clouded sulphur, striped hairstreak, melissa blue, regal fritillary, Atlantis fritillary, variegated fritillary, pearl crescent, Wiedemer's admiral, viceroy, mourning cloak, red admiral, painted lady, hackberry emperor, common wood nymph, common check-kipper, and Delaware skipper. Several species of grasshoppers and crickets (Orthoptera) are common in the park, as are elm leaf beetles and elm bark beetles.

Wildlife and People

Wildlife is affected by the activities of visitors and park staff, such as road construction and maintenance. The extent of the effect depends on many factors, including the type, predictability, frequency, and timing of the recreational activity (Knight and Cole 1995). Human actions also can result in the loss of wildlife habitat. For example, trampling or removing vegetation can reduce or eliminate cover for wildlife.

The effects of visitors on wildlife in Badlands have not been documented. However, in trying to see wildlife better, hikers have been observed disturbing bighorn sheep and bison. It is possible that visitors might adversely affect sheep lambing in places. Aircraft overflights also might disturb bighorns and other wildlife in the park.

SPECIAL STATUS SPECIES — THREATENED, ENDANGERED, OR CANDIDATE SPECIES

Several state-listed and federally listed species are known to exist in and around Badlands National Park and use habitats in the park. The U.S. Fish and Wildlife Service have determined that black-footed ferret, bald eagle, whooping crane, and least tern can be found in the two counties that encompass the North Unit (see appendix D). The black-tailed prairie dog also is a candidate for listing. However, no least tern habitat is found in the park. The other bird species either are transitory migrants or are found in limited numbers in Badlands; therefore, they are not discussed further in this document (see “Impact Topics Considered but Not Analyzed in Detail,” p.77).

The state of South Dakota lists bald eagle, peregrine falcon, whooping crane, black-tailed prairie dog, black-footed ferret, mountain lion, and swift fox as threatened or endangered species. Most of these species occupy the park in limited numbers or would not be affected by this plan; therefore, they are not discussed further (as mentioned on p.77). Swift foxes recently were reintroduced into the park. The park also contains potential habitat that might be affected by actions in this plan, which could affect future efforts to restore the fox in Badlands. Therefore, the swift fox is discussed below.

Black-footed Ferret

The black-footed ferret (*Mustela nigripes*) is listed by both the federal and state governments as endangered. Indeed, it is one of the most endangered mammals in North America. In 1987, only 18 individuals survived. However, an aggressive captive-breeding and reintroduction program has made progress in recovering the ferret population.

Black-footed ferrets, a member of the weasel family, are the only ferret native to North America. These predators feed primarily on prairie dogs. Because they are solitary and hunt at night, ferrets are seldom seen. Black-footed ferrets live in prairie dog towns and cannot survive for extended periods outside of prairie dog colonies — ferrets would not be able to survive in the wild without the right number, quality, and distribution of prairie dog colonies (Licht 1997).

Black-footed ferrets rely on prairie dog burrows for shelter, family rearing, and escape from predators. Small ferret populations survive best on larger complexes of prairie dogs. Individuals may use small prairie dog towns for dispersal, but they appear to be unable to persist in them long-term. At its peak in 1984, the average density of the Meeteetse, Wyoming, ferret population (the last ferret population discovered in the wild before the recovery effort began) was about one ferret per 124 acres of habitat. The smallest prairie dog colony (which supported one ferret) was 31 acres, and only towns greater than 250 acres supported more than one adult. Colonies larger than 445 acres were continuously occupied by ferrets, while smaller colonies were used only seasonally (USFWS, NPS, and USFS 1994).

Black-footed ferret populations are characterized by short individual lifespans and high turnover rates of individuals. Few ferrets live longer than three years in the wild. They have many natural predators, including owls, hawks, eagles, coyotes, badgers, and bobcats.

At one time ferrets were found throughout the Great Plains, including South Dakota. It is believed that they never were abundant, although their underground nocturnal habits make it difficult to know for certain. The decline and near extinction of the species is attributed to three main causes: habitat conversion for agriculture, extensive efforts to control prairie dogs (which

competed with livestock for available prairie forage), and sylvatic plague, a disease that wiped out large numbers of prairie dogs. These three factors also fragmented prairie dog colonies, making large areas of habitat unsuitable for black-footed ferrets. The introduction of canine distemper probably also played a role in the decline of the species. In the Badlands area, after large carnivores such as bears and wolves were removed, the proliferation of coyotes (the main predator on ferrets in this area) may have increased predation on ferrets.

Little historical information is available about ferret densities in the Badlands National Park area. They probably were resident in some number; documented populations were found in neighboring Shannon and Mellette Counties in the 1960s and 1970s. It is not known when ferrets disappeared from the park, but the last confirmed sightings of individual black-footed ferrets in South Dakota were in 1979 and 1983.

Badlands National Park and the Conata Basin area of nearby Buffalo Gap National Grassland were designated as a reintroduction site in 1994 (USFWS, NPS, and USFS 1994). A total of 217 captive-bred individuals were released in the park from 1994 through 1999 (when the reintroductions ended) or an average release of 35 animals each year. Many of these ferrets died soon after their release because of high levels of avian and terrestrial predation. Predation also was a major cause in high natural mortalities of juvenile kits born in the wild. In spite of the loss of many of the released individuals, successful reproduction of ferrets has been detected every year. The minimum detected wild born production at Badlands from 1995 through 2001 was 29 litters consisting of 66 ferret kits.

Since the end of the captive born ferret releases in 1999, the ferret population has begun to disperse outward from the release sites to smaller adjacent prairie dog colonies

in the park, on the national grassland, and onto private lands. This dispersal has resulted in an increase of prairie dog towns confirmed to be occupied by ferrets, with a corresponding decrease of ferret densities in the prairie dog towns used for the original release. The ferret population now is concentrated in the Kocher Flats and Roberts areas in the North Unit.

The park's ferret population reached a high in late summer 2000 with a minimum of 33 individuals, and then declined to an estimated 14 individuals in the autumn of 2001. As of 2003, nine animals were known to be in the park, including at least one litter of kits. Although the park's ferret population has been declining, the ferret population in the adjacent Conata Basin in Buffalo Gap National Grassland has been flourishing: as of 2003 at least 200 adult ferrets had been recorded, with a minimum of 65 litters of kits (Badlands National Park, B. Kenner, pers. com., Nov. 7, 2003). More monitoring is needed to determine if the decline in the park is due to the inability of the park's fragmented prairie dog habitat to support a viable ferret population, the dispersal of the ferrets to lower quality habitat, survey detection problems, disease in the ferret population (canine distemper has been confirmed in the local coyote population) or an increase in predation on ferrets.

The park's reintroduced black-footed ferret population is designated a nonessential experimental population under the Endangered Species Act. This designation allows federal, state, and tribal resource managers more flexibility in managing this population. It provides for experimental designs in releasing animals and allows for incidental take of individuals (such as the death of an individual during anesthesia). The management of surrounding private land is not affected under this designation, and private landowners have latitude in addressing concerns, such as trapping and translocating individual ferrets. Individual ferrets under this designation still are

protected from trapping, shooting, or harassment.

Swift Fox

Badlands National Park falls within the estimated historic and current range of the swift fox (*Vulpes velox*), which the state of South Dakota lists as threatened. Before European settlement of the Great Plains, the swift fox was believed to be relatively abundant. It generally inhabits flat, open prairie areas. The decline of this species in its northern range is believed to have been the result of fur trapping and hunting, predator and rodent control programs, habitat loss, droughts, severe winters, and disease (Carbyn et al 1993). By 1900 the swift fox was relatively rare in the northern plains.

Swift fox habitat in the park is concentrated in the Sage Creek area and along the northern edge of the North Unit. Up until recently, swift foxes had been documented

infrequently in the park and in the national grassland adjacent to the North Unit, primarily in the Upper Sage Creek area. In 1987 a family group of swift fox were trapped on the Pine Ridge Indian Reservation and translocated into the North Unit. Foxes also were released in the Cedar Pass area in 1988, but no sightings were subsequently reported.

In 2003, the park staff began a three-year effort to reintroduce swift fox into the North Unit. Thirty radio-collared animals were released in the North Unit that year, 28 animals were released in 2004, and an additional 30 animals are planned to be released in 2005. Although there has been some mortality in the foxes in the park, several of the foxes also have mated and reproduced. In 2004, three pairs of foxes produced 15 pups, of which nine were still alive in the fall of 2004. The foxes are primarily staying in the park and in the adjacent Buffalo Gap National Grassland.

CULTURAL RESOURCES

BACKGROUND

Badlands National Park's cultural resources comprise archeological resources, historic structures, ethnographic resources (including traditional cultural properties), cultural landscapes, and museum collections. Little of the park (approximately 5%) has been surveyed to identify cultural resources. Most of these surveys have been conducted in the Cedar Pass developed area as a result of project-specific development, leaving the likelihood for presence of cultural resources in the rest of the park unknown. To identify any currently unknown cultural resources in the remaining areas of the park, additional surveys may be required before undertaking the actions associated with this GMP/EIS. Should cultural resources be identified, appropriate mitigation measures as described in "Mitigating Measures" in the "Alternatives, including the Preferred Alternative" chapter, will be carried out should avoidance of these resources not be feasible.

Available documents outlining the known cultural resources and their condition include archeological surveys related to previous development projects and cultural landscape analyses. Additionally, in 2005 a historic resource study (HRS) was initiated for Badlands National Park.

The purpose of the history resource study is to provide a historical overview of the park and to identify and evaluate the park's cultural resources within a historic context. It is expected that at the end of the study in 2007, a context for assessment will be provided for all structures and buildings for possible addition to the List of Classified Structures. It is further expected that the context will assist in making recommendations for their inclusion in the National Register of Historic Places (NRHP). The park's "Resource Management Plan" (NPS 1999c) presents baseline resource status and

provides a foundation for the following discussion of the park's cultural resources.

HISTORIC STRUCTURES

The National Park Service maintains a computerized List of Classified Structures (LCS) for all of its national parks. The list consists of an evaluated inventory of all historic and prehistoric buildings and structures with historical, architectural, or engineering significance that the National Park Service has legal interest in or manages. Included are structures that individually meet the criteria of eligibility for the National Register of Historic Places or are contributing resources of sites and districts that meet the national register evaluation criteria.

Over time the List of Classified Structures can change as buildings and structures are altered or removed, or are identified and assessed for condition, importance, and eligibility to the National Register of Historic Places. As a result, the list for Badlands National Park has remained a dynamic and changing database.

As currently constituted the List of Classified Structures for the park contains five properties: four historic roads or segments and a gravesite (table 9).

TABLE 9. LIST OF CLASSIFIED STRUCTURES, BADLANDS NATIONAL PARK

1. Eugene Tyree Gravesite
2. Cedar Pass to Northwest Entrance Road
3. Cedar Pass Road
4. Sage Creek Road — Hocking Ranch Road to Northwest Entrance
5. Sheep Mountain Table Road — Route 44 to Park Boundary.

A cultural landscape report was prepared in 2004 to assess the eligibility of the Cedar Pass developed area, surrounding and adjacent to, the visitor center, for its eligibility for inclusion in the National Register of Historic Places. More than 70 structures were identified within the Cedar Pass developed area, 47 of which are believed to contribute to the national register eligibility of the developed area.

In 2001 a determination of eligibility was submitted to the South Dakota State Historic Preservation Office recommending that the Ben Reifel Visitor Center was not eligible for inclusion in the national register. However, it would become eligible for the national register upon reaching 50 years of age. It is not currently listed in the List of Classified Structures.

The Prairie Homestead, 0.5 mile north of the park's northeast entrance, is included in the description of the park's affected environment because it was considered in the alternatives for inclusion within the park boundary. The homestead was listed in the National Register of Historic Places (state significance) on January 11, 1974. It was listed as eligible under criterion (a) for its association with events that have contributed to the broad patterns of American history and criterion (b) for its architectural value. Prairie Homestead is an interesting combination of three types of early regional dwellings: the dugout, the sod house, and the claim shanty. The wallpaper and wooden floors of the frame claim shanty section, which were added later, contrast with the sod and underground appearance of the earlier structure. Edgar I. Brown, who homesteaded near the Dakota Badlands and lived there until 1949, built the sod house from available material, in 1909. The Crew family rehabilitated the house in the 1960s, furnishing it with items typical of the period.

ETHNOGRAPHIC RESOURCES

Ethnographic resources (and traditional cultural properties) such as a site, structure, landscape, or natural resource feature assigned traditional legendary, subsistence, religious, or other significance exist in the area and are generally acknowledged as part of the historical territory of the Lakota Peoples. Traditional cultural properties are ethnographic resources that can be associated with cultural practices or beliefs and that are either eligible for inclusion in, or are listed in, the National Register of Historic Places.

Aboriginal peoples have used lands within the park boundaries since before the coming of the Europeans and the creation of Badlands National Monument.

The park contains evidence of continuing traditional spiritual uses by the Oglala Sioux Tribe, such as the presence of prayer banners. Current ethnographic information provided by the Lakota has indicated that there are several areas known to have special spiritual significance for them.

The Lakota people have identified several areas in the Sheep Mountain locality as areas of spiritual importance. Tribal members are guaranteed unrestricted access to these areas in perpetuity, and the National Park Service will not add developments in these areas without the tribe's written consent.

An ethnographic overview was completed in 2002 by Dr. David White under contract with the National Park Service to document and analyze historic and contemporary resource use of the Badlands National Park area by American Indian groups. That report, "An Ethnographic Overview and Assessment and American Indian Oral History," should contribute to a better understanding of the Lakota use of park lands. The study identifies the American Indian groups that have both traditional and contemporary links to the park's natural and

cultural resources. The study also identifies resource uses and ethnographic issues that have the potential to affect the National Park Service's management responsibilities for natural and cultural resources within the park boundaries.

CULTURAL LANDSCAPES

In the broadest sense, a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions

The National Park Service categorizes cultural landscapes into four groups: (1) historic designed landscapes, which are designed and/or deliberate artistic creations, (2) historic vernacular landscapes, which reflect peoples values and attitudes toward land use, (3) historic sites, which are associated with important events, activities, and persons, and (4) ethnographic landscapes, which are generally associated with contemporary groups with historic or prehistoric connections.

As described above, a cultural landscape report was prepared in 2005 to assess the eligibility of the Cedar Pass developed area. It analyzed the landscape's development and evolution, geographic context, modification, materials, construction techniques, and use over time. Three goals were identified: (1) understand which features survive from the period of historic significance; (2) establish the basis for an integrity assessment; and (3) provide an understanding of the similarities and differences between historic and existing conditions. The result identifies three conditions of an element within a landscape — (1) contributing, (2) non-contributing, or (3) missing a feature.

No other landscapes have been evaluated for listing in the National Register of Historic Places. Several vernacular landscapes, however, may merit consideration. These include Big Foot Pass along the Badlands Loop Road, and fossil collecting sites where prominent early paleontologists conducted surveys and research.

As is detailed on page 79, although all potential cultural landscapes face degradation from the badlands' characteristic endemic erosion, they will not be affected by the actions of any of the alternatives.

VISITOR EXPERIENCE

BACKGROUND

To enjoy Badlands National Park, visitors must have access to adequate information about how to get to the park, activities available in the park, and proper safety instructions. Adequate facilities must be available, as must opportunities to learn about park resources. The North Unit contains the highly developed northeast area and the Sage Creek area. The congressionally designated wilderness consists of 64,250 acres south of the Loop and Sage Creek Rim roads.

Weather in South Dakota can be extreme, with an average temperature of 90°F in July and August and 80°F in June and September. Record high temperatures of 111°F have been recorded in August. Winters often are extremely cold, with below-zero temperatures as low as -40°F, with heavy, drifting snow and strong winds.

A “Long Range Interpretive Plan” has been prepared for the park (NPS 1999b). The plan outlines interpretive actions to bring the park’s stories to visitors in a form they can enjoy and understand.

VISITOR STATISTICS

An average of 1 million visitors a year come to Badlands National Park. Most visitors travel along Interstate 90, the major highway west into the Black Hills. Badlands often is the first stop on a longer trip to Mount Rushmore National Memorial, Wind Cave and Jewel Cave National Parks, and Custer State Park. I-90 also is traveled by people going to destinations farther west, such as Yellowstone National Park. Some visitors make a spur-of-the-moment decision to visit Badlands National Park when they see signs along the highway. The Oglala Sioux Parks and Recreation Authority expects that the Badlands Loop Scenic Byway (designated by

the state of South Dakota) and the proposed Crazy Horse Scenic Byway might increase visitation by 1 million to 2 millions visitors in the next decade (Oglala Sioux Parks and Recreation Auth. 2000).

A formal visitor survey conducted in August 2000 compiled statistics about visitors such as: group composition, trip origin and destination, length of visit, favorite park sites, and other data (Simmons and Gramann 2001). Park employees have collected other information about visitors at entrance stations, during routine patrols, and from registration of backcountry and wilderness visitors. The information collected from these various sources is summarized in this section.

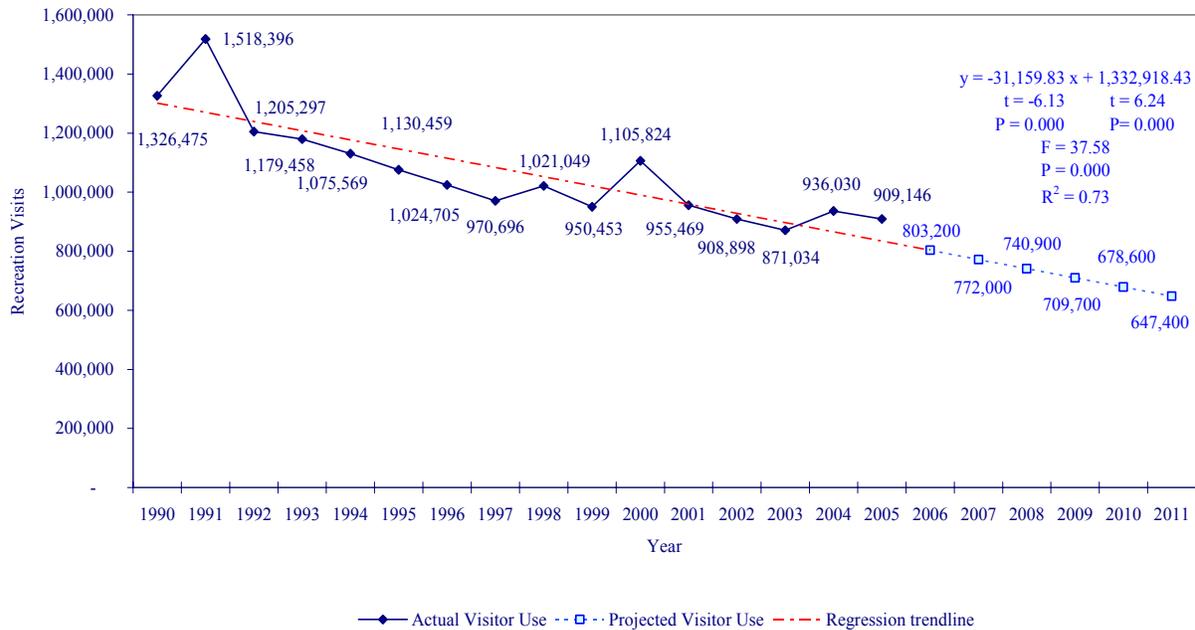
Visitation

The highest visitation to Badlands National Park is in June, July, and August (70% of the annual visitation), followed by the “shoulder season” months of September, October, and May. Visitation in the shoulder season has increased recently partly because more retired people are visiting the park.

Visitation to the park for the period 1990 through 2005 is presented in Figure 1 (statistics provided by the park). A downward trend, averaging - 2.33% per year, in visitor use is apparent. If the current downward trend continues, recreation visits in 2011 would be less than 650,000.¹

¹ The regression trend line is a fairly good fit with an R-square of 73% indicating the 73% of the variation in visitation is explained by the time variable – year. The t-values are high indicating that the intercept and year variable are significant. The F-value is also high indicating that regression equation is also significant. This simple regression equation is a fairly good model of recreation use at Badlands National Park.

Figure 1. Badlands National Park Actual and Projected Visitor Use



Projecting future visitor use is a very inexact art. Normally a steady downward trend in visitation at most units of the national park system is not likely over an extended period. However, actual visitor use at the park has, for the most part, steadily declined since 1991. This projection is considered a reasonable forecast given the historic data presented here. But, it in no way implies cause and effect. And it is highly unlikely that visitor use would continue to decline for another extended number of years. The underlying cause(s) of the historic decline are not known.

Group Composition

Most groups (76%) that visit the park consist of 4 people or fewer. More than 50% of the visitors to Badlands National Park are in family groups that stay less than one day. Many bus travelers are senior citizen tour groups or international tour groups. Tour buses frequently are on tightly managed schedules. Moderate numbers of school groups visit the park, mostly from Pine Ridge

Indian Reservation or from the greater region. Most visitors (65%) were making their first visit to the park, spending less than one day.

Point of Origin and Destination

Most visitors contacted during the 2000 visitor survey originated from the upper Midwest: Minnesota, Wisconsin, Illinois, and Michigan. There were some visitors from 40 other states and Washington, D.C. International visitors (7% of the visitors) were primarily from Canada, England, and Germany, with some from 11 other countries.

Members of the scientific community came to study the park’s natural and cultural resources or geologic features. Badlands National Park also is a destination park for an increasing number of backpackers and pack stock users who come to experience the wilderness.

Length of Stay

Of the 1.2 million visitors per year, 83% spend less than one day in the park; and 67% spend only two to four hours, mostly in the North Unit. Informal interviews of visitors in 1984 indicated that people visiting the Stronghold unit spent more time in the park (1–3 days) than those visiting the North Unit.

Sites Most Visited

Visitors contacted for the 2000 visitor survey most commonly visited sites in the developed North Unit. They went to the Pinnacles Overlook, the Ben Reifel Visitor Center, Cedar Pass Lodge, the Bigfoot Pass picnic area, and the Roberts Prairie Dog Town. Visitors also went to the Big Pig Dig, a paleontological site.

Services and Facilities

The services and facilities most used by visitors are in the North Unit. Visitors use the paved roads and overlooks, trails, the visitor center, directional road signs, and restrooms. All visitor services and facilities were rated above average in importance and quality. Visitors considered the overlooks and Cedar Pass campground the most important visitor services and facilities in the park.

The Cedar Pass Lodge and Restaurant, a concession operation open from mid-April through mid-October, is adjacent to the Ben Reifel Visitor Center. This business offers overnight lodging, a restaurant, and a large gift shop. Many visitors patronize this establishment.

The surrounding area offers limited visitor services. The closest year-round hotel lodging is available in the town of Wall. Interior offers seasonal hotel lodging and RV camping. Food is available in Wall, Cactus Flats and Interior although the number of restaurants is limited.

ACCESS

There are five official entrances to the North Unit of Badlands National Park, the Northeast, Conata Road, Interior, Pinnacles, and Sage Creek entrances, of which Conata Road and Sage Creek are self-serve entrance stations. In addition, people can enter the park on secondary gravel-surfaced roads, which are used primarily by local residents. The National Park Service is responsible for managing and maintaining all designated roads in the park.

Most visitors reach the park via I-90, which is north of the park. Historically, visitors have entered at the Northeast entrance from I-90 and followed the Loop Road through the park; however, in recent years the number of visitors entering at the Northeast entrance has decreased, although that entrance is still the most used. Most visitors still enter the park at the Northeast entrance on South Dakota Highway 240, 3 miles from exit 131 of I-90. The Pinnacles entrance, near the town of Wall, is the second most used entrance. It is about 28 miles west of the Northeast entrance along the Loop Road. Exit 110 of I-90 leads to Wall, which is about 8.5 miles from the Pinnacles entrance. The least used entrance is the Interior entrance, in the town of Interior.

South Dakota Highway 44, a major highway originating in Rapid City, is another major travel corridor in the region. SD 44, which roughly parallels I-90, is the most direct way to the park from the Rapid City area. It connects towns of Scenic and Interior, which are about 20 miles apart. There are no visitor services or facilities along SD 44.

The Loop Road from Cactus Flats to the Pinnacles entrance of the park has been designated by the state of South Dakota as the Badlands Loop Scenic Byway. This route has been proposed for a federal designation. In addition, the Oglala Sioux Tribe has proposed the creation of the Crazy Horse Scenic Byway, as described on page 24.

Visitors arriving in personal cars stay mostly on paved roads in the North Unit of the park. The Loop Road and many pullouts are crowded in the summer peak visitation period. However, recently redesigned pullouts and parking lots along the Loop Road have reduced congestion and improved the traffic flow in these areas.

According to NPS data about visitation from 1992, more than 90% of visitors traveled on the Loop Road. The 1989 average daily traffic count for the entire year was 530 vehicles; the average daily traffic count for July 1993 was 2,200. For 1999, the busiest month recorded was August, with an annual daily traffic figure of 2,734. In 1995 an estimated total of 400,000 vehicles traveled the Loop Road. Figures in 1999 from traffic counters along the route indicated the annual traffic was 348,640 vehicles. This works out to an average daily traffic figure of 955 vehicles. Bus traffic also is increasing in the park, with a maximum of 12 buses a day and up to 3 or 4 buses at one time at Ben Reifel Visitor Center. This causes serious parking lot congestion.

Farm-to-market traffic travels on the Loop Road between the Interior entrance and the Northeast entrance. Traffic counts indicate approximately 1,380 trips per month primarily for commuting, transporting goods, and students traveling to high school. The Loop Road also provides access between the Pine Ridge Indian Reservation and Interstate 90.

The main access route to the North Unit is I-90, from which there are two entrances, the Pinnacles entrance on the west and the Northeast entrance on the east. Exit 131 from I-90, at Cactus Flats, is most frequently used to enter the park. South Dakota Highway 240 also enters the park at Cactus Flats. SD 240 is a 3.5 mile two-lane asphalt road in good condition, maintained by the state. According to the South Dakota Department of Transportation, the average daily traffic for this road is 1,206. Urban

congestion is virtually nonexistent along this stretch of rural highway. The Loop Road begins at the community of Cactus Flats (exit 131 of I-90), travels south to the Northeast entrance, and continues over Cedar Pass through the North Unit of the park. It leaves the park at the Pinnacles entrance and returns to I-90 near the town of Wall. Visitors can take this route in either direction.

County Road 502 intersects the Sage Creek Rim Road on the north side, approximately 5 miles west of the Pinnacles entrance station. The northwestern corner of the intersection is the site of the former Hocking homestead. Visitors can enter the park on this secondary road without passing an entrance station. The primary users of this road are local residents or visitors leaving the park to travel back to Wall.

The gravel-surfaced County Road 590 travels along and through the park's western edge from SD 44 near Scenic to Wall. This road connects to the Sage Creek Rim Road at Hocking Wye, where a self-serve entrance station is available. The primary users of this road are local residents and visitors leaving the Sage Creek area of the park to go to Rapid City on SD 44.

North Unit Circulation

The major park roads in the North Unit are the Loop Road and the Sage Creek Rim Road, which are accessible to the average passenger vehicle. No off-road travel is allowed for any wheeled vehicles, including cars, motorcycles, and bicycles. Vehicle access is restricted to designated roads.

The National Park Service maintains the Loop Road year-round and is now in the final phase of rehabilitating the entire road, which is used by more than a million visitors each year. The windy, steep Loop Road descends from the Northeast entrance station to the Cedar Pass complex, which contains the Ben Reifel Visitor Center, park

headquarters, the Cedar Pass campground, and the concessioner-operated Cedar Pass Lodge. (For more about the Loop Road, see pp. 22 and 30.)

The Sage Creek Rim Road, which intersects the Loop Road south of the Pinnacles entrance station, provides access to the northwest corner of the park, Roberts prairie dog town, and the Sage Creek campground via CR 590, the Sage Creek Road. Many visitors travel some part of this road, which offers a quieter, more remote experience than the Loop Road and presents the best opportunity to see the park's bison herd. It travels approximately 5 miles from the Loop Road to CR 590 and continues another 5 miles past the Sage Creek campground before leaving the park's western boundary toward Scenic. The Conata Road is a well-maintained gravel-surfaced road about 9 miles long connecting the Loop Road with SD 44. It is about 20 miles east of Scenic. For the first 7 miles from SD 44 it is a county road, entering the park at approximately mile 7, when it becomes a park road. This road provides access to the Conata Road picnic area and the Big Pig Dig.

Scenic Byways

The Badlands Loop Scenic Byway was designated by the state of South Dakota in 2001 and has been proposed for designation as a federal scenic byway. As was described on page 24, the byway begins at exit 131 of I-90 at Cactus Flats and travels south and west along the Loop Road to the Pinnacles entrance station.

AVAILABILITY OF INFORMATION

Orientation and Information Services

Before visiting Badlands National Park, visitors can obtain information about the park from the NPS Web site (<<http://www.nps.gov/>>), and from travel guides, previous visits, and state or local welcome

centers (Simmons and Gramann 2001). A trip planner is available from the park upon request. More information also is available in a rack card at state-operated rest areas along I-90, which are open from April to October each year.

Orientation and information about the park is available at the three staffed entrance stations: Northeast, Interior, or Pinnacles. All visitors receive orientation, a map, the park newspaper, and safety information. Information about the park is also available at the visitor centers, as well as at waysides along the Loop Road.

Visitor Centers

There is one visitor center in the North Unit of Badlands National Park, the Ben Reifel Visitor Center. The visitor center is in the Cedar Pass complex, which is about 8 miles from the Northeast entrance station. Year-round services and facilities are available. The visitor center underwent an extensive renovation and expansion in 2005, reopening to the public in February 2006 with the addition of a theater, public classroom, and research library, as well as new exhibits and release of a new park orientation film, "*Land of Stone and Light*." The visitor center also houses the park's division of Resource Education and Badlands Natural History Association, the park's nonprofit partner.

The visitor center is open for extended hours from Memorial Day to late August. About 25% of park visitors stop at the visitor center. Because the parking lot is small and often appears full, some visitors choose to bypass the visitor center. Curves in the road and inadequate signs cause many visitors to miss the entrance to the visitor center and continue to the nearby Cedar Pass Lodge.

Other Visitor Facilities

The campgrounds at Cedar Pass and Sage Creek both contain campsites that are

available on a first-come, first served basis. Reserved sites available for groups have clustered picnic tables and parking and contain areas for multiple tents. The campgrounds fill to capacity, especially on weekends and holidays. Evening amphitheater programs are a popular element of the camping experience.

The park's main campground at Cedar Pass contains 96 sites and 4 group sites. Campers are charged \$10 per night. Facilities available are cold running water, flush toilets, shaded picnic tables, gravel roads, parking areas, and a trailer sewage dump station. Some campers are discouraged by this campground's exposure to the elements. Typically, the campground is filled on 10% to 15% of summer nights. Most campers stay only one night. In summer, programs are offered nightly at the amphitheater, which was renovated in 2006 and seats 150–200 visitors.

The Sage Creek campground, at the west edge of the North Unit off Sage Creek Rim Road, contains pit toilets and picnic tables, but no formal campsites, and there is no potable water. No fee is charged for using this campground, which is popular with visitors to the wilderness and with pack stock users.

Small picnic areas with a few tables each are available at the Ben Reifel Visitor Center, the Cedar Pass campground, Journey Overlook, and Conata Road.

Recreational Opportunities

Throughout Badlands National Park visitors can camp, picnic, bicycle, ride horseback, study nature, attend ranger-led programs, experience the wilderness, photograph wildlife; and search for birds or flowers. There also are opportunities to enjoy studying paleontology, the fossil remains of ancient life.

The highly developed and most heavily visited section of the park is along the Loop Road in the North Unit, where there are hiking trails, interpretive trails, overlooks, wayside exhibits, picnic areas, and restrooms. The experience available in this area is highly structured, with considerable interaction with other visitors and park staff. To enter a less structured environment with a sense of discovery, remoteness, and solitude, visitors can travel along the Sage Creek Rim Road to the primitive Sage Creek campground, which is less visited than the Loop Road.

Sightseeing. Sightseeing is available for tour bus riders and other visitors driving along the Loop Road, where they can see the scenery that forms the badlands: expansive colors and rock formations, as well as the prairie ecosystem, which may appear bleak and barren to the untrained eye.

Fourteen designated overlooks along the Loop Road give visitors a chance to stop and take pictures or simply enjoy the view. Interpretive panels at six overlooks describe aspects of the geologic scene. Besides stopping at pullouts and overlooks to learn about the park through the roadside exhibits, visitors can walk along short interpretive trails. A few of the more popular stopping places are described below.

- ◆ **Big Badlands Overlook** — The first vista of the badlands country comes just inside the Northeast entrance, at the Big Badlands Overlook. About 30–35% of Badlands visitors stop here; it is their first orientation to the park. At the overlook there are two waysides and a 60-yard path.
- ◆ **Window, Door, and Notch Trails** — Three trails offer the first opportunity to get “up close” to the scenery. The short Door Trail and Window Trail give visitors easy and accessible paths out to or through the Badlands Wall.

- ◆ *Prairie Winds* — An elevated boardwalk at the popular Prairie Winds stop lets visitors walk a short distance into the prairie and view this vast landscape.
- ◆ *Fossil Exhibit Trail* — About 5 miles west of Cedar Pass, visitors can stop at the Fossil Exhibit Trail, where paleontology is interpreted. The easy, elevated 400-yard boardwalk meanders among replica fossils in acrylic plastic and metal cases. Guided fossil walks are available in summer, and 20-minute fossil talks are given daily at the small covered pavilion in the parking lot. The trail, one of the first “100% accessible” trails in the national park system, was listed as a national recreation trail in 1985. It also is a starting point for hikers on the Castle Trail. Vault toilets are available.
- ◆ *Pinnacles Overlook* — One of the most popular stops along the Loop Road is the Pinnacles Overlook, which offers a spectacular view of the spires and canyons of the Pinnacles region, as well as distant views of the Sage Creek area. A short trail leads down a set of stairs to wayside panels and overlooks on the very edge of the formations.

The large number of people using the area influences the visitor experience along the Loop Road. Between Big Foot Pass and Dillon Pass, the Loop Road travels across the prairie, offering an extensive view of the open grasslands and big skies of the Great Plains.

Hiking and Backpacking. Hiking is permitted throughout the North Unit. The North Unit contains some designated trails, as follows:

- ◆ *Castle Trail Network* — The Castle, Medicine Root, and Saddle Pass Trails make up the largest network of trails in the park, offering about 7 miles of marked and maintained trails. At 5 miles one way, the Castle Trail is the longest; it

travels between the parking lots at Door and Window and the Fossil Exhibit.

- ◆ *Cliff Shelf* — Just past the Castle Trail network is the Cliff Shelf nature trail and viewpoint, a heavily used interpretive loop 0.5 mile long leading through a wooded oasis perched on the edge of the Badlands Wall. Wildlife talks are given in summer, and a trail brochure is available.

Backpacking is allowed throughout the park, and no backcountry permits are required. However, it is recommended that hikers carry in all the water they will need, and the lack of available potable water limits the number of backpackers using the park. Two companies currently provide guided hiking and back packing trips in the park. These companies are permitted under incidental business permits.

Bicycling. Bicycles are allowed on park roads in Badlands National Park. There are no specifically designated bicycle trails in the park; no bicycling is allowed on pedestrian walkways or hiking trails; and no off-road bicycle travel is allowed. The use of bicycles is increasing among visitors, who seem to enjoy the Loop Road, Sage Creek Rim Road, and other secondary roads. A map of suggested distance routes is available at the visitor centers.

Horseback Riding and Pack Stock Use.

The use of pack stock is allowed in Badlands National Park, but not in developed areas or on marked trails, roads, or highways. Pack stock can be horses, mules, burros, or llamas that are used to carry riders or goods. Horseback riding is very popular, especially in the wilderness.

Scientific Observation. Observing an active paleontological excavation is available to visitors from early June through mid-August at a site on Conata Road called the Big Pig Dig (also see p. 87). The Badlands are world renowned as one of the largest storehouses of North American vertebrate fossils. Fossils

being unearthed at the Big Pig Dig are of an ancient piglike mammal called *Archaeotherium*, as well as ancient rhinoceroses, horses, and deerlike early mammals. Each year, fieldwork proves the Big Pig Dig to be a significant research site whose boundaries have yet to be set. Researchers and educators are on hand in summer to answer questions as they work.

Scenic Resources

The scenic features of Badlands National Park have been extolled for more than a century. Although the landscape is difficult to travel, the peaks, gullies, buttes, and prairie of the Badlands have attracted the interest and praise of many visitors. The park's landscape contains a limited number of visual intrusions — primarily the park's

facilities at Cedar Pass and Pinnacles. Smaller intrusions — shade shelters and restrooms — are found at trailheads and waysides. From within the park, visitors can see the landscape beyond the park boundary. The viewshed beyond the park boundary is rural landscape, which includes human-made features such as ranches, roads, and communication towers.

The remoteness and rural nature of the lands adjacent to the park have resulted in limited intrusions to the night sky. The intrusions are primarily from radio and cellular telephone towers located outside the park boundary. In addition, from certain areas in the park the lights of developed areas are visible — lights of areas inside the park (such as Cedar Pass) and outside of the park (such as the town of Wall).

SOCIOECONOMIC ENVIRONMENT

The North Unit, with the most development, is also the most heavily visited unit of the park. It lies in southeastern Pennington County and western Jackson County and is bordered by the Buffalo Gap National Grassland. South Dakota Highway 240 (also called the Badlands Loop Road) takes visitors from Interstate 90 at Cactus Flats south to the park.

With more than 240,000 acres, Badlands National Park is the largest of four units of the national park system in southwestern South Dakota. Mount Rushmore National Memorial, Wind Cave National Park, and Jewel Cave National Monument are in the Black Hills area south of Rapid City and west of the Badlands. Custer State Park and the Black Hills National Forest also offer recreational resources in the region west of the park. Southwest South Dakota is a destination stop for many tourists because of this concentration of attractions and the accessibility from I-90, a major east-west interstate route.

POPULATION

Jackson, Pennington, and Shannon Counties will serve as the regional economic unit for this plan, since the park is contained within these counties. County and state populations are shown in table 10. In a state whose population ranks 46th in the nation, it is to

be expected that the three-county region is predominantly rural.

The major exception is Rapid City in central Pennington County — it is the largest city in western South Dakota (59,607 persons in 2000, according to the U.S. Census Bureau) and a center for commerce, services, and trade in this part of the country. In 2000, approximately 57% of the total population for the three counties lived in Rapid City, which also contained more than two-thirds of the population of Pennington County.

In the other two counties of the affected area, American Indians make up a large percentage of the population — almost half the Jackson County residents and nearly all of Shannon County’s population are American Indians. This is because the Pine Ridge Indian Reservation (made up of lands held in trust by the federal government for the Oglala Sioux Tribe of Pine Ridge and individual Indians), covers all of Shannon County and the southern half of Jackson County (south of the White River). The population of Shannon County increased by approximately 26% from 1990 to 2000; this rate was about five times the state rate for population growth.

As of October 1997 there were 39,734 enrolled members of the Oglala Sioux Tribe of Pine Ridge. Of this number, 39,321 were living in and adjacent to the Pine Ridge Indian Reservation (BIA 1997a).

TABLE 10: AFFECTED AREA POPULATION FOR SELECTED YEARS

Location	1990	2000	% Change 1990– 2000	American Indian 2000	% of County Total 2000
Jackson County	2,811	2,930	4.2%	1,401	47.8%
Pennington County	81,343	88,565	8.9%	7,174	8.1%
Shannon County	9,902	12,466	25.9%	11,743	94.2%
South Dakota	696,004	754,844	8.5%	62,283	8.3%

SOURCE: Bureau of the Census, U.S. Dept. of Commerce 1990a; 2001b.

INCOME, EARNINGS, AND EMPLOYMENT

Income

South Dakota had a per capita personal income of \$25,041 in 1999, only 87.7% of the national average (see table 11). The per capita personal income of Pennington County was slightly higher than the state average, but it was still well below the national level. Jackson County's per capita personal income was only 54.2% of the state average. Shannon County lagged even farther behind, with a per capita personal income only 45.0% of the South Dakota per capita personal income. The national economy was booming in the 1990s, but such low levels of per capita personal income indicate that the area's economy was not experiencing the same benefits.

TABLE 11: PER CAPITA PERSONAL INCOMES IN 1999

Location	1989	1999
Jackson County	\$ 9,189	\$13,560
Pennington County	\$15,942	\$25,088
Shannon County	\$ 6,185	\$11,280
South Dakota	\$14,767	\$25,041
United States	\$18,566	\$28,546

SOURCE: Bureau of Economic Analysis, U.S. Dept. of Commerce 2000; 2001a; 2001b.

Although the data in the next table are relatively old (income data from the 2000 Census is not yet available), table 12 provides some insight into why the per capita personal income is so low in Shannon and Jackson Counties. The per capita personal income of American Indians in the region ranged from one-third to one-half that of white Americans living in the area. It is surmised that this situation for 1997 was similar, on the basis of the low per capita personal incomes for Jackson and Shannon Counties and the facts that American Indians in the region experienced high levels of unemployment and poverty.

Major Industries by Earnings

The various levels of government provided 37.2% of the earnings in Jackson County (\$18,604,000, in 1999, as shown in table 14). Service industries were second in rank, providing 16.2% of earnings. Retail trade accounted for 15.9% of earnings. These three sectors of the county economy together provided more than two-thirds of the total earnings. Three other sectors, agricultural services, mining, and finance, provided few or no earnings. These facts indicate that the Jackson County economy is not well diversified and could be vulnerable to disturbances in a key industry. When measured by earnings, Jackson County's economy is only 1.3% as large as that of Pennington County.

The earnings of Shannon County residents amounted to about 6.0% of what was earned in Pennington County in 1999. The three largest sectors were services at 43.1%, all government at 38.8%, and farming at 4.1% of the total earnings of \$98,985,000. Shannon County's economy also suffers from a lack of diversity. Several sectors provide little or no earnings (less than 2%) for the county.

Pennington County, with its much larger population, has a larger and more diversified economy than either of the other two counties described here. The largest sector is services, which accounted for 28.4% of the total earnings of \$1,653,293,000. All government sectors provided 23.4% of the earnings in Pennington County. Retail trade was the third largest sector, with 13.1% of earnings.

Major Industries by Employment

Farming (24.9% of the total), services (21.5%), retail trade (18.5%), and all levels of government (19.6%) accounted for most of the jobs, nearly 85% of the total, in Jackson County (see table 13). Many sectors provided few, if any, jobs in Jackson County. Pennington County was more diversified, with hundreds or thousands of jobs in each

sector. The largest sectors were services (31.2% of total jobs), retail trade (21.3%), and all levels of government (15.8%). Services (50.6% of all jobs) and government

at all levels (25.5%) accounted for more than three-quarters of the jobs in Shannon County. Some sectors provided few positions, if any.

TABLE 12: PER CAPITA PERSONAL INCOMES (PCPI) IN 1989 BY COUNTY AND BY RACE (IN 1989 DOLLARS)

Location	County/State /USA Avg. PCPI	White PCPI	American Indian PCPI	American Indian PCPI as a % of White PCPI	American Indian PCPI as a % of State Avg. PCPI (\$10,661)
Jackson County	\$ 6,947	\$ 8,979	\$4,183	46.6%	39.2%
Pennington County	\$12,031	\$12,723	\$5,396	42.4%	50.6%
Shannon County	\$ 3,417	\$ 9,074	\$3,029	33.4%	28.4%
South Dakota	\$10,661	\$11,230	\$4,040	36.0%	37.9%
United States	\$14,420	\$15,687	\$8,328	53.1%	78.1%

SOURCE: Bureau of the Census, U.S. Dept. of Commerce 1990a

TABLE 13: EARNINGS BY INDUSTRY FOR 1999

Industry	Jackson County	% of Total	Pennington County	% of Total	Shannon County	% of Total	
Farm	\$2,282,000	12.3%	\$6,845,000	0.4%	\$4,021,000	4.1%	
Agricultural Services, Forestry, Fishing	*	*	7,058,000	0.4%	*	*	
Mining	0	0.0%	3,135,000	0.2%	0	0.0%	
Construction	893,000	4.8%	130,394,000	7.9%	4,698,000	4.7%	
Manufacturing	131,000	0.7%	134,376,000	8.1%	*	*	
Transportation; Public Utilities	1,107,000	6.0%	82,163,000	5.0%	916,000	0.9%	
Wholesale Trade	343,000	1.8%	103,234,000	6.2%	114,000	0.1%	
Retail Trade	2,951,000	15.9%	216,060,000	13.1%	3,694,000	3.7%	
Finance, Insurance, Real Estate Services	*	*	113,655,000	6.9%	*	*	
Federal Civilian Government	3,014,000	16.2%	470,166,000	28.4%	42,629,000	43.1%	
Military	3,856,000	20.7%	64,920,000	3.9%	28,878,000	29.2%	
State Government	281,000	1.5%	157,308,000	9.5%	1,191,000	1.2%	
Local Government	416,000	2.2%	45,384,000	2.7%	1,493,000	1.5%	
Total	2,370,000	12.7%	118,595,000	7.2%	6,818,000	6.9%	
	\$18,604,000	100.0%	\$1,653,293,000	0	100.0%	\$98,985,000	100.0%

SOURCE: Bureau of Economic Analysis, U.S. Dept. of Commerce 2000. NOTE: Estimated values are included in totals.

* Estimates are not shown to avoid disclosure of confidential information.

Unemployment

South Dakota has had relatively low unemployment during the 1990s, as has Pennington County (see table 14). The unemployment rate in Jackson County has been nearly twice the rate in the state. The unemployment rate in Shannon County has been four to five times the state level.

Unemployment among the Lakota people has been very high, with nearly three out of four members of the labor force being unemployed (table 15).

POVERTY

The national average for persons living in poverty in 1989 was 13.1%. This figure represented 31,742,864 people out of a population of 241,977,859. The poverty rate

for South Dakota was slightly higher at 15.9%. Over the years, only Pennington County's poverty rate has been near that for the state and the nation. The poverty rates for Jackson and Shannon Counties have fallen from 1989 to 1997, but they still are much higher than the state or national averages.

In 1989, four out of 10 people in Jackson County and six out of 10 people in Shannon County were living in poverty. In 1997, the situation had improved somewhat, so that three out of ten people in Jackson County and four out of ten people in Shannon County were living in poverty (see table 16).

TABLE 14: UNEMPLOYMENT FOR SELECTED YEARS

Location	1990	1996	2000
Jackson County	6.0%	5.4%	5.5%
Pennington County	3.3%	3.3%	2.0%
Shannon County	14.5%	15.4%	9.8%
South Dakota	3.9%	3.2%	3.2%
United States	5.6%	5.4%	4.0%

SOURCES Bureau of the Census, U.S. Dept. of Commerce 1998; 2001; Bureau of Labor Statistics, U.S. Department of Labor 2001.

TABLE 15: UNEMPLOYMENT AMONG OGLALA SIOUX TRIBE MEMBERS LIVING ON OR ADJACENT TO THE RESERVATION

Year	Population	Labor Force	Total Unemployed	% Unemployed
1997	39,321	22,840	16,642	73%
1995	38,426	18,986	14,021	74%

SOURCE: Bureau of Indian Affairs, USDI, 1995; 1997a; 1997b.

TABLE 16: PERCENTAGE OF PEOPLE LIVING IN POVERTY FOR SELECTED YEARS

Location	1989	1993	1997
Jackson County	38.8%	31.0%	33.5%
Pennington County	12.9%	14.8%	14.3%
Shannon County	63.1%	49.9%	42.9%
South Dakota	15.9%	14.3%	14.0%
United States	13.1%	15.1%	13.3%

SOURCE: Bureau of the Census, U.S. Dept. of Commerce 1990b; 1997; 1998.



Environmental Consequences

INTRODUCTION AND METHODOLOGIES

INTRODUCTION

The National Environmental Policy Act mandates that environmental impact statements disclose the environmental effects of proposed federal actions. In this case, the proposed federal action is the adoption of a general management plan for the North Unit of Badlands National Park. This “Environmental Consequences” chapter analyzes the potential effects of four management alternatives on natural resources, cultural resources, the visitor experience, and the socioeconomic environment of Badlands National Park. By examining the environmental consequences of all alternatives on an equivalent basis, decision-makers can evaluate which approach would create the most desirable combination of the greatest beneficial results with the fewest adverse effects on the park.

The alternatives in this plan provide broad management direction for the park. Because of the general nature of the alternatives, the potential consequences of the alternatives are analyzed in similarly general terms using qualitative analyses. For many actions discussed in this document, subsequent environmental documents would be required; such documents would be completed following the development of detailed alternatives before the action would be implemented.

For the purposes of environmental analysis, it is assumed that the road over Cedar Pass will remain intact. This impact analysis does not address the immediate actions that would be taken should the road fail. Since this conceptual plan will serve as the first phase of tiered planning, the analysis of detailed site-specific road alignments would not be appropriate. The National Park Service would conduct additional environmental analyses before implementing site-specific actions. In particular, additional NEPA compliance

would have to be completed before construction could begin on a new alignment for the Loop Road in the Cedar Pass area. If necessary, statements of findings for wetlands and floodplains also would be completed.

The existing conditions for all the impact topics that are analyzed here were identified in the “Affected Environment” chapter. All the impact topics are assessed for each alternative. For each impact topic, there is a description of the beneficial and adverse effects of the alternative, a discussion of the cumulative effects when this project is considered in conjunction with other actions occurring in the region, and a brief conclusion.

The analysis of the no-action alternative (continue current management) includes discussion of what the future conditions in the park would be if no changes were made to facilities or park management. Then the three “action” alternatives are compared to the no-action alternative to identify the incremental changes that would result from changes in park facilities and management. The effects of recent decisions and approved plans, such as expanding the park headquarters area and redeveloping the Sage Creek campground, are not evaluated in this document, except as reasonably foreseeable future projects in the cumulative impact analyses (as described on p. 122). Although these actions would take place during the life of this plan, they have been or are being evaluated in detail in other environmental documents.

At the end of the analysis of each alternative is a brief discussion of energy requirements and conservation potential, unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and the relationship of short-term uses of the environment and the maintenance and enhancement of long-term

productivity. A brief summary of the impacts of each alternative appears in table 8, page 67.

METHODOLOGIES FOR ANALYZING EFFECTS

The analysis of effects and the conclusions in this chapter are based largely on information from NPS experts, park staff insights, and professional judgment, as well as on the review of existing literature and studies. The planning team's method of analyzing effects is further explained below. It is important to remember that it is assumed in the analyses that the mitigative measures described in the "Alternatives" chapter would be applied to minimize or avoid impacts. If these measures were not applied, the potential for resource impacts and the magnitude of those impacts would increase.

Basis for Defining Environmental Consequences

The environmental consequences of each impact topic were defined on the basis of *type* of effect, *intensity*, *context*, and *duration*. Cumulative effects also were identified; they are discussed later in this section.

Type refers to an effect being either *adverse* or *beneficial* for the topic being analyzed. Effects also can be *direct* or *indirect*. *Direct* effects are caused by an action and occur at the same time and place as the action. *Indirect* effects are caused by the action and occur later or farther away, but they still are reasonably foreseeable.

Intensity refers to the degree or magnitude to which a resource would be positively or negatively affected. Each effect was identified as *negligible*, *minor*, *moderate*, or *major* in conformance with the criteria for the classifications established for each impact topic, as described below. Because this is a programmatic document, the intensity of each effect typically is expressed qualitatively.

Context refers to the setting within which an effect is analyzed, such as the affected region or locality. In this document most effects would be either *localized* (site-specific) or *parkwide*. Cumulative effects are either *parkwide* or *regional* (for example, an effect on air quality would be regional). For special status species, such as threatened and endangered species, the context is the species' range.

Duration refers to how long an impact would last. The planning horizon for this plan is approximately 20 years. Unless otherwise specified, in this document the following terms are used to describe the duration of the impacts:

Short term: The effect would be temporary, lasting a year or less, such as effects associated with construction.

Long term: The effect would last more than one year and could be permanent; for example, the loss of soil due to the construction of a new facility

Intensity Definitions by Topic

Natural Resources. The natural resource impact topics analyzed in this document are air quality, soundscapes, geologic features (including soils), paleontological resources, vegetation, wildlife, and special status species (which includes both federally listed species and those listed by the state as threatened and endangered). Information about known resources was compiled and compared with the locations of proposed developments and other actions. The impact analysis was based on the knowledge and best professional judgment of planners, biologists, and paleontologists; data from park records; and studies of similar actions and effects, when applicable. The planning team qualitatively evaluated the intensities of effects on all the natural resource impact topics.

The intensity of effects on *air quality* was rated as follows:

Negligible: There would be no measurable or detectable effect on air quality.

Minor: The action would have a slight effect on air quality, causing a change in air emissions or visibility.

Moderate: An effect would be clearly detectable; there would be an appreciable change in local air emissions or visibility.

Major: There would be a substantial, highly noticeable change in local or regional air emissions or visibility.

The intensity of effects on *soundscapes* was rated as follows:

Negligible: The natural sound environment might be affected, but the effects would be at or below the level of detection, or changes would be so slight they would not be of any measurable or perceptible consequence to wildlife or the visitor experience.

Minor: There would be a detectable change in the natural sound environment, but the effects would be small, local, and of little consequence to wildlife or the visitor experience.

Moderate: A change in the natural sound environment would be readily detectable, affecting the behavior of wildlife or visitors in a large area.

Major: A severely adverse or exceptionally beneficial change in the natural sound environment would be obvious and would affect the health of wildlife or visitors or cause a substantial, highly noticeable change in the behavior of wildlife or visitors in a local or regional area.

The intensity of effects on *paleontological resources* was rated as follows:

For paleontological resources the intensities are only minor, moderate, and major.

Minor: A few fossils might be lost through illegal collecting, or there would be a low probability of effects from a ground-disturbing activity because (a) the activity

would be in a geologic layer not known to contain extensive fossils, and the volume of bedrock disturbance would be low or (b) the activity would be in a fossil-rich geologic layer, but the volume of bedrock disturbed would be nearly indiscernible. Monitoring would be likely to detect fossils, and the loss of fossils and/or associated contextual information would be minimal.

Moderate: A number of fossils might be lost through illegal collecting, or there would be a moderate probability of effects from a ground-disturbing activity because (a) the activity would be in a geologic layer not known to contain extensive fossils, but the volume of bedrock disturbance would be large or (b) the activity would be in a fossil-rich area, and the area of bedrock disturbance would be small. Most fossils uncovered probably would be found by monitoring, but some fossils and/or associated contextual information could be lost.

Major: Many fossils could be lost through illegal collecting, or there would be a high probability of effects from a ground-disturbing activity because the activity would be in a geologic layer of high fossil richness, and the volume of bedrock disturbance would be large. Even with monitoring, many fossils and/or associated contextual information probably would likely be lost.

The intensity of effects on *other geologic features, including soils*, was rated as follows:

Negligible: The action would result in a change in a geologic feature, but the change would be at the lowest level of detection, or not measurable.

Minor: The action would result in a detectable change, but the change would be slight and local. A geologic feature might be slightly altered in a way that would be noticeable. There could be changes in a soil's profile in a relatively small area, but the change would not increase the potential for erosion.

Moderate: The action would result in a clearly detectable change in geologic features — a geologic feature would be obviously altered, or a few features would show changes. There could be a loss or alteration of the topsoil in a small area, or the potential for erosion to remove small quantities of additional soil would increase.

Major: The action would result in the permanent loss of an important geologic feature, or there would be highly noticeable, widespread changes in many geologic features. There would be a permanent loss or alteration of soils in a relatively large area, or there would be a strong likelihood for erosion to remove large quantities of additional soil as a result of the action.

The intensity of effects on *vegetation* and *wildlife* was rated as follows:

Negligible: The action might result in a change in vegetation or wildlife, but the change would not be measurable or would be at the lowest level of detection.

Minor: The action might result in a detectable change, but the change would be slight and have a local effect on a population. This could include changes in the abundance or distribution of individuals in a local area, but not changes that would affect the viability of local populations. Changes to local ecological processes would be minimal.

Moderate: The action would result in a clearly detectable change in a population and could have an appreciable effect. This could include changes in the abundance or distribution of local populations, but not changes that would affect the viability of regional populations. Changes to local ecological processes would be of limited extent.

Major: The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be

permanent. This could include changes in the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Significant ecological processes would be altered, and “landscape-level” (regional) changes would be expected.

For *special status species*, the following impact intensities apply. These definitions are consistent with the language used to determine effects on threatened and endangered species under the federal Endangered Species Act:

No effect: The action would cause no effect on the species or critical habitat if present.

Not likely to adversely affect: The action would be expected to result in discountable effects on a species or critical habitat (that is, extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated), or it would be completely beneficial.

Likely to adversely affect: The action would result in a direct or indirect adverse effect on a species or critical habitat, and the effect would not be discountable or completely beneficial.

Cultural Resources. Effects on *historic buildings and other structures* result from physical changes to the fabric or configuration of elements that make them eligible for inclusion in the national register. Adverse effects result from modifying a significant characteristic of a historic building or other structure, removing a significant structural element, or adding a new, incompatible element. Beneficial effects can result from intervention to restore or rehabilitate a resource. Removing incompatible or noncontributing additions also can be seen as beneficial to attaining an acceptable level of conformance to its original or desired historical period.

For a building or other structure to be listed in the national register, it must be associated with an important historic context *and* possess historic integrity of the features necessary to convey its significance — location, design, setting, workmanship, materials, feeling, and association (see National Register bulletin 15: *How to Apply the National Register Criteria for Evaluation*).

The intensity of effects on *historic buildings and other structures* was rated as follows:

Negligible: Effects would be at the lowest level of detection — barely and not measurable. For purposes of section 106, the determination would be *no adverse effect*.

Minor: Adverse effect — the action would not affect the character defining features of a building or other structure that is listed on or eligible for the National Register of Historic Places. *Beneficial effect* — there would be stabilization/preservation of character-defining features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (USDI 1996) to maintain the existing integrity of a building or other structure. For section 106 purposes, the determination would be *no adverse effect*.

Moderate: Adverse effect — the action would alter a character-defining feature(s) of the building or other structure but would not diminish the integrity of the resource to the extent that its national register eligibility would be jeopardized. For section 106 purposes, the determination would be *adverse effect*. *Beneficial effect* — the building or other structure would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (USDI 1996) to make possible a compatible use of the property while preserving its character-defining features. For section 106 purposes, the determination would be *no adverse effect*.

Major: Adverse effect — the action would alter a character-defining feature of the building or other structure, diminishing its integrity to the extent that it no longer would be eligible for listing in the national register. For section 106 purposes, the determination would be *adverse effect*.

Beneficial effect — the structure would be restored in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (USDI 1996) to accurately depict its form, features, and character as it appeared during its period of significance. For section 106 purposes, the determination would be *no adverse effect*.

The National Park Service defines *ethnographic resources* as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. The decision to call resources *ethnographic* depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their lifeways. A traditional cultural property is an ethnographic resource eligible to be listed in the national register because of its association with the cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (National Register bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*).

For ethnographic resources, certain important questions about human culture and history can be answered only by gathering information about the cultural material of cultural resources. Ethnographic resources have the potential to address questions about contemporary peoples or groups and their identity and heritage. The ethnographic link is vested in specific places of traditional use with cultural meaning. Ethnographic resources can be eligible for inclusion in the national register

if they meet its criteria for traditional cultural properties. To those for whom the resources hold cultural meaning, effects on ethnographic resources range from barely perceptible, slight but noticeable, apparent, and strikingly obvious. Those effects correlate respectively with the terms *negligible*, *minor*, *moderate*, and *major*.

The intensity of effects on *ethnographic resources* was rated as follows:

Negligible: Adverse effect — the effects would be barely perceptible, and the action would not alter resource conditions such as traditional access or site preservation or the relationship between the resource and the affiliated group's body of beliefs and practices. **Beneficial effect** — there would be no change to a group's body of beliefs and practices. For section 106 purposes, the determination of effect on traditional cultural practices would be *no adverse effect*.

Minor: Adverse effect — the effects would be slight but noticeable; the action would not appreciably alter resource conditions such as traditional access or site preservation or the relationship between the resource and the affiliated group's body of beliefs and practices. **Beneficial effect** — traditional access would be allowed, or a group's traditional practices or beliefs would be accommodated. For section 106 purposes, the determination of effect on traditional cultural practices would be *no adverse effect*.

Moderate: Adverse effect — effects would be apparent, and the action would alter resource conditions such as traditional access, site preservation, or the relationship between the resource and the affiliated group's beliefs and practices, but the group's beliefs and/or practices would survive. For section 106 purposes, the determination of effect on traditional cultural practices would be *adverse effect*. **Beneficial effect** — a group's beliefs and practices would be facilitated. For section

106 purposes, the determination of effect on traditional cultural practices would be *no adverse effect*.

Major: Adverse effect — the action would alter resource conditions such as traditional access, site preservation, or the relationship between the resource and the affiliated group's beliefs and practices to the extent that the survival of a group's beliefs and/or practices would be jeopardized. For section 106 purposes, the determination of effect on traditional cultural practices would be *adverse effect*. **Beneficial effect** — the action would encourage a group's beliefs and practices. For section 106 purposes, the determination of effect on traditional cultural practices would be *no adverse effect*.

Visitor Experience. Three factors determine the effects of actions on the visitor experience: *access*, *availability of information*, and the *range and enjoyment of visitor activity*. Changes in available parking spaces, the availability of trailheads, and closure or opening of roads might affect *access* to the primary activity areas of the park. The *availability of information*, orientation, and interpretation can affect visitors' enjoyment of the park, as can the *range of visitor activity*.

The following definitions describe the *types* of effects on the visitor experience:

Visitor Access — **beneficial** indicates there would be an increase in accessibility to a specific area or a reduction in congestion; **adverse** indicates that the accessibility to a specific area would be reduced or congestion increased.

Availability of Information — **beneficial** indicates an improvement in opportunities for visitors to obtain information, orientation, and interpretation; **adverse** indicates a reduction in opportunities for visitors to obtain information, orientation, and interpretation.

Range of Visitor Activity — **beneficial** indicates more opportunities for recreational activities like those mentioned above; **adverse** indicates a reduction in such opportunities.

The intensity of effects on the *visitor experience* was rated as follows:

Negligible: The effect would be not detectable by visitors or would be barely perceptible to most visitors; therefore, it would have no discernible effect.

Minor: The action might result in a slightly detectable effect that would result in little detraction or improvement in the quality of the visitor experience. There would not be an overall effect on the visitor experience.

Moderate: There would be a change in the experiences of a large number of visitors, resulting in a noticeable decrease or improvement in the quality of the experience. A decrease in quality would be indicated by a change in the frustration level or in the inconvenience for a period of time.

Major: A substantial improvement or a severe drop in the quality of many peoples' experience would result from an action such as the addition or elimination of a recreation opportunity or a permanent change in access to a popular area that would be clearly detectable. A substantial, highly noticeable influence could have an appreciable effect on the visitor experience by permanently altering access to and the availability of various aspects of the visitor experience.

Socioeconomic Environment. Badlands National Park operates within the regional social and economic environment of Jackson, Pennington, and Shannon Counties. Effects on the social and economic condition within these counties due to the action alternatives are of concern to the National Park Service, park managers, local communities and individuals, local governments, and the public.

Parts of Badlands National Park stretch into all three counties of the affected region. This

park is one of the many visitor attractions in southwestern South Dakota. It follows that developments proposed by the action alternatives could have a direct effect on some parts of the social and economic environment of the region. Planning team members applied logic, experience, professional expertise, and professional judgment to analyze the impacts of each alternative on the social and economic setting.

Socioeconomic data, expected future visitor use, and future developments in the park all were considered in identifying and discussing the potential effects. A simplistic analysis of the direct effects of each alternative was completed. The identification of these impacts is sufficient for the comparison of alternatives for decision-making purposes. For the most part, impacts from the action alternatives would be linked to the three-county regional area.

In the socioeconomic analysis, the duration of effects is as follows: *Short-term* effects would last less than three years; *long-term* effects would last more than three years (and could be considered a permanent change in conditions).

The intensity of effects on the *regional and local economy* was rated as follows:

Negligible: The effect would be at the lower levels of detectability.

Minor: The effect would be slight but detectable.

Moderate: The effect would be readily apparent.

Major: The effect would be severely adverse or exceptionally beneficial.

The regional and local socioeconomic base in the three-county region, including local gateway communities, would be changed by development in the park and the operation and management of its facilities. The socioeconomic base includes such factors as population, income, employment, and

earnings. Development projects in the park units would benefit the local construction industry. Park operations would provide employment opportunities for about 60 people.

The greatest effects from park operations would come from the \$4,343,400 increase in the park's annual operating budget and the addition of 73 full-time equivalent (FTE) positions, as detailed in the *Badlands National Park Business Plan 2001* (NPS 2001a). Obviously, these changes would be long-term positive effects on the regional economy. A doubling of the park's annual operating budget and a 125% increase in staff FTEs represent moderate long-term beneficial increases in business and employment opportunities in the depressed economy around the park. These improvements probably would not be implemented all at once; rather, they would take place over the course of the 15-year planning period. Therefore, the benefits also would occur over a period of time.

These significant increases are necessary to meet the standards of operations, maintenance, and resource protection mandated by the various laws, regulations, and policies that direct the management of the park. For purposes of this analysis, it is assumed that these improvements would be made as part of the continuing management of the park; therefore, they are included as part of the no-action alternative (A). The effects of the action alternatives are evaluated with this situation serving as the baseline for comparison.

DETERMINING CUMULATIVE IMPACTS

Methods Used

The CEQ regulations for implementing the National Environmental Policy Act define a cumulative impact as follows:

the impact on the environment which results from the incremental impact of the

action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Each cumulative effect analysis is additive; that is, the overall effect of the alternative is considered when combined with the effects of other actions (inside and outside the park) that have occurred or would occur in the foreseeable future.

To determine potential cumulative effects, projects in a 15-mile area surrounding the North Unit of Badlands National Park were identified. This area includes the communities of Wall, Scenic, and Interior, the South Unit of Badlands, parts of Buffalo Gap National Grassland and the Pine Ridge Indian Reservation, and parts of Jackson, Pennington, and Shannon counties.

For the air quality impact topic, a different geographic area was used in the analysis of cumulative effects. Because air quality effects in the park result from actions occurring over a large area, the cumulative effects area for this topic was the airshed extending west to the Black Hills and Wyoming.

Actions and Projects inside Badlands National Park

The primary projects and actions that could contribute to cumulative effects are summarized below. These include ongoing and planned actions and projects in the park, reservation, communities, and adjacent counties:

A plan is being prepared to build a Lakota Heritage and Education Center on land in the South Unit or on land in the reservation that is close to the park. The purpose of this facility is to offer the public an opportunity to learn about the Lakota people and their culture and

to provide an area for tribal members to share their cultural heritage. The project is envisioned to be a building housing a museum, a visitor contact area, a meeting room, classrooms, wacipi dance grounds, Lakota lodges, an open-air bazaar, and administrative office space.

The Sage Creek campground is being redesigned to meet the needs of diverse users seeking access to the backcountry. Surrounding natural and cultural resources will be protected. The design includes creating new parking areas, campsites, and group camping shelters in the existing campground footprint, as well as expanding the campground's footprint to make new separate-use areas for horse users and group campers. This project was started prior to this planning effort and therefore a separate environmental assessment is being prepared for this project.

The Park Service likely would conduct some small, limited prairie dog control efforts in areas that are adjacent to private lands upon request from the landowners. All control efforts would be conducted in accordance with federal and state laws and NPS management policies.

Actions and Projects outside the North Unit of Badlands National Park

The Minuteman Missile National Historic Site, which was recently established near the park, will be administered by the Badlands National Park staff. A general management plan for the site is being prepared. A visitor center / administrative facility and parking lot are planned for an area off I-90 east of Wall.

The U.S. Forest Service is following a land and resource management plan for Nebraska National Forest, which includes the Buffalo Gap National Grassland (USFS 2001b). The plan calls for several actions that could affect Badlands National Park, including the following:

- ◆ a recommendation for a wilderness area (Indian Creek)
- ◆ building a primitive campground/trailhead and trails for hiking and horseback riding southwest of the park's South Unit
- ◆ managing the southwest part of the Wall District to promote prairie dog expansion (primarily adjacent to the park) and black-footed ferret reintroduction habitat
- ◆ designating a backcountry nonmotorized area (Rake Creek)
- ◆ developing trails northeast of the park
- ◆ developing a primitive campground southwest of Wall near the park

Other actions that may be taken in the grassland in the future that could affect the park are making changes in public access (such as limiting or closing public access in areas adjacent to the park), changing livestock stocking rates, and changing fuel treatments (such as prescribed burning).

Prairie dog control efforts are continuing on private lands around the park, which may be affecting prairie dogs leaving the park and possibly ferrets. The U.S. Forest Service is also likely to control prairie dogs near private lands.

The cleanup of the former bombing range in Badland's South Unit is an ongoing effort by the Army Corps of Engineers and the Oglala Sioux Tribe to identify and mitigate public safety concerns relating to the former military use of these lands. The effort involves a thorough survey of the bombing range (including the South Unit), followed by investigations of areas identified to have high concentrations of metals. This involves excavating the area by means that can range from hand tools to a backhoe. All excavated areas are backfilled upon removal or destruction of ordnance. Large excavated areas are seeded with a mix of native plant species.

The Mni Wiconi water project is a regional water distribution system being built to bring potable water from the Missouri River to the Pine Ridge Reservation. A series of pipelines are being built near the park. The construction is primarily within the road prism of existing roads, thus reducing the adverse impacts of the project.

The proposed new Dakota, Minnesota, and Eastern (DM&E) railroad line would be built primarily to transport coal from the Powder River Basin of northeastern Wyoming to the Midwest. The line would be about 6 miles from the wilderness boundary in the North Unit. DM&E received regulatory approval from the U.S. Surface Transportation Board on January 30, 2002, to proceed with the \$1.5 billion project. Although the route has been approved, construction has been delayed by court challenges. If the rail line is built, emissions of visible particulates from the diesel locomotives might cause perceptible deterioration of visibility in the park.

The Oglala Sioux Parks and Recreation Authority has submitted a proposal to the state of South Dakota for the designation of the Crazy Horse Scenic Byway. The proposed route of the 133-mile byway is detailed beginning on page 24. The designation of a scenic byway probably would increase traffic levels on these roads.

A number of energy development projects are being proposed in the Powder River Basin in northeastern Wyoming. A group of oil and gas companies proposes to extract coalbed methane on public lands. The Bureau of Land Management has forecast that approximately 39,000 new coalbed methane wells and 3,200 oil wells would be developed and operated on federal lands in the Wyoming portion of the Powder River Basin, along with a somewhat smaller coalbed methane project in the Montana portion of the basin, along with various support facilities in the region (BLM 2002).

Other proposed facilities in the area are a 500 megawatt coal-fired power plant (WYGEN 2) near Gillette, Wyoming, as well as the Two Elks unit no. 2 and the Mid-PRB 500 megawatt power plants. Increased emissions are expected from the Dacotah Cement plant near Rapid City. In addition, the startup of the new 500 megawatt Two Elks unit no.1 will likely result in air quality problems. These energy developments could add substantial emissions to the airshed, which in turn could affect the visibility and air quality of Badlands National Park (BLM 2002).

SECTION 106 SUMMARIES FOR CULTURAL RESOURCES

Effects on historic structures and ethnographic resources are described in terms of type, context, duration, and intensity, as outlined above. This is consistent with the CEQ regulations implementing the National Environmental Policy Act. However, these impact analyses also must comply with the requirements of section 106 of the National Historic Preservation Act (36 CFR 800: *Protection of Historic Properties*). In accordance with those regulations, the effects on cultural resources have been evaluated by (a) determining the area of potential effects, (b) identifying cultural resources present in the area of potential effects that are either listed on or eligible to be listed in the National Register of Historic Places, (c) applying the criteria of adverse effect to either listed or eligible affected cultural resources, and (d) considering ways to avoid, minimize, or mitigate any adverse effects.

Under the Advisory Council's regulations, a determination of *no historic properties affected*, *adverse effect*, or *no adverse effect* must be made for cultural resources that are eligible for the national register. An *adverse effect* occurs whenever an action would alter, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the national register. For example, diminishing the integrity of the resource's location,

design, setting, materials, workmanship, feeling, or association would constitute an adverse effect. Adverse effects also can include reasonably foreseeable effects caused by the preferred alternative that would occur later, be farther removed in distance, or be cumulative (36 CFR 800.5: *Assessment of Adverse Effects*). A determination of *no adverse effect* may mean that there would be an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the national register.

CEQ regulations and the NPS *Director's Order 12, Conservation Planning, Environmental Impact Analysis, and Decision-making* call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (for example, changing an effect from major to moderate or minor). However, any resultant reduction in the intensity of an effect due to mitigation is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only; it does not suggest that the level of effect as defined by Section 106 would be similarly reduced. Although adverse effects under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included in the impact analyses for historic structures, ethnographic resources, and the cultural landscape in all alternatives. These summaries have been prepared with the use of definitions consistent with section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations of the Advisory Council on Historic Preservation (36 CFR 800). The summaries assess the effects of the undertaking on cultural resources, based on the criteria of effect and adverse effect found in the Advisory Council's regulations.

IMPAIRMENT OF PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the preferred alternative, NPS planners are required by NPS *Management Policies 2001* to determine whether or not actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable, adverse effects on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park. That discretion is limited by the statutory requirement that the National Park Service must leave park resources and values *unimpaired* unless a particular law directly and specifically provides otherwise.

The prohibited impairment would occur when, in the professional judgment of the responsible NPS manager, the integrity of park resources or values would be harmed. Any effect on a resource or value could be an impairment, but impairment would be most likely if it would result in a major or severe adverse effect on a resource or value whose conservation is (a) necessary to fulfill specific purposes identified in the park's establishing legislation or proclamation, (b) key to the natural or cultural integrity of the park or opportunities to enjoy it, or (c) identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment could result from NPS management activities, from visitor activities, or from activities undertaken by concessioners, contractors, and others operating in the park. A determination about impairment is made in the "Conclusion" section for each impact

ENVIRONMENTAL CONSEQUENCES

topic except visitor use and the socio-economic environment. Effects that were found to be moderate or lower in intensity were assumed not to be sufficient to constitute an impairment of park resources or values.

EFFECTS FROM ALTERNATIVE A: CONTINUE CURRENT MANAGEMENT (NO-ACTION ALTERNATIVE)

EFFECTS ON NATURAL RESOURCES

Air Quality

Analysis. No new developments or emission sources would result from alternative A. Vehicle traffic probably would increase slightly if visitation increased, but the effect of vehicular exhaust on the park's air quality would be minor, mostly on the Loop Road. Vehicles being driven on dirt and gravel roads would generate some dust, which would have a minor local adverse effect on visibility. Emissions from NPS diesel generators, vehicles, and wood stoves, primarily in the park headquarters area, would result in minor local adverse impacts.

Cumulative Effects. Short-term minor local adverse effects on air quality from particulates and machinery fumes would result from construction activities in the park's North and South Units, including the development of the Lakota Heritage and Education Center, the redesign of the Sage Creek Campground, and the facilities being built in the park headquarters area.

Periodic prescribed burns throughout the park's grasslands would result in temporary increases in particulates, carbon monoxide, and volatile organic compounds, causing moderate to major local short-term adverse effects on air quality.

As was mentioned in the "Affected Environment" chapter, sources outside the park are believed to be largely responsible for the degradation of the air quality and visibility in Badlands National Park. Future developments would be expected to add to the pollution load affecting the park. Several developments mentioned above (beginning on page 123) have the potential to adversely affect the park's air quality. In particular, the proposed energy and industrial developments in the

Powder River Basin would generate large amounts of particulate matter, sulfur dioxide, nitrogen oxides, and volatile organic compounds, which could cause substantial adverse effects on the visibility and air quality in the park.

Emissions from the DM&E rail line also would result in a long-term effect on the park's airshed. The construction of the rail line and the Mni Wiconi water project would have minor to moderate short-term effects. If the Crazy Horse Scenic Byway was designated, increased traffic on roads near the park would cause minor long-term impacts on air quality. Prescribed burns outside the park and wildfires also would be likely to result in short-term minor to major adverse effects on the park's air quality and visibility.

All the above actions, added to the actions in alternative A, could result in long-term cumulative major adverse effects on the park's air quality. However, the actions in alternative A would add a minimal increment to this cumulative impact.

Conclusion. Implementing alternative A would cause long-term minor adverse effects on the air quality in Badlands National Park primarily from increased vehicle emissions. Overall, the park's air quality and visibility probably would continue to deteriorate because of emissions from sources outside the park. A long-term major cumulative adverse impact on regional air quality would be likely, although the incremental contribution from the actions of alternative A would be minor. Overall, the effects of alternative A would not constitute an impairment of park resources or values.

Soundscape

Analysis. No new actions would be taken under alternative A that would result in

important changes in noise levels. Increases in visitation to the North Unit would result in a slight increase in vehicle traffic and associated noise, causing a long-term minor local adverse effect. Park machinery and visitors also would continue to generate noise, most of which would continue to be confined to primary developed visitor and administrative areas, including the Cedar Pass area, the Sage Creek campground, and the Loop Road.

Cumulative Effects. At different times, short-term minor to moderate adverse effects from noise would be caused by park construction machinery, including that at the new park headquarters facilities and from redesigning the Sage Creek campground. Outside the park, the construction of the Mni Wiconi water project would generate noise that would be audible in places in the North Unit. Commercial helicopter tours would be likely to continue, as would farm-to-market traffic, generating noise intrusions in the North Unit. These effects, added to noise caused by visitors and park operations under alternative A, would result in short and long-term minor to moderate cumulative adverse noise effects in local areas.

Depending on location and wind direction, the construction and operation of the proposed DM&E rail line also could increase noise levels. More traffic resulting from the designation of the Crazy Horse Scenic Byway might be audible in the southwest end of the North Unit. When these noises are combined with the sounds of visitor and administrative use in the southwest end of the North Unit, there could be a minor, long term, adverse cumulative noise impact.

Conclusion. Most of Badlands National Park would continue to be relatively quiet under alternative A. However, there would continue to be long-term minor adverse effects on the park's soundscape in local areas, largely from visitation and administrative activities in developed areas. Noise from activities in alternative A added to noise from other actions within and outside the North Unit

could result in short-and long-term, minor to moderate adverse cumulative effects in local areas. These effects would not be sufficient to constitute an impairment of park resources or values.

Geologic Features, Including Soils

Analysis. None of the actions of alternative A would adversely affect the park's geologic features. However, soils would continue to be compacted and altered in local areas by hikers and backpackers walking cross-country and horseback riding in the park. Soil compaction would continue in areas where vehicles are parked on road shoulders. In some areas, such as the Door and Window area, erosion would continue from "social" trails caused by visitors walking to see and climb on geologic features. Vehicles being driven on the road to Sheep Mountain Table also would continue to cause erosion because of the slope and nature of the road. These long-term adverse impacts would be minor to moderate.

Cumulative Effects. Although other actions would result in several construction activities in and outside the park, alternative A would not result in any cumulative effects. None of the other actions would be in areas where effects from visitor activities or NPS operations under alternative A would result in an additive, cumulative effect on soils.

Conclusion. Alternative A would result in long-term minor to moderate adverse effects on soils in local areas caused primarily by continuing use of the park by visitors. No cumulative effects on soils would be expected, and the effects on soils from this alternative would not result in any impairment of park resources or values.

Paleontological Resources

Analysis. In the recent past, Badlands National Park has been the target of intensive, systematic collecting of fossils (NPS 1999a). Any foot or vehicle traffic on bedrock potentially could result in effects on

paleontological resources. The greatest impact on fossil resources from foot traffic would be in intensive visitor use areas such as Door and Window and Fossil Exhibit trail.

Given the size of Badlands National Park and the relatively few NPS law enforcement officers; it is extremely difficult to identify how much illegal fossil collecting occurs in the park. The park initiates 20 to 25 cases a year, which typically result in three to four citations/prosecutions a year. The extent of this long-term adverse effect on the park's resources is somewhat uncertain, but it is thought that it would be a moderate, adverse, long-term impact.

Park visitors such as those in school groups probably would continue to pick up fossils and to take them illegally, either knowingly or unknowingly. Most illegal fossil collecting probably occurs relatively close to roads. Amateur and commercial collectors also probably would continue to take fossils from the park. The number of illegal fossil collection cases investigated has increased from one case in 1998 to 32 in 2000 and 72 in 2001. These cases primarily involved visitors taking a few to large numbers of fossils. However, the number of documented cases may not accurately reflect the amount of illegal fossil collecting in the park; rather than increased poaching; the upsurge in cases may be due to greater NPS efforts and more awareness training of the staff.

Illegal fossil collecting is a major problem in other areas. A study commissioned by the U.S. Forest Service found that almost one-third of the paleontological sites surveyed in the Oglala National Grassland showed evidence of unauthorized collecting (USFS 2001a; USDI 2000). In Petrified Forest National Park it is estimated that individual visitors remove approximately 12 tons of petrified wood from the park annually, in spite of severe penalties, written and oral warnings, and the opportunity to legally obtain petrified wood (NPS 1999a, 2002b).

Cumulative Effects. Activities in and outside the North Unit could potentially affect paleontological resources. The construction of facilities in the park headquarters area, as well as the redesign of the Sage Creek campground would disturb the ground, thus possibly affecting fossils. However, the use of mitigative measures, including surveys and monitoring by paleontologists, should help minimize the extent of the impacts.

In the South Unit the construction of the Lakota Heritage and Education Center could affect fossils, although mitigative measures should minimize the extent of the impacts. The bombing range cleanup efforts also could adversely affect paleontological resources. Excavation is necessary to recover and destroy unexploded ordnance. Excavations typically are small, using hand tools; however, at times heavy equipment is used. Although surveys and monitoring would help reduce the extent of impacts, the cleanup efforts would have the potential for minor to moderate adverse impacts.]

Construction activities outside the park also could adversely affect paleontological resources. The construction of the proposed DM&E rail line near the South Unit would be likely to result in the loss of fossils through excavation and other disturbance of bedrock. The installation of the Mni Wiconi water project would require excavation, which could adversely affect paleontological resources. However, that effect should be minor, since the waterline would be adjacent to existing roads, and fossils in the road corridors already would have been disturbed.

Several actions in the adjacent national grassland could affect paleontological resources: the construction of trails and primitive campgrounds near the park could directly affect fossils. Indirectly, increased use in the area could result in fossil theft and the vandalism of sites, inadvertent camping on sites, and increased erosion in areas that have not been heavily used (USFS 2001b).

Construction and unregulated fossil collecting on private lands near the park might destroy fossils. All actions in and outside the North Unit, added to the expected effects that would result from continued public use of the park in the no-action alternative would result in a long-term adverse cumulative effect of unknown magnitude on area fossils.

Conclusion. Alternative A would have the potential to result in moderate long-term adverse effect on paleontological resources. This would be caused primarily by the continued illegal removal of fossils from the park by visitors and collectors. These impacts would be mitigated by continued efforts to educate visitors about fossils and efforts to allocate existing law enforcement resources towards fossil protection. Added to this, other actions in and outside the North Unit could result in a long-term cumulative adverse impact of unknown magnitude.

Although alternative A would lead to adverse effects on paleontological resources, this would not constitute an impairment of park resources or values. Despite the loss of some fossil resources, the National Park Service would not be prevented from fulfilling the purposes for which Badlands National Park was established. The loss of resources would not destroy the integrity of the park relative to paleontological resources — fossils would continue to be present throughout the park, and the park staff would continue to protect, interpret, and provide opportunities for scientific research on paleontological resources. People still could come to Badlands and enjoy its values, including its fossils.

Vegetation

Analysis. Adverse effects on vegetation from visitors would continue under this alternative. Trampling would continue to affect vegetation at overlooks along the Loop Road and in and near campgrounds, campsites, picnic areas, trailheads, administrative buildings, and scenic and interpretive facilities, with the effects ranging from

complete absence of vegetation to slight alterations in species composition. Similar effects would be evident along road shoulders, where cars crush vegetation and compact soil, in areas where vehicles are driven off-road on Sheep Mountain Table), and in areas where “social” trails are formed. The long-term adverse effects of vegetation loss in local areas would be minor.

In addition, the unintentional transport of exotic plants into and around the park by visitors would continue (as discussed on p. 90), although the magnitude of this effect is unknown.

The park supports several rare plant species. However, these species occur in sparsely vegetated badlands that are not commonly visited. No impacts are known to be occurring to these populations from visitors at present, and no changes would be expected to occur to the populations under alternative A.

Cumulative Effects. In the North Unit the redesign of the Sage Creek campground would result in a minor loss or alteration of native vegetation. Park maintenance operations along roads also would continue to affect plants growing on road shoulders. On the other hand, long-term minor to moderate beneficial effects on the park’s vegetation would result from continued NPS prescribed burning efforts, the reintroduction of native vegetation, and weed management efforts

Outside the North Unit, cattle grazing on surrounding private, public, and reservation lands would continue to alter the types and distribution of vegetation. Building the Lakota Heritage and Education Center, cleanup efforts at the bombing range in the South Unit, and construction of the DM&E rail line also would result in the loss and alteration of vegetation near the North Unit. The construction of the Mni Wiconi water project probably would cause negligible effects on vegetation because it would be built along roads where native vegetation already has been altered. A beneficial effect on range

condition would result from increases in prescribed burning in the adjacent Buffalo Gap National Grassland, as is delineated in the *Land and Resource Management Plan for the Nebraska National Forest and Associated Units* (USFS 2001b).

Overall, when all the effects of actions in and outside the North Unit were added to the effects from alternative A (primarily continuing effects from visitor use), the long-term adverse and beneficial cumulative effects on grassland vegetation in the area would be minor.

Conclusion. Most of the natural vegetation in Badlands National Park would not be affected under alternative A. However, minor long-term adverse effects on vegetation in local areas would continue to be caused primarily by visitor activities. Long-term cumulative minor effects on native vegetation, both beneficial and adverse, would occur in the area. The levels of these effects would not be sufficient to constitute an impairment of park resources or values.

Wildlife

Analysis. Few of the actions of alternative A would affect the park's wildlife populations or habitats. Wildlife populations and habitat already have been altered by visitors and employees, as have wildlife habits and movements, and this would continue. The use of the park by visitors is concentrated mostly in developed areas, such as along the Loop Road. Animals sensitive to human activities already avoid such areas.

The presence of hikers would continue to disturb some sensitive wildlife such as bighorn sheep occasionally, but this disturbance would be temporary and would not affect the park's populations. If visitors were to hike into the sheep lambing habitat when the sheep were lambing there would be a much greater impact, but this is not likely because access to that habitat is difficult.

Some visitors might wander into prairie dog towns, affecting the behavior of animals in the area, but any disturbance would be temporary and the effect would be negligible to minor.

The occasional injury or death of wildlife from motor vehicles on roads would continue. Some animals probably would continue to be attracted by feeding by visitors or to areas where food and garbage are left out. However, the adverse effects on wildlife from all these activities would be local and negligible to minor, and none would substantially affect the park's populations.

Cumulative Effects. Maintenance activities in the North Unit would continue to disturb some animals temporarily.

The behavior, distribution, and movements of some wildlife would be affected by the construction of some developments outside the park, such as the Mni Wiconi water project and the DM&E railroad in those areas. When the rail line begins operating, the behavior of some wildlife would be affected and some animals could be injured or killed by collisions. Similarly, the designation of the Crazy Horse Scenic Byway could result in some animals being injured or killed by vehicles if traffic increased.

Prairie dog control efforts on lands outside the North Unit would continue, which could affect prairie dogs leaving the park. Some limited prairie dog control efforts also probably would occur within the North Unit. On the other hand, on lands in the southwestern and south central parts of the Wall Ranger District in Buffalo Gap National Grassland, which borders the park, the Forest Service's 2001 land management plan states that it will continue to manage to maintain and enhance the prairie dog colony complexes in the southwest part of the Wall District and specifically to promote the expansion of prairie dog habitat adjacent to the park (USFS 2001b). This should be a long-term, beneficial effect on the prairie dog.

Prescribed burning in the adjacent Buffalo Gap National Grassland by the Forest Service might improve wildlife habitat.

Overall, when the effects of alternative A (primarily minor impacts due to continued visitor use) were added to other actions within and outside the North Unit, there would be a minor long-term adverse cumulative impact on area wildlife populations.

Conclusion. Negligible to minor short-term adverse effects on park wildlife populations would continue under Alternative A in local areas, primarily in developed areas, from the presence of visitors and staff. Minor long-term adverse cumulative effects would be expected on the area's wildlife populations. The level of these adverse effects would not be sufficient to constitute an impairment of park resources or values.

Special Status Species

Analysis. Alternative A would not include new developments or other changes in management or visitation that would affect the park's two special status species: black-footed ferret, and swift fox. Although visitor use levels could increase slightly in the future, those species would not be affected. Black-footed ferrets and swift foxes would be seen by few visitors, if any.

Cumulative Effects. Although some limited prairie dog control efforts likely would occur in the North Unit in the future, it is unlikely that such efforts would be permitted in areas where black-footed ferrets are known to occur, or would prevent the ferrets from using these areas.

Actions outside the North Unit could have both beneficial and adverse impacts on black-footed ferrets and their habitat. The construction of the DM&E rail line (depending on its route) could reduce some potential habitat for ferrets. In addition, prairie dog control efforts on lands outside the North

Unit could affect ferrets if they occurred in these areas.

On the other hand, the Forest Service stated in its 2001 land management plan that it will continue to maintain and enhance prairie dog colony complexes in the southwestern and central parts of the Buffalo Gap National Grassland and that it will maintain black-footed ferret reintroduction habitat in this area and in the southeastern part of the Wall Ranger District (USFS 2001b). This should be a long-term beneficial effect on the ferret.

The National Park Service would continue to reintroduce swift fox into the park for another year, which would have a long-term beneficial impact on the fox population, assuming the foxes survive and breed.

Adding the above effects from actions outside the North Unit to alternative A would not result in any cumulative effects on the endangered black-footed ferret or the state-listed swift fox. This is because the alternative does not include any actions that would contribute or add to the effects of other actions in and outside the park.

Conclusion. Alternative A would not affect the endangered black-footed ferret or the state-listed swift fox. No changes in visitation or park management under this alternative would affect these populations or their habitats. No cumulative effects would result from alternative A, and the park's resources and values would not be impaired by any changes in the park's special status species.

EFFECTS ON CULTURAL RESOURCES

Historic Buildings and Other Structures

Analysis. None of the buildings or structures identified as being eligible for inclusion in the National Register of Historic Places would be impacted by continuing the current management direction.

Cumulative Effects. Several miles north of Badlands National Park, the development of the Minuteman Missile National Historic Site would affect the historic condition of the missile control and launch facilities. The alterations could include substantial structural changes to accommodate public visitation, environmental control, and protective barriers. The long-term, adverse effects on the structures of the national historic site would range from negligible to moderate.

Since there are no actions impacting historic buildings and structures associated with implementation of the alternative, the adverse effects associated with Minuteman Missile National Historic Site would constitute the entire cumulative impact.

Conclusion. Alternative A would not result in any effects on historic buildings or other structures in Badlands National Park. Therefore, the park's cultural resources and values would not be impaired.

Section 106 Summary. This summary (like all section 106 summaries in this document) has been prepared with the use of definitions consistent with section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations of the Advisory Council on Historic Preservation (36 CFR 800).

In accordance with the regulations of the Advisory Council on Historic Preservation implementing section 106 of the National Historic preservation Act, the National Park Service finds that no historic properties would be affected (36 CFR 8004(d)(1)).

Ethnographic Resources

Analysis. NPS knowledge of the locations of traditional use is limited to areas identified by American Indian tribes as containing sacred sites. The ongoing study of ethnographic resources will provide additional information. Ethnographic resources, including sacred sites and traditional cultural properties, would be

identified and protected from impacts associated with the implementation of this alternative. As a result, there would be no effects on ethnographic resources from this alternative.

Alternative A would not result in any change in access by American Indians or use of ethnographic resources sacred to the tribes. The alternative would not change the agreement that guarantees tribal members unrestricted access in perpetuity and requires their written consent to affect those sites. Consultation with tribes to identify traditional use areas would precede ground-disturbing or other activities that could affect the current use, viewshed, or perception of the resource.

Cumulative Effects. Actions inside and outside the park could affect ethnographic resources, including traditional cultural properties. Excavation in the park as part of efforts to clean up the bombing range could alter vegetation patterns and landscapes, affecting the viewshed of a sacred site. Although surveys and cleanup plans would help to reduce the extent of these effects, the cleanup efforts could result in long-term moderate adverse impacts.

Traditional cultural use areas could be disturbed by construction activities associated with the proposed DM&E railroad near the South Unit or by the installation of the Mni Wiconi waterline. The waterline would be placed along existing roads, but if ethnographic resources were disturbed, long-term moderate adverse effects could be caused by installing the rail line.

Ethnographic resources could be affected by actions in the adjacent Buffalo Gap National Grassland. The construction of trails, campgrounds, or other visitor accommodations could directly affect traditional use areas, and inadvertent camping on traditional use sites and hiking across areas of eroding landforms could result in long-term adverse impacts ranging in intensity from negligible to moderate.

Outside the park, the development of coalbed methane fields by oil and gas companies that operate in northeast Wyoming could affect viewsheds, use, and tribal relationships to regional ethnographic resources. Depending on the location, the long-term cumulative adverse effects could be widespread or limited and could range from minor to moderate.

Alternative A would not contribute to the cumulative effects on ethnographic resources from other actions discussed above.

Conclusion. Implementing alternative A would result in no effects on ethnographic resources in the park.

Until the completion of inventories of ethnographic resources in the park, the National Park Service would conduct site-specific surveys and consult as appropriate with American Indians for each development action. Because there would be no adverse impacts, the park's resources and values would not be impaired.

Section 106 Summary. There are no known traditional cultural properties in Badlands National Park. Because alternative A would not result in any effect on traditional cultural properties, the National Park Service finds that the determination of effect would be *no historic properties affected* (36 CFR 800.4(a)(2)).

In accordance with NPS policies and procedures, the park would continue to protect ethnographic resources to the greatest extent possible. The disturbance of such resources would be avoided wherever possible. In instances where avoidance or preservation could not be achieved, appropriate mitigation would be carried out in consultation with American Indian tribes identified as having a cultural affiliation with the park and, if such resources were determined to be eligible for national register listing, with the South Dakota state historic preservation officer.

EFFECTS ON VISITATION AND THE VISITOR EXPERIENCE

Access

Analysis. The overall accessibility of the park to visitors would not change under alternative A; that is, there would be no changes in the operation or location of the entrances, in the major roadways in the park, in the amount of available parking, in visitors' access to existing park facilities such as visitor centers and campgrounds, or in access to trailheads.

The Loop and Sage Creek Rim roads would continue to be the primary corridor through the park; most of 1.2 million visitors per year would use these roads. The Loop Road still would offer access to numerous existing parking areas, to interpretive and hiking trails, and to facilities at the Cedar Pass complex. The roads in the North Unit would remain asphalt or gravel as at present and would be maintained year-round. All the current park entrances would remain open, as would all the present trailheads and waysides. The existing roads and trails would continue to meet the current levels of visitation, which has been relatively consistent for the past 20 years.

The road to Sheep Mountain Table would remain primitive with relatively unrestricted use, but the road condition still would affect visitors by limiting access to high-clearance vehicles.

Overall, access and circulation over the existing roads and facilities in the North Unit would be adequate for the current level of visitation.

Cumulative Effects. Traffic projections indicate that a substantial increase in park visitation could result from the completion of the Heartland Expressway and the Crazy Horse Scenic Byway. The increase from these roads originating from the south and west, added to visitation projections, could alter the current visitation patterns to the park. The routes for these two road projects already

exist, but typically park visitors do not use them.

Implementing alternative A would not change visitors' access to the park; therefore, despite the effects from other actions described above, there would be no cumulative effects on visitor access from this no-action alternative.

Conclusion. Alternative A would not change visitors' access to the park; access to the North Unit would continue to be adequate.

Availability of Information

Analysis. Under the no-action alternative, opportunities for visitors to get information would continue at the existing locations. The primary location for orientation, interpretation and education still would be the Ben Reifel Visitor Center in the North Unit.

The location of the Ben Reifel Visitor Center near Cedar Pass was based on the historic visitation pattern, but now visitors who enter at the park's west side must travel through much of the park before they reach that center to obtain information. The current adverse effects on the availability of information are minor, but they could be more severe if the changes in visitation patterns continued under alternative A.

Most opportunities for visitors to come in contact with NPS staff would be in the park's North Unit. Educational opportunities for schools and organized groups would continue to be limited by a lack of adequate facilities, and there still would be no access, facilities, signs, or interpretive waysides along SD Highway 44.

Cumulative Effects. When developed, the Lakota Heritage and Education Center would be another outlet that would distribute information to the public. This facility would be near the proposed Crazy Horse Scenic Byway, which is projected to lead to an increase in traffic in this area. A visitor center

proposed for the Minuteman Missile National Historic Site along the Interstate Highway 90 corridor would be another outlet for information, which, although focused primarily on the historic site, would offer basic information about Badlands National Park. These projects would result in long-term minor to moderate beneficial effects on the availability of information.

Alternative A would result in minor long-term adverse effects on the visitor experience because the changing visitation patterns in the North Unit lead to difficulty in getting information for visitors entering the park from the west.

The adverse effects of implementing alternative A, combined with the beneficial effects from regional projects, would result in long-term minor beneficial cumulative effects on the visitor experience in Badlands National Park. The creation of two information facilities would improve opportunities for visitors to get information about the park and the region.

Conclusion. Alternative A, the no-action alternative, would result in continued adverse effects on the visitor experience, especially for those entering the park from the west. The current effects on the visitor experience are minor; however, if the changes in visitation patterns continue, the effects could become more severe.

Range and Enjoyment of Visitor Activity

Analysis. The four most popular visitor activities in Badlands National Park are vehicle use, hiking and pack stock use, camping, and picnicking. Those four activities are discussed separately in the consequences section for each alternative.

Vehicle Use — The existing range of driving opportunities in the park would continue under alternative A. The Loop Road and the Sage Creek Rim Road would continue to be available for year-round driving and

sightseeing. The experience along the Loop Road would be highly structured, and the number of interactions with other visitors would be high. The Sage Creek Rim Road would offer a more rustic experience, with a sense of isolation and fewer interactions with other visitors. Visitors using these roads would have access to spectacular views of the Badlands.

Overall, this alternative would result in no new impacts on visitors.

Hiking and Pack Stock Use — The existing range of hiking and horseback riding would continue in alternative A, with ample opportunities for hikers and pack stock users to explore the park. The only designated and maintained hiking trails would be the Castle Trail system north of the Loop Road between Cedar Pass and Fossil Exhibit. The lack of marked trails would continue to limit the number of visitors hiking in the park.

Most of the park would be available for pack stock users to explore, but, these users would find limited facilities such as corrals and loading ramps to enhance their visits. This would cause a negligible adverse effect on pack stock users.

Camping — The existing camping opportunities in Badlands National Park would continue. The Cedar Pass campground still would be the park's main campground, offering typical facilities — restrooms, picnic tables, and potable water. The Sage Creek campground would continue as a site for a more primitive camping experience. The ongoing campground rehabilitation would continue, with the goal of retaining the campground's primitive character. The existing campgrounds typically are not filled to capacity, even during the peak season. Overall, this alternative would result in minor beneficial effects on visitors from the improvements to the Sage Creek Campground.

Picnicking — Picnicking would continue to be available at the Journey Overlook and Conata Road. A demand for picnic facilities near the Cedar Pass complex would continue. The area around the Ben Reifel Visitor Center becomes a de facto picnic area in summer, increasing congestion levels at the park's main visitor center. Adequate facilities for a high-quality picnic opportunity are unavailable in this area, which results in negligible adverse effects on the visitor experience.

Cumulative Effects. It is projected that various plans for road improvements in the region will increase opportunities for driving and sightseeing. If the Crazy Horse Scenic Byway was designated and marked by signs, it would offer an additional scenic driving opportunity in the region. The management plan for Buffalo Gap National Grassland calls for the development of a primitive campground near the park's South Unit, expanding the region's camping opportunities (USFS 2001b). These projects would result in long term benefits for visitors seeking recreational opportunities in the region.

Alternative A, the no-action alternative, would maintain the status quo, which provides a range of opportunities for visitors. However, there would be some negligible effects on park visitors seeking hiking opportunities, because the existing designated trail system is relatively small. In addition, the lack of a picnic area at the Cedar Pass complex, the major attraction in the park, causes adverse effects on the visitor experience.

The long-term benefits of the regional projects, coupled with the negligible adverse effects of implementing alternative A, would result in long-term cumulative beneficial effects on the visitor experience.

Conclusion. Implementing Alternative A would result in long-term negligible adverse effects on visitors seeking hiking or picnic opportunities, especially at the Cedar Pass complex. Pack stock users would continue to

be adversely affected by the lack of facilities such as corrals and loading ramps.

Scenic Resources

Analysis. Alternative A would result in no changes to the existing facilities in the park. These facilities would continue to cause minor long-term adverse impacts on the park's scenic resources.

Cumulative Impacts. Activities outside the park boundary would have the potential to affect the viewsheds from within the park. The construction of the DM& E Railroad would result in adverse impacts on the viewshed. These adverse effects would be long-term and minor to moderate.

Developments on private lands adjacent to the park have resulted in impacts on viewsheds from the park. The construction of new buildings, signs, and communications towers has resulted in long-term minor adverse impacts on the viewshed. There is the potential that additional communications towers would be constructed within the viewshed of the park; however none are proposed at this time. If more towers were constructed, they would result in long-term adverse impacts.

The effects of the activities outside the park, combined with the effects of implementing alternative A, would result in long-term minor adverse cumulative effects on scenic resources.

Conclusion. Alternative A would continue to result in long-term minor adverse impacts on scenic resources. The existing facilities would continue to cause minor adverse impacts on the scenic resources.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

Analysis

The policy and regulatory requirements for the protection of resources and the safe enjoyment of the park by the public are not all being met at present. Fiscal and staffing shortfalls have been identified in the park's major functional areas of resource protection, visitor experience and enjoyment, facility operations, maintenance, management, and administration. The presence of shortfalls means that many operations and maintenance activities have been deferred and levels of service to the public have been below what they should be. Such problems would be addressed under alternative A. Increased funding and more staff would correct these current problems and fulfill the necessary requirements for adequate resource protection and visitor enjoyment. Additional funding for park activities would more than double the existing budget and available staff. Some improvements would be made to the park infrastructure (for example, repairing and expanding the Ben Reifel Visitor Center).

Unfortunately, not all serious problems facing the park would be addressed in this alternative. Many desired or necessary capital improvements would not be accomplished, including needed park housing, new visitor facilities, and necessary road realignment at the east end of the park. Staff housing at this remotely located park would remain in short supply. There would be fewer facilities for visitor use than desired.

The east entrance road eventually would fail, and a one-way trip to enter and exit through the most popular and accessible part of the park would no longer be possible. This would inconvenience visitors and greatly complicate the park management. Visitors would be forced to back track to their original entrance point to leave the park. The drive times for many park employees going to and from work assignments would be greatly increased

because they would have to go around the failed section of the Loop Road.

Cumulative Effects

No cumulative effects on the socioeconomic environment have been identified for alternative A.

Conclusion

This alternative would achieve many necessary improvements to the park and its operations, but not all serious problems would be sufficiently addressed. For comparison purposes, the present value of the annual cost of the no-action alternative is \$30,018,000.¹

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

With private vehicles continuing to be the primary means of transportation to and through the park, additional energy requirements (gasoline consumption and fuel for heating and lighting visitor facilities,) would be expected only as a direct result of increased visitation. The retrofitting of existing facilities, such as the Ben Reifel Visitor Center, would result in more energy consumption; however, the projects would follow NPS policies concerning sustainability and energy conservation to minimize the overall energy requirements.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. Minor adverse impacts on natural resources would be caused by human use in some areas throughout the park. Although all these impacts would be unavoidable (short of not allowing any increased human use), mitigation to reduce them would be carried out where possible.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

Under alternative A the additional energy requirements identified above would result in an irreversible commitment of resources. There would be no permanent effects on park resources.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE OR ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Under alternative A, most of the park would be protected in a natural state and would maintain its long-term productivity. Only a small percentage of the park would be converted to development.

1. The concept of *present value*, also known as discounting, allows for comparisons of different monetary benefits received at different times in the future; that is, it allows for the comparison of apples and oranges. Discounting brings the benefits of a future income stream back to the present time and allows for the comparison of alternatives, which represent varying costs spread over time. *Present value* is the amount of money that would generate a given stream of income for a given period at a given rate of interest. The concept of present value explicitly incorporates the time value of money. For this no-action alternative, the stream of income needed to support park operations is \$3,116,000 annually, the interest rate is 6.125% (federal discount rate for fiscal year 2002), and the time period is 15 years (life of the *General Management Plan*). This interest rate and time period are the same for all alternatives.

EFFECTS FROM ALTERNATIVE B: EXPAND VISITOR OPPORTUNITIES (PREFERRED ALTERNATIVE)

EFFECTS ON NATURAL RESOURCES

Air Quality

Analysis. Minor changes in the park's air quality would result both from increased visitation and the construction of facilities. Under alternative B there would be short- and long-term minor local impacts from the construction and use of new visitor facilities (outdoor classrooms, education pavilions, visitor contact stations, campgrounds, trailheads), improvements to visitor facilities (picnic areas, roads, parking areas), and construction and use of new employee housing facilities. Construction of the new Loop Road segment in the Cedar Pass area would also cause minor to moderate short-term and long-term adverse impacts. All these impacts would be largely due to fumes (hydrocarbons, carbon monoxide and nitrogen oxides) and particulates emitted from construction machinery and increased dust due to the excavation of earth and in the immediate project areas. Air quality impacts would be local and the impacts would be likely to be spread out over the 15–20 year timeframe of this plan.

Constructing the new Loop Road segment in the Cedar Pass area also would require asphalt, which would result in emissions from an asphalt batch plant, a storage pile, and haul trucks. Volatile hydrocarbons and other organic compounds in the asphalt would enter the air for a short time after the road surface was completed.

The new section of the Loop Road would not increase traffic volume; however, depending on the design of the road, if vehicles had to be driven up a higher grade, emissions could increase compared to the no-action alternative. The impact would vary depending on the level of traffic, the time of day, the season, and weather conditions, but it could range from a

negligible to moderate long-term adverse impact.

An improvement of the Sheep Mountain Table road would lead to small increases in traffic, which would add negligible additional emissions into the air. The impact would vary, depending on the level of traffic, the time of day, the season, and weather conditions, but it could range from a negligible to moderate long-term adverse impact.

Cumulative Effects. As was described for the no-action alternative, several actions in and outside the North Unit would affect air quality and visibility in the park. Construction activities, including the redesign of the Sage Creek Campground, and development of the Lakota Heritage and Education Center, would result in minor short-term local adverse effects on air quality. Periodic prescribed burns in the North Unit could cause moderate to major, short-term impacts to air quality in local areas. However, sources outside the park would add far more pollutants to the airshed. In particular, energy and industrial developments in the Powder River Basin in Wyoming could cause substantial adverse effects on air quality in the park, as was described in the no-action alternative. Other outside actions that could affect the park's air quality are prescribed fires, wildfires, the construction and operation of the DM&E rail line and the Mni Wiconi water project, and the possible designation of the Crazy Horse Scenic Byway.

All the above actions, added to the actions of alternative B, would result in a major long-term cumulative adverse effect on the air quality in Badlands National Park. However, the actions of alternative B would add a minimal increment to this cumulative effect because the air quality effects resulting from alternative B would be short term, local, and spread out over time.

Conclusion. Alternative B would result in minor to moderate short- and long-term adverse effects on air quality in local areas, primarily from construction and use of developments. Combined with emissions from sources outside the park, this would result in a major long-term cumulative adverse effect on regional air quality, but the incremental contribution of alternative B to this impact would be minor. The level of impact that would result from alternative B would not be sufficient to constitute an impairment of park resources or values.

Soundscape

Analysis. As with the air quality, facility construction and improvement projects in alternative B would affect the park's soundscape in local areas. Construction workers and equipment would generate noise during the construction or improvement of trails, housing, education pavilions, outdoor classrooms, the Pinnacles visitor contact station, campgrounds, roads, and parking areas. In some of these areas, the noise from construction equipment would be substantial, but it would be temporary and local and would take place at different times and places through the park. Most noise from new developments would be in or near developed areas that already are exposed to noise from vehicles, park equipment, and visitors. Excluding noise from construction of the new Loop Road section, noise from the construction activities would have negligible to moderate short-term adverse impacts on the natural soundscape in local areas, depending on the presence of other facilities and people, vegetation, wind, and time of day.

Substantial noise would come from demolition and excavation equipment (trucks, graders, bulldozers, and portable generators) constructing the new Loop Road segment, causing major long-term adverse effects during the construction period. Depending on the design of the new road alignment, vehicular noise also might increase: if the grade was higher than the current road or if

there were no natural features to absorb sound; such noise could carry farther from vehicles being driven up and down the Badlands Wall. Thus, the long-term adverse effects on the soundscape in the vicinity of the new part of the Loop Road from alternative B would be moderate to major.

Noise levels would be likely to increase under alternative B in several places that have been relatively quiet in the past. More visitors and vehicles would be likely at the Conata picnic area and trailhead, the Pinnacles visitor contact station, the new Sage Creek developments, the new waysides along SD 44, and the new outdoor classrooms. Although noise levels would increase at these facilities, the effect on the soundscape would be minor because visitor numbers would not increase substantially. On a few high-use weekends, more noise would be expected, and the impact could be moderate at some locations.

A few more vehicles might be present after the improvements to the Sheep Mountain Table road but the increase in noise would be transitory and minor. Similarly, after the designation and construction or improvement of trails in the North Unit, more visitors might use the trails, affecting the soundscape, but there would not be large numbers of hikers at any one time. Thus, the effect on the soundscape, primarily in the peak season, would be minor and long term.

Cumulative Effects. As in the no-action alternative, noise in parts of the park would increase from construction activities, the operation of machinery and vehicles, and the presence of people. There could be a cumulative long-term minor adverse noise effect in local areas from increased noise levels under alternative B (construction of facilities, greater numbers of people and vehicles in some park areas) added to actions independent of this plan such as the redesign project at the Sage Creek campground, continued commercial tour helicopter overflights, commercial traffic through the park, and the designation of the Crazy Horse Scenic Byway.

Outside the park, the construction of the Mni Wiconi water project would generate noise that would be audible in places in the North Unit. On the southwestern end of the North Unit, noise levels could increase from traffic on the scenic byway (assuming increased traffic resulted from that designation). These sounds could combine with visitor and administrative use in the park (including sounds from the construction and operation of the new orientation facility), resulting in a long-term minor adverse cumulative effect on the soundscape.

Conclusion. The soundscape in most of Badlands National Park would continue to be relatively quiet under alternative B, with few unnatural sounds. However, there would be more sources of noise in the park than in alternative A. The construction and operation of visitor facilities would cause short-term and long-term minor adverse effects on the soundscape, mostly in areas already exposed to some noise. The construction and use of a new section of the Loop Road would result in moderate to major short-term and long-term adverse effects. There would be the potential for minor long-term adverse cumulative effects on the soundscape from the operation of new park facilities added to construction activities and increased traffic levels outside the park.

The construction and use of the new Loop Road segment would adversely affect the soundscape under alternative B, but, the park's resources and values would not be impaired. Only a small part of the park would be affected, and the National Park Service would not be prevented from conserving resources or values as needed to fulfill the park's specific purposes, as identified in the establishing legislation. The natural or cultural integrity of the park would not be compromised, nor would opportunities for visitor enjoyment.

Geologic Features, Including Soils

Analysis. Except for the new Loop Road segment in the Cedar Pass area, none of the actions of alternative B would affect the park's geologic features. Depending on the design of the new road segment, some parts of the Badlands Wall (eroding walls, cliffs, buttes) might have to be modified or removed, resulting in a long-term moderate to major local adverse effect. Although mitigation measures and best management practices would be applied to help minimize soil disturbance, soil impacts would still occur along the new road alignment: soil profiles would be disrupted by construction equipment, topsoil would be lost due to paving of the road surface, and some soil would still be lost due to erosion. If people parked their vehicles in informal pulloffs off the side of the new road, that could cause a secondary adverse effect on soils. All these changes could result in a moderate to major long-term adverse impact on soils along the route of the new road.

The soils in Badlands National Park also would be adversely affected by several other actions in alternative B. Park soils would be affected by constructing or improving park facilities, including campgrounds, pavilions, waysides, employee housing, and the Sheep Mountain Table road and parking area. Most of these developments would be in already disturbed areas where the soils have been altered by past activities. Although some soils in these areas could be altered and erosion increased by construction, with mitigation the local adverse effects on soils in most areas would be minor.

The construction of the Pinnacles visitor contact station would be in a previously undisturbed area. Although erosion would be minimized by mitigative measures, some soil would be permanently disturbed, resulting in a moderate long-term local adverse effect.

As in alternative A, erosion on part of the Sheep Mountain Table road would continue,

resulting in a long-term moderate adverse effect on soils. Even with the road improvements in this alternative, the slope of that road would allow erosion to continue. However, the improvements to the road on top of the table and below the hill would reduce erosion, a beneficial effect.

The construction or designation of new trails and routes would result in both beneficial and adverse consequences for the park's soils. New trails in the Castle Trail area would increase use in an area with fragile cryptogamic soils. Some soils would be altered by foot traffic both in and adjacent to the trail corridors, and some erosion could occur, resulting in a long-term minor to moderate adverse impact.

Soils would be compacted by increased foot traffic going into the wilderness area from the Sage Creek campground, but compared to soil compaction caused by bison, the effect would be negligible.

Designating trails or routes from the Sage Creek campground and Conata picnic area into the wilderness area and restricting hikers to those trails and Sheep Mountain Table trails would help focus use, reducing "social" trails. This would reduce erosion, bringing about a long-term minor to moderate beneficial effect on soils. Constructing boardwalks for the short interpretative trails off the Loop Road also would result in a beneficial effect on soils.

All park resources, including soils, would benefit from adding outdoor classrooms or pavilions, and visitor contact stations. Visitors could be educated about the nature of the park's soils and learn ways to avoid or minimize the impacts from foot traffic. This would result in a minor to moderate long-term beneficial effect on park soils.

Cumulative Effects. Soils would be lost or altered and erosion temporarily increased by several developments in and outside the North Unit, including the redesign of the Sage

Creek campground, construction of the Lakota Heritage and Education Center, and the installation of the Mni Wiconi water project (although this would be built primarily along existing roads). Other actions that would affect soils are the development of the DM&E rail line and the bombing range cleanup. The loss and alteration of soils from these other actions, added to the potential effects from construction and improvements under alternative B and from more visitation in parts of the North Unit, would increase soil erosion and alteration in the region, resulting in a long-term minor to moderate adverse cumulative effect on area soils.

Conclusion. Most of the park's soils and geologic features would not be affected by alternative B, but constructing the new Loop Road segment could result in long-term moderate to major adverse effects on geologic features and soils along the corridor. The alternative also would cause long-term minor to moderate beneficial and adverse local effects on park soils. The adverse soil impacts from construction and the use of new or improved trails would be mostly in developed areas. The beneficial effects on soils would result from restricting people to established trails, improving the road on Sheep Mountain Table, and adding education and interpretation (which could reduce the effects caused by visitors). When outside developments are added to new park developments, improvements, and increased use in parts of the park, the cumulative result would be a minor to moderate long-term adverse cumulative effect on area soils.

The effects on soils from alternative B would not constitute an impairment of park resources or values. Although the construction of the new Loop Road segment could result in a major adverse effect on geologic features, this would not impair park resources and values. The effect would be local, and its extent would depend on the road design (that is, whether the road would be elevated or cut through the Badlands Wall).

The loss of geologic features under alternative B would not destroy the integrity of the park relative to its geologic features. Geologic features would continue to be present throughout the park (albeit potentially in fewer numbers), and the park staff still would protect and interpret the features and provide opportunities for scientific research on the park's geology. People still could come to Badlands and enjoy the park's values, including its geologic features.

Paleontological Resources

Analysis. The paleontological resources of Badlands National Park could be adversely affected under alternative B by new developments, improved access, and more visitors. Most developments and improvements in alternative B (campgrounds, pavilions, waysides, housing, a picnic area, and trailheads) would be in already disturbed areas that are not known to be highly fossiliferous. Little additional bedrock would need to be disturbed for most of these projects, but if drilling into bedrock was necessary, some fossils could be damaged or lost. With surveys and monitoring, the potential for adverse effects on paleontological resources would be minor.

A new Pinnacles visitor contact station would be built in an area above the Badlands Wall that is thought not to be highly fossiliferous. The improvement of the Sheep Mountain Table road could cause damage or the loss of some fossils, as could the construction of the parking area. However, with surveys and monitoring, the effects probably would be minor.

Even with mitigation (surveying and monitoring), the construction of the new Loop Road segment in the Cedar Pass area would be likely to result in the loss of fossils. Fossils could be damaged or lost through a variety of actions, including drilling, demolition and excavation work, placement of fill, paving, and crushing by construction equipment being driven over areas. Erosion along the road could increase,

indirectly resulting in additional fossil loss. The extent of the adverse effects on paleontological resources would depend on where the new road segment would cross through the Badlands Wall (generally, the narrower the affected section of the highly fossiliferous Wall, the fewer the impacts) and the design of the road (that is, whether it would be elevated on piers or a cut-and-fill road). The long-term adverse effects on paleontological resources from the new road segment could range from moderate to major.

New trailheads, trails, and routes in alternative B, as well as improvements to existing trails and routes, would improve access to the wilderness area, and the Castle Trail area. It is unlikely that such improved access would affect poaching by commercial collectors in the park — poaching of fossils would continue regardless of any changes in access.

Although more efforts at visitor education, more ranger patrols, and more enforcement efforts in alternative B would help decrease illegal fossil collecting, improved access could still increase the potential for the incidental undetected removal of fossils from the park. Thus, even with mitigation efforts, the potential for the loss of fossils due to collecting would be greater in this alternative than in alternative A.

Several actions of alternative B would result in beneficial effects on paleontological resources:

- ◆ The addition of visitor contact stations and outdoor classrooms could increase visitors' awareness of the significance of the park's fossils and help reduce the potential for fossil collecting.
- ◆ Ranger patrols would be increased under alternative B.
- ◆ The boundary expansion along SD 44 would improve access for rangers, researchers and resource managers into the Badlands Wilderness Area, increasing the protection of fossils in that area.

Cumulative Effects. Like alternative A, alternative B could result in cumulative adverse effects on the area's paleontological resources. Actions in and outside the North Unit (such as constructing the Lakota Heritage and Education Center, redesigning the Sage Creek campground, cleaning up the bombing range, the construction of the DM&E rail line and the Mni Wiconi waterline, increased use of the adjacent national grassland, and illegal fossil collecting on lands near the park) could result in the loss or vandalism of fossils.

All the impacts from other actions in and outside the North Unit, added to the impacts from new developments and more public use in parts of the park under alternative B, could result in more fossils being lost or damaged in the region, even though surveys and monitoring would be carried out. Thus, alternative B would contribute to a long-term adverse cumulative effect of unknown magnitude on the area's fossil record.

Conclusion. Alternative B would result in some minor beneficial effects on paleontological resources primarily from increased staffing and educational efforts. However, there would be a greater potential for adverse effects on paleontological resources from alternative B than alternative A, primarily from constructing the new Loop Road segment and from the potential for more illegal fossil collecting due to improved access in parts of the park. Even with mitigation efforts, alternative B could result in moderate to major long-term adverse effects on the park's paleontological resources relative to alternative A. These effects, added to those from other actions in and outside the North Unit, could result in a long-term cumulative adverse impact of unknown magnitude.

Although alternative B would have a higher potential to cause adverse effects on paleontological resources than alternative A, this would not constitute an impairment of park resources or values. The National Park Service would continue to be able to fulfill the

purposes for which Badlands National Park was established. The loss of resources under alternative B would not destroy the integrity of the park relative to its paleontological resources. Fossils would continue to be present in the park, and the park staff would continue to protect and interpret paleontological resources and to offer opportunities for scientific research on that subject. People still could come to Badlands National Park and enjoy its values, including its fossils.

Vegetation

Analysis. Vegetation would be lost or altered in local areas under alternative B, primarily from the development or improvement of facilities and visitor services. Most new developments or improvements would be placed within the existing footprint of disturbed areas in which the vegetation already has been altered; therefore, little additional loss of native vegetation would result from construction or improvements in proposed campgrounds, pavilions, the Sheep Mountain Table road and parking area, and employee housing. Given the previous vegetation disturbance in most of these areas, and with the use of appropriate mitigative measures to minimize additional impacts (such as ensuring that equipment stays within project area boundaries, revegetating disturbed areas, and taking steps to avoid the spread of exotic species), the adverse effects on native vegetation from these actions would be negligible to minor.

Constructing the new Cedar Pass segment of the Loop Road would cause both direct and indirect adverse effects on prairie vegetation. Native grassland vegetation would be lost or damaged both above and below the Badlands Wall. Some rare plants could be lost, although it might be possible to locate the road to avoid those plants. Some native plants would be permanently lost because of the road footprint. Even with mitigative measures, construction equipment in the project area would result in the damage or loss of other plants.

Several indirect impacts also could result from the construction of the road segment. If erosion along the road increased, more vegetation would be lost. Nonnative plants could be introduced or spread into disturbed areas. If visitors created “informal” pull-offs by parking off the side of the road, some roadside plants might be crushed, trampled, or picked. Road maintenance also might indirectly affect roadside vegetation. Depending on the road’s location and design, the long-term adverse effects on native vegetation from the new road segment would range from minor to moderate.

The new Pinnacles visitor contact station would be built in a previously undisturbed area. Despite the use of mitigative measures to help reduce the loss of native prairie vegetation, some vegetation would be permanently disturbed or lost, resulting in a long-term, minor, adverse impact.

Vegetation also would be altered or lost through visitation in alternative B. As in alternative A, people walking over and trampling plants in and around existing facilities would result in the loss of native vegetation, a long-term minor to moderate adverse effect.

As soils would be affected, building or designating new trails and routes would cause both beneficial and adverse consequences for the park’s vegetation. Hiker and pack stock use would increase on new trails and routes in the Castle Trail area, and in the Conata picnic area, resulting in the trampling and loss of vegetation. More erosion in any of these areas would cause the loss of some plants, and the potential for visitors or pack stock to inadvertently carry in and spread exotic species also would increase. Depending on the level of use, time of use, and the vegetation, there could be a minor to moderate long-term adverse impact on vegetation in these local areas.

Designating trails or routes into the wilderness from the Sage Creek campground

and the Conata picnic area and restricting use to those routes, as well as restricting use to trails on Sheep Mountain Table would help to focus use and reduce “social” trails. This would cause a long-term, minor to moderate beneficial effect on native vegetation. Constructing boardwalks for the short interpretative trails off the Loop Road also would prevent additional “social” trails, resulting in a minor beneficial effect on vegetation.

The improvement of the Sheep Mountain Table road would reduce two-track ruts, resulting in a long-term minor to moderate local impact on vegetation, depending on the number of vehicles being used.

Adding outdoor classrooms/pavilions, way-sides, interpretive trails, and visitor contact stations would benefit park vegetation by improving visitors’ education, and their appreciation of native and rare plants would be increased, so that adverse effects on vegetation would be reduced. One beneficial effect of such education would be to help avert the spread of exotic species from visitors walking in the park. Overall, the beneficial effect on park vegetation would be minor to moderate.

Surveys for rare plants would be conducted before developments were constructed in alternative B, and in most cases developments (new trails, visitor facilities) could be sited to avoid effects on these populations. Two species of rare plants, Dakota buckwheat and sidesaddle (or Secund) bladderpod, could occur in the area where the new Cedar Pass road might be built. These plant populations might not be found in a survey because the buckwheat is an annual plant and the bladderpod is an annual or short-lived perennial; even if a survey did not find them in a given year, they might be present on a site. Even if the road was located to avoid populations of these plants, impacts still could be caused by construction equipment in the project area, and indirect impacts could result from visitors pulling off the roads or from roadside maintenance activities. On the other hand,

given the environmental requirements of these plants, their ability to disperse seeds, and the relatively small populations in the park, it is unlikely that the construction of the new road would affect the park's populations.

The boundary adjustments proposed in alternative B would result in a moderate beneficial effect on native vegetation.

Although much of the land near SD 44 and on the west side of the North Unit that would be added to the park has been grazed, the protection of existing native grassland vegetation would be increased by being included in the park, and over time native vegetation would become reestablished in much of the areas.

Cumulative Effects. Other actions within and outside the park, added to the actions of alternative B, would result in a potential for cumulative adverse and beneficial effects. In the North Unit the redesign of the Sage Creek campground and park maintenance activities along roads would result in a minor loss or alteration of vegetation. Outside the North Unit, actions such as the construction of the Lakota Heritage and Education Center, cattle grazing on surrounding private, public, and reservation lands, the construction and operation of the DM&E rail line, the designation of the Crazy Horse Scenic Byway (which could increase visitation to the park), and the construction of primitive campgrounds and trails in the national grassland adjacent to the park could alter or cause the loss of native plants. These other actions, added to the developments and improvements of alternative B and a likely increase in visitation would result in a long-term minor to moderate adverse cumulative effect on the region's native vegetation.

Some cumulative effects could be beneficial. NPS prescribed burning efforts, reintroducing native plants, and weed management efforts in Badlands could result in beneficial effects on native plants. Increases in prescribed burns in the adjacent national grassland also would cause a positive effect on native plants. Those actions, added to the effects of designating trails and routes and campsites in the park,

eliminating off-road recreational vehicle use in part of the Sheep Mountain Table area and increasing educational and interpretive efforts, would result in better protection of native vegetation and its possible increase in previously disturbed areas. All these actions would result in a moderate long-term beneficial cumulative effect on the region's native vegetation.

Conclusion. Most native vegetation in Badlands National Park would continue to be protected and sustain itself under alternative B. However, this alternative would have more potential for both beneficial and adverse effects in more areas of the park than alternative A. Constructing the new Loop Road segment and a few other new developments, along with more visitors from improved trails and routes in parts of the park, would result in the loss of native plants, causing adverse effects. The potential for the spread of exotic plants would increase in the areas mentioned. Overall, the new developments and visitor use would likely have a long-term, minor to moderate adverse impact in local areas.

The loss of native vegetation would be reduced by better protection, and native vegetation would benefit from designating campsites, trails, and routes, improving the Sheep Mountain Table road, increasing education and interpretation, and adding two areas to the park. Overall, long-term beneficial effects on native vegetation from alternative B would be minor to moderate in local areas.

The long-term cumulative effects on vegetation from this alternative and other actions in and outside the North Unit would be minor to moderate and both beneficial and adverse. The levels of these effects would not be sufficient to constitute an impairment of park resources or values.

Wildlife

Analysis. New developments, improved access, and increased visitation to parts of the park would be the primary actions affecting

wildlife and their habitat under alternative B. Although a number of new developments or improvements would be made to existing facilities, most would be done in existing already disturbed areas: the additions to the Conata Road picnic area, Sheep Mountain Table road improvements, added outdoor classrooms, , and a group campsite in the bison handling facility area. Wildlife populations and their habitats have been altered by past human actions in these areas, and no more habitat would be lost. Increased noise and human activity due to construction could temporarily displace some animals such as rodents and birds, resulting in minor short-term adverse impacts on wildlife populations in local areas. Increased visitation due to new developments in a few areas could indirectly affect some prairie dogs — some visitors might wander into prairie dog towns, affecting the behavior of animals in the area, but any disturbance would be temporary and the effect would be negligible to minor. However, most new developments would not affect bison, bighorn sheep, or prairie dog populations and habitats; therefore, the most of the new developments and/or improvements in alternative B would have a negligible to minor long-term adverse impact on wildlife and habitats.

Building the new Cedar Pass segment of the Loop Road would cause the permanent loss of grassland habitat, displacing wildlife along this corridor. Clearing vegetation in that area would result in the loss of wildlife forage and shelter. Noise from construction equipment and people would displace some wildlife. Most birds, mammals, and reptiles would avoid the area during the construction period, but many would return after construction ceased. Some animals, primarily invertebrates, would be unable to move out of the construction area and would be killed. Some grazing areas for bighorn sheep above and below the Badlands Wall would be lost. The road could cut off a travel corridor used by the sheep, fragmenting their habitat. Sheep movements in the area would be altered, and whether the animals would adapt to this change is un-

known. The new road segment could cause a moderate long-term adverse impact on the bighorn sheep population in this area.

The new road segment also would have indirect impacts on wildlife. Some wildlife could be hit by vehicles and injured or killed on the new road segment, resulting in adverse impacts. Maintenance activities along the road also could disturb wildlife. The extent of the effects would depend partly on the location of the road and its design. With careful design of the road and the use of mitigative measures, the new road segment would result in a long-term minor to moderate adverse indirect effect on area wildlife.

Building the education pavilion, and a group camping area, at the bison facility handling facility area could affect the bison capture and culling efforts, which in turn would affect the general long-term health and well-being of the herd. However, these new facilities would be closed during the bison roundups or other times deemed necessary for management activities. Thus, the impact of the new facilities would be expected to have a negligible adverse impact on the bison herd.

The Pinnacles visitor contact station would be built in a previously undisturbed area, causing the permanent loss of some grassland habitat. This loss would primarily affect smaller, less mobile wildlife species and species with smaller home ranges, such as invertebrates. Some reptiles, small mammals, and birds also could be displaced. The loss of habitat would result in a long-term minor adverse effect on animals near this facility.

Visitation to parts of the park probably would be increased by improved access from developing and improving the trails to Deer Haven and the Castle Trail region and routes from the Sage Creek campground. In turn, habitat fragmentation would increase over current levels because of more visitor use of trails and routes. Some wildlife sensitive to the presence of people — pronghorn antelope, bobcat, badger, and raptors — might be

displaced from areas around these corridors during the peak high use season. These actions would result in a minor to moderate short-term and long-term adverse impact on wildlife populations in local areas, depending on such factors as the level, duration, and type of visitor use, the season of use, and the wildlife species.

Designating new routes from the Sage Creek campground also could attract more people and displace bison cows and calves, as well as deer, birds, and other wildlife, from an important watering hole (the CCC spring). This impact could be mitigated if the routes were sited to avoid this area. Even with appropriate monitoring, education of visitors, and regulation of use, there still could be a minor to moderate long-term adverse impact on wildlife populations in this area.

Several actions of alternative B would improve the protection of wildlife populations and habitats. Designating trails and routes for visitors could help lead people away from prairie dog towns. (People currently are hiking by colonies.) As with vegetation, increased educational and interpretive efforts under alternative B would generally benefit wildlife. The addition of the outdoor classrooms/pavilions, waysides, interpretive trails, and visitor contact stations would help educate visitors, increasing their appreciation of the park's wildlife and minimizing impacts they could cause such as teaching them to avoid feeding wildlife. The long-term beneficial effect on the park's wildlife would be minor to moderate.

The proposed addition of land along SD Highway 44 and on the west end of the North Unit would add prairie dog towns to the park, which would give the animals more protection and help ensure their continued presence. The addition also would protect additional wildlife habitat for a variety of other species such as mule deer, bighorn sheep, pronghorn antelope, and bobcat, a long-term moderate beneficial effect.

Cumulative Effects. Several other actions outside Badlands National Park would affect area wildlife. Some deer and small mammals would be killed or displaced by the construction and operation of the DM&E rail line, and possibly more traffic attracted by the designation of the Crazy Horse Scenic Byway. The adverse effects on these wildlife populations would be minor. These effects, added to the effects of alternative B on wildlife from constructing and using new or improved facilities (trails and routes in particular) and more visitation to parts of the park, would increase the fragmentation of wildlife habitats, increase the potential for wildlife to be displaced, and reduce the number of areas where wildlife could exist without people or facilities. The long-term cumulative adverse effects of alternative B plus these other outside actions on area wildlife would be minor.

Actions within and outside the North Unit, independent of alternative B, would likely affect prairie dogs in the future. Some potential prairie dog habitat could be lost due to developments outside the North Unit, such as the DM&E rail line. In addition, prairie dog control efforts on lands outside the North Unit would continue, resulting in the loss of animals. Some limited prairie dog control efforts probably also would occur within the North Unit, which would result in the loss of animals in areas adjacent to private lands. On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would continue to be managed to maintain and enhance prairie dog complexes. This would be a long-term beneficial effect. When the beneficial and adverse impacts of actions occurring within and outside the North Unit on prairie dogs are added to the actions in alternative B, there could be a long-term, minor, adverse cumulative effect on the area's overall prairie dog population. However, the boundary adjustments in alternative B would add a beneficial increment to this adverse cumulative impact.

Conclusion. Alternative B would not affect most wildlife populations and habitats in

Badlands National Park; they would continue to be protected and would not be changed by the actions of this alternative. No actions would substantially affect areas that are known to be important for breeding, nesting, or foraging or are key migration routes. Bison and prairie dog populations in most of the park generally would not be affected, although their behavior could be affected in a few areas. Constructing the new Loop Road segment could result in long-term moderate adverse effects on the North Unit's bighorn sheep population. Most other developments of alternative B would result in long-term negligible to minor adverse effects on wildlife populations and habitats.

New or improved trails and routes would increase visitation to parts of the park, which would cause long-term minor adverse effects on wildlife. Increased educational and interpretive efforts and the proposed boundary adjustments along SD 44 and on the west end of the North Unit would result in long-term minor to moderate beneficial effects on wildlife.

The cumulative effects of alternative B added to other actions outside the park on area wildlife and their habitat would include increased habitat fragmentation, wildlife displacement, and loss of prairie dogs in localized areas, resulting in a long-term minor adverse effect. These impacts would not constitute an impairment of park resources or values.

Special Status Species

Analysis. No developments and improvements in alternative B would be in areas known to contain black-footed ferret or swift fox populations. Most areas where visitation might increase because of new or improved trails and routes would not be in areas known to support these populations.

The proposed boundary adjustments along SD 44 and the western boundary of the North Unit would add prairie dog towns to the park

and thus protect additional potential black-footed ferret habitat.

Alternative B may affect, but would not be likely to adversely affect, swift fox and fox habitat in the area. The land acquisitions along SD 44 and on the west side of the North Unit would protect potential swift fox habitat that could support the fox in the future, and thus would be a beneficial impact. Most facilities proposed for alternative B, including the new Loop Road segment, would be in marginal potential fox habitat. Facilities that would be developed in the Pinnacles area would be in or near potential fox habitat, but the facilities and more people in these areas would not necessarily keep foxes from dispersing into and using the areas. The foxes, which are mostly nocturnal, would be in the areas when few people were present. It is possible that a fox might be hit by a vehicle on the new Loop Road segment, but this is unlikely because that area is not prime fox habitat, and traffic at night would be at very low levels.

Cumulative Effects. Although some limited prairie dog control efforts likely would occur in the North Unit in the future, independent of alternative B, it is unlikely that such efforts would be permitted in areas where black-footed ferrets are known to occur, or would prevent the ferrets from using these areas.

Actions outside the North Unit could have both adverse and beneficial impacts on black-footed ferret and their habitat. Some potential prairie dog and black-footed ferret habitat could be lost due to developments outside the North Unit, such as the DM&E rail line. In addition, prairie dog control efforts on lands outside the North Unit could affect black-footed ferrets if they occurred in these areas.

On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would be managed to maintain and enhance prairie dog complexes, providing additional potential black-footed ferret habitat. This would be a long-term beneficial effect.

The potential loss of prairie dogs due to the actions within and outside the North Unit, added to the actions in alternative B, could result in a long-term adverse cumulative effect on the area's existing or potential for black-footed ferret populations. However, the boundary adjustments in alternative B would add a beneficial increment to this cumulative impact.

Some potential swift fox habitat could be protected by two boundary adjustments under alternative B. When these actions are combined with efforts to reintroduce the fox, independent of alternative B, there could be a long-term, beneficial cumulative impact for swift fox in the area.

Conclusion. Before taking any action in alternative B that might affect federally listed species in the park, the National Park Service would consult with the U.S. Fish and Wildlife Service to ensure potential impacts are identified and avoided. Overall, alternative B might affect, but would not be likely to adversely affect, the populations of black-footed ferrets and swift fox in Badlands National Park. The proposed boundary adjustments would add potential black-footed ferret and swift fox habitat, which would be a beneficial impact. Alternative B plus actions within and outside the North Unit (independent of the alternative) could result in an adverse cumulative impact on black-footed ferrets. However, alternative B would add a beneficial increment to this cumulative impact. Likewise, when the boundary adjustments under alternative B are combined with efforts to reintroduce the swift fox, independent of the alternative, there could be a long-term beneficial cumulative impact for swift fox in the area. No impairment of park resources or values would result from this the alternative.

EFFECTS ON CULTURAL RESOURCES

Historic Buildings and Other Structures

Analysis. None of the structures identified as being eligible for inclusion in the National

Register of Historic Places would be affected by the implementation of alternative B.

Cumulative Effects. Several miles north of Badlands National Park, the development of the Minuteman Missile National Historic Site would affect the historic condition of the missile control and launch facilities. The alterations could include substantial structural changes to accommodate public visitation, environmental control, and protective barriers. The long-term, adverse effects on the structures of the national historic site would range from negligible to moderate.

Since there are no actions impacting historic buildings and structures associated with implementation of alternative B, the adverse effects associated with Minuteman Missile National Historic Site would constitute the entire cumulative impact.

Conclusion. Alternative B would not result in any effects on historic buildings or other structures in Badlands National Park, and the park's resources and values would not be impaired.

Section 106 Summary. This summary (like all section 106 summaries in this document) has been prepared with the use of definitions consistent with section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations of the Advisory Council on Historic Preservation (36 CFR 800).

In accordance with the regulations of the Advisory Council on Historic Preservation implementing section 106 of the National Historic preservation Act, the National Park Service finds that no historic properties would be affected (36 CFR 8004(d)(1)).

Ethnographic Resources

Analysis. NPS knowledge about the locations of traditional use is limited to areas identified by American Indian tribes as containing sacred sites. Alternative B would involve no

change in the agreement that guarantees tribal members unrestricted access in perpetuity and requires their written consent to affect those sites. The identification of traditional use areas would continue on a project-by-project basis that could affect the use, viewshed, or perception of the area of potential effect of the undertaking. The National Park Service would consult with tribal officials to determine strategies for preserving ethnographic resources or mitigating any adverse impacts.

Ethnographic resources sacred to tribes, including the viewshed, can be degraded by visitor congestion and vehicular traffic. Increased visitation could result from alternative B. Vehicle noise could increase, and there could be unintentional incursion of visitors into areas of sacred importance during periods of use. Trampling could cause erosion in traditional use areas. These short-term adverse impacts would be expected to be negligible to minor.

Cumulative Effects. Actions in and outside the park could affect ethnographic resources, including traditional cultural properties. Excavation might be required for the bombing range cleanup; this could alter vegetation patterns and landforms, affecting the viewshed of a sacred site. Surveys and cleanup plans would help to reduce the extent of these impacts, but the long-term adverse effects would be moderate.

Traditional use areas could be disturbed or destroyed by construction associated with the DM&E railroad near the South Unit or the installation of the Mni Wiconi waterline. However, the waterline is being placed along existing roads, which would limit any resulting effects. The long-term adverse effects from installing the waterline would be minor; the long-term adverse effects from the railroad would be minor to moderate.

Ethnographic resources could be affected by actions in the adjacent Buffalo Gap National Grassland. The construction of trails, campgrounds, or other visitor accommodations

could directly affect traditional use areas, and inadvertent camping on traditional use sites and hiking across areas of eroding landforms could result in long-term adverse impacts ranging in intensity from negligible to moderate.

Outside the park, the development of coalbed methane fields by oil and gas companies that operate in northeast Wyoming could affect viewsheds, use, and tribal relationships to regional ethnographic resources. Depending on the location, the long-term cumulative adverse effects could be widespread or limited and could range from minor to moderate.

Implementing the actions of alternative B and cumulative actions in or outside the park would result in long-term cumulative minor adverse effects on area ethnographic resources.

Conclusion. Implementing alternative B could result in long-term, minor to moderate adverse impacts on ethnographic resources in the park. Actions of an unknown magnitude outside the park could result in cumulative long-term adverse impacts. Until inventories of ethnographic resources in the park could be completed, the park would conduct site-specific surveys and complete American Indian consultations for each development activity, as appropriate. Because alternative B would not result in any major adverse impacts, there would be no impairment of ethnographic resources or of park resources and values.

Section 106 Summary. According to NPS policies and procedures, the park would continue to protect ethnographic resources to the greatest extent possible, avoiding disturbance wherever possible. If avoidance or preservation could not be achieved, appropriate mitigation would be carried out in consultation with American Indian tribes identified as having a cultural affiliation with the park and, if the resources were eligible for national register listing, with the South Dakota state historic preservation officer. Because

alternative B would result in no adverse effects on traditional cultural properties within the boundaries of Badlands National Park, the National Park Service finds that the determination of effect would be *no historic properties affected* (36 CFR 800.4 (a)(1)).

EFFECTS ON VISITATION AND THE VISITOR EXPERIENCE

Access

Analysis. The focus of alternative B would be to expand opportunities for visitors to explore and learn about Badlands National Park.

The Loop and Sage Creek Rim Roads would continue to be the primary access in the North Unit for most park visitors. Designating routes for visitors would improve access into the backcountry in the North Unit at Conata Picnic area and Sage Creek campground. If the proposed addition along SD 44 was added to the park, new access would be available from that corridor. These changes would constitute a noticeable improvement in visitor access over alternative A, a long-term, minor to moderate beneficial effect.

Cumulative Effects. Traffic projections indicate that a substantial increase in park visitation could result from the completion of the Heartland Expressway and the Crazy Horse Scenic Byway. The increase from these roads originating from the south and west, added to visitation projections, could alter the current visitation patterns to the park, improving access into the park. The routes for these two road projects already exist, but typically park visitors do not use them.

By improving access points, alternative B would result in minor to moderate beneficial effects on visitors. These actions, coupled with proposed improvements to regional roads, would result in a long-term, moderate, beneficial cumulative effect on park visitors.

Conclusion. By improving access in the North Unit, alternative B would produce a minor to moderate, long-term beneficial effect on access. The improvement in access would come from designating hiking routes, and improving trailheads.

Availability of Information

Analysis. A new visitor contact station near the Pinnacles entrance, the second most popular entrance to the park, would offer year-round orientation and interpretation and onsite staff. This would mean that visitors entering the park from the west no longer would have to travel more than 20 miles along the Loop Road to the Ben Reifel Visitor Center before receiving information about the park. Placing a contact station in this location also would meet a goal of the “Long-range Interpretive Plan” (NPS 1999b), which recommends the development of a facility for restrooms, potable water, orientation, and interpretation in this general vicinity. This would result in moderate to major long-term beneficial effects on visitors.

A new small visitor contact station in the town of Scenic would offer orientation, interpretation, and education along SD 44, where none is available now. Rather than go 35 more miles to the Ben Reifel Visitor Center, visitors could get information at this location to decide how they would like to experience the park. This would be a minor to moderate long-term beneficial effect on visitors.

If the park boundary was expanded along SD 44, the existing ranch would be adaptively used by visitors for orientation and for direct access to the wilderness area. Park interpretation and education also would be available in this new location. This would result in a minor long-term beneficial effect on visitors.

Educational opportunities for schools and other organized groups would be available at a new education pavilion and group campsite at the bison handling facility. This would increase curriculum-based education activities

and offering a new recreational opportunity. This would result in a minor long-term beneficial effect on the visitor experience.

Cumulative Effects. The Lakota Heritage and Education Center would be an additional outlet disseminating information to the public. This facility would be near the proposed Crazy Horse Scenic Byway, which, if designated, would increase traffic in this area. The visitor center that would be developed for the Minuteman Missile National Historic Site in the Interstate Highway 90 corridor would also be an outlet for information. Although the focus of that facility would be on the historic site, it could offer regional information, including information about Badlands National Park. These projects would produce long-term moderate beneficial effects on the availability of information for visitors.

The actions of alternative B, by increasing the number of outlets for information and dispersing them throughout the park, would substantially improve the availability of information about the park. This would be a long-term major beneficial effect on the visitor experience. When this effect was combined with other improvements in the region, long-term moderate beneficial cumulative effects would result.

Conclusion. Alternative B would result in long-term major beneficial effects on the availability of information about the park. The increase in the number of outlets where visitors could obtain information and the dispersed locations of these outlets would substantially improve the visitor experience.

Range and Enjoyment of Visitor Activity

Analysis. Vehicle use, hiking and pack stock use, camping, and picnicking are the four most popular activities.

Vehicle Use — Designating the part of SD 44 that crosses the park as part of the driving/sightseeing zone and seeking to partner with the South Dakota Department of

Transportation in constructing waysides could substantially improve the visitor experience along this section of highway. At present no park information is available to visitors passing through the park, nor is there a location to stop and view the park safely. Adding waysides would give visitors a safe place to stop along this scenic highway and get information about the park, creating long-term minor beneficial effects for visitors.

Improving the road to Sheep Mountain Table and adding a small parking lot and comfort station would provide better access for all types of vehicles, particularly passenger cars. (At present the road condition limits access for some types of vehicles.) The road improvement would make it possible for more visitors to experience Sheep Mountain Table. This would result in a minor long-term beneficial effect on visitors.

Alternative B would offer more opportunities (dispersed throughout the park) for visitors seeking a driving/ sightseeing experience. Overall, alternative B would result in moderate to major beneficial effects on visitors seeking a driving/ sightseeing experience.

Hiking and Pack Stock Use —

Developing trailheads and designating trails in the natural area / recreation zone would substantially increase opportunities for hiking and pack stock users. Although new trails could be designated throughout the zone, the highest priority would be from existing trailheads and from proposed trailheads. Many visitors are reluctant to explore the back-country except in areas with designated trails or routes. The designation of new routes would expand opportunities beyond the limited number of trails now in the park. Designating trails would result in minor to moderate long-term beneficial effects on the visitor experience.

Designating hiking trails from the Sage Creek Campground and from the Conata Picnic Area could increase recreational use of the wilderness area. More visitors could diminish

the wilderness experience for some users seeking solitude. However, signing and marking trails would eliminate confusion and disorientation of some hikers, substantially increasing their enjoyment. Designating routes into the wilderness area would offer new opportunities for a wilderness experience. These actions would result in long-term moderate beneficial effects on visitors lacking strong backcountry skills, giving them more opportunities to explore the park.

Camping — The Cedar Pass and Sage Creek campgrounds would continue to operate as described for alternative A.

A group campground would be created at the bison handling facilities under this alternative. Its primary purpose would be to be used for the park's education program, but it would be made available to other groups. At present groups are accommodated at the Cedar Pass or Sage Creek campgrounds, but neither of these locations has facilities designed for larger groups. The new group campground would produce long-term minor beneficial effects on visitors seeking a group camping experience.

Picnicking — This alternative would result in no changes to picnicking from Alternative A

Cumulative Effects. Various plans for road improvements in the region would increase driving/sightseeing opportunities. The Crazy Horse Scenic Byway would be a designated, signed route offering more regional scenic driving opportunities. The management plan for Buffalo Gap National Grassland (USFS 2001b) calls for the development of a primitive campground near Badlands National Park, which would expand the region's camping opportunities. These projects would bring about long term beneficial effects on visitors seeking recreational opportunities in the region.

Opportunities for visitor enjoyment would be distributed throughout the park under

alternative B by creating new trailheads, and waysides.

The effects of the actions of alternative B, coupled with those of other projects in the region, would result in long-term moderate cumulative beneficial effects on visitor enjoyment.

Conclusion. There would be more opportunities throughout the park for visitors seeking a driving/sightseeing experience, creating moderate to major beneficial effects on such visitors.

The development of a group campground would result in long-term moderate benefits for visitors seeking this experience.

Scenic Resources

Analysis. Alternative B would result in no changes to the existing facilities in the park. These facilities would continue to cause minor long-term adverse effects on the park visitors.

The proposed construction of the Pinnacles visitor contact station would create a new intrusion on the landscape. This building, which would be adjacent to the Loop Road, would be visible to visitors traveling along this corridor. The building would add a new source of artificial light during the night. Since most park visitors travel along this road, there would be a long-term moderate adverse effect on scenic resources.

Cumulative Impacts. Activities outside the park boundary would have the potential to affect the viewsheds from within the park. The construction of the DM& E Railroad would affect the viewshed. These would be minor to moderate long-term adverse impacts.

Developments on private lands adjacent to the park have affected the viewsheds from the park. The construction of new buildings, signs, and communication towers has resulted in long-term minor adverse impacts on the viewshed. There is the potential that addi-

tional communications towers could be constructed within the park viewshed, but none are proposed at present. However, if additional towers were built, they would result in long-term adverse impacts.

Implementing alternative B would result in long-term moderate adverse impacts on scenic resources. Activities outside the park, combined with the effects implementing alternative B, would result in minor to moderate long-term adverse cumulative effects on scenic resources.

Conclusion. Alternative B would result in long-term moderate adverse impacts on scenic resources from the construction of new facilities in the park. The existing facilities would continue to cause minor adverse impacts on scenic resources.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

Analysis

Alternative B would add to and improve the park's infrastructure and increase the resource education and maintenance staff, an improvement over the no-action alternative. More housing facilities at Pinnacles, a new campground, and new trailheads would improve the efficiency and effectiveness of park operations and offer more opportunities for visitor experiences. Capital improvements would cost \$4,418,000 in current dollars; additional staff would add an annual cost of \$450,200 to the park's operating budget.

Some additional employment opportunities would be available locally under alternative B. A few individuals would receive long-term benefits from employment opportunities with

the park. A few individuals and firms (mostly in the construction industry) would receive short-term opportunities relating to capital improvements from the various improvement projects of this alternative. Although this alternative would create some short-term and long-term economic benefits that would be important to a small number of individuals and business firms, the overall effect on the economic conditions and socioeconomic factors such as population, income, employment, and earnings of the three-county region would be minor. Overall, this alternative would result in a minor long-term beneficial effect on the socioeconomic environment.

Boundary adjustments, if achieved, would result in some one-time payments of federal monies to a few private landowners. Such acquisitions would be accomplished on a willing seller-willing buyer basis so that the landowners and the public would benefit from the transactions. Some private land would become public land, so that there would be some decrease in the local real estate tax base. Any loss of real estate taxes would be minor and perhaps could be mitigated through the payments-in-lieu-of-taxes program.²

Cumulative Effects

The additional capital improvements and extra staff would combine with the actions described for alternative A to enable the park to be managed in compliance with all applicable laws, rules, regulations, and policies governing the management and operation of Badlands National Park.

2. Current federal law provides for the compensation of local governments for losses to their tax bases due to the presence of most federally owned land. Local governments receive no local real-estate tax money for the publicly owned federal land within county borders. The "Payments-in-Lieu-of-Taxes" program provides some federal funds to local county governments to compensate them for the public services they provide regarding federal land (such as law enforcement and road maintenance).

Conclusion

The present value of the annual operations cost of alternative B is \$87,184,000.³ Alternative B would require \$4,418,000 (2002 dollars) more than alternative A for capital improvements.

For comparison purposes it is assumed that these capital costs would occur during the first year of implementation, which would make the total present value of this alternative \$91,602,000, an increase of \$8,755,000 (10.6%) over the present value of the no-action alternative.

Improvements to the park from this alternative would produce a major beneficial effect on the touring public and the tourism industry because there would be more opportunities for visitors to explore and use the park's scenic and recreational resources, which might lead to an increase in the length of the average visitor's stay in the park.

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Under alternative B, the National Park Service would construct and operate new facilities, and energy use by the park also would increase. To maintain, operate, and protect the facilities, NPS travel in the park also would increase, and the increased travel would increase energy consumption.

UNAVOIDABLE ADVERSE IMPACTS

Human use and the construction of new facilities under alternative B would result in minor adverse impacts on natural resources in some areas throughout the park. The impacts

on wildlife, vegetation, and the visitor experience, which are discussed in detail above for the specific impact topics, would be unavoidable.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

The additional energy requirements identified above would result in an irreversible commitment of resources. In addition, there would be a commitment of material used to construct new visitor facilities such as the visitor contact station in the Pinnacles area.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

As in alternative A, most of the park would be protected in a natural state and would maintain its long-term productivity under alternative B. Only a small percentage of the park would be converted to development. In addition, more than 9,500 acres of land included in the proposed boundary adjustments would be placed under federal ownership and managed by the National Park Service. No actions of this alternative would jeopardize the long-term productivity of the environment. Short-term impacts might result from construction, such as local air and water pollution, as detailed in the analysis of specific impact topics. Noise and human activity from construction and restoration might displace some wildlife from the immediate area. However, these activities would not jeopardize the long-term productivity of the environment.

3. For this preferred alternative (B), the stream of income necessary to support park operations would be \$9,191,444 annually, the interest rate would be 6.125% (federal discount rate for fiscal year 2002), and the time period would be 15 years (life of this *General Management Plan*).

EFFECTS FROM ALTERNATIVE C: FOCUS ON RESOURCE PROTECTION AND PUBLIC EDUCATION

EFFECTS ON NATURAL RESOURCES

Air Quality

Analysis. The construction and use of developments in alternative C — a Pinnacles area visitor contact station, a visitor center above Cedar Pass, employee housing, and trailer pads at the bison handling facility, along with improving part of the Sheep Mountain Table road — would cause short- and long-term minor adverse local effects on air quality, largely from fumes (hydrocarbons, carbon monoxide and nitrogen oxides) and particulates emitted from construction machinery, as well as from dust in the immediate project areas and from excavations. The impacts from construction of these developments would occur in local areas and probably would be spread out over the 15- to 20-year period covered by this plan.

As in alternative B, emissions of fumes and particulates from construction equipment during the construction of the new Loop Road segment in the Cedar Pass area would cause minor to moderate short-term effects on air quality. Asphalt also would be required for the new road, which would result in emissions from an asphalt batch plant, a storage pile, and haul trucks. Volatile hydrocarbons and other organic compounds in the asphalt would enter the air for a short time after the road surface was completed.

The new section of the Loop Road probably would not increase traffic volume in the park, and thus would not likely result in increased air pollution. But ending vehicle access at the base of Sheep Mountain would decrease emissions and fugitive dust from vehicles being driven there, producing a negligible beneficial effect on local air quality.

The Castle Trail demonstration shuttle system would probably slightly reduce vehicle traffic, with visitors using the shuttles rather than their vehicles to access trailheads. However, only a small decrease in vehicle emissions would be likely, because relatively few people would be expected to use this area. Assuming the system operates for more than one year, there would be a negligible, long-term, beneficial impact on local air quality.

Cumulative Effects. As in other alternatives, the construction of facilities like the Lakota Heritage and Education Center and prescribed burns in the park would result in short-term local adverse effects on air quality. However, sources outside the park would add far more pollutants to the park's airshed. In particular, energy and industrial developments in the Powder River Basin in Wyoming could substantially affect the park's air quality, as was mentioned for the no-action alternative. Other actions outside the park that could affect air quality in the park are prescribed fire and wildfires, the construction and operation of the DM&E railroad, the Mni Wiconi water project, and possibly the designation of the Crazy Horse Scenic Byway.

All the above actions, added to the actions in alternative C, would result in a cumulative long-term major adverse impact on park air quality. The increment added to this impact by the actions of alternative C would be minimal because those effects would be local, short-term, and spread out over time.

Conclusion. Alternative C would result in short- and long-term minor to moderate adverse effects on air quality in local areas primarily from construction and use of new developments. A cumulative long-term major adverse effect on regional air quality would result from alternative C and emissions from sources outside the park, but the incremental

contribution of alternative C to this impact would be minor. These effects would not constitute an impairment of park resources or values.

Soundscape

Analysis. Building new facilities and improving facilities in alternative C would affect the park's soundscape in local areas. Noise would be generated by construction workers and their equipment when completing the improvements mentioned under "Air Quality" for this alternative. Construction noise would be substantial in some areas, but it would be temporary and would take place at different times and places. Most noise from new developments would be in or near developed areas where there is already noise from vehicles, park equipment, and visitors. Excluding noise from construction of the new Loop Road section, noise from the construction activities would result in negligible to moderate adverse effects on the natural soundscape in local areas, depending on the presence of other facilities and people, vegetation, wind, and time of day.

As in alternative B, constructing a new road segment would make substantial noise, causing long-term moderate to major adverse effects on the soundscape near the road. Noise also would come from trucks and other vehicles and from road maintenance activities, particularly during the peak use season. Thus, alternative C would result in a short-term and long-term moderate to major adverse effect on the soundscape near the road.

Noise would be heard in a few places that have been relatively quiet in the past. More visitors and vehicles would be likely at the new visitor contact station and visitor center, and at the Prairie Homestead. Although noise would increase at these facilities, the effect on the soundscape would be long term and minor because a substantial increase in visitation would not be likely. On a few high-use weekends, more noise would be expected at the new visitor contact station and visitor center,

and the impact could be moderate at some locations.

Ending the existing road at the base of Sheep Mountain would eliminate noise from vehicles being driven up the mountain and on the table, causing a long-term minor to moderate beneficial effect on the soundscape.

Cumulative Effects. As in other alternatives, noise in parts of the park would be increased by construction activities, the operation of machinery and vehicles, and the presence of people. Greater noise levels under alternative C (construction of facilities, larger numbers of people and vehicles in some park areas), added to actions independent of this plan (the redesign project at the Sage Creek campground, continued commercial tour helicopter overflights, commercial traffic through the park) could result in a cumulative long-term minor adverse noise effect in local areas.

Outside the park, the construction of the Mni Wiconi water project would generate noise that would be audible in places in the North Unit. On the southwestern end of the North Unit, noise levels could increase from traffic on the Crazy Horse Scenic Byway (assuming increased traffic resulted from that designation). These sounds could combine with visitor and administrative use in the park, resulting in a long-term minor cumulative adverse effect on the soundscape.

Conclusion. Under alternative C, most of Badlands National Park would continue to be relatively quiet, with few unnatural sounds, but there would be more sources of noise in the park. The construction and operation of most facilities proposed in alternative C would cause short-term and long-term minor adverse effects on the soundscape, but most would be in areas where there is already some noise.

The construction and use of the new visitor contact station and visitor center would increase noise levels in these areas. The facilities would result in short-term and long-

term minor adverse impacts on the soundscape. At times of high use, the use of the facilities would result in moderate short-term impacts.

The construction and use of the new Loop Road segment would cause short-term and long-term moderate to major adverse effects on the soundscape near the road, but this would not impair park resources or values. Only a small part of the park would be affected. The natural and cultural integrity of the park would not be compromised, nor would opportunities for visitor enjoyment. The National Park Service would not be prevented from conserving resources or values necessary to fulfill the park's specific purposes, as identified in the establishing legislation nor from achieving the goals of the park's *General Management Plan* or other relevant NPS planning documents.

Short-term and long-term minor adverse cumulative effects on the soundscape could be caused in other local areas by the operation of new facilities under alternative C, added to noise from construction and more traffic outside the park. This level of impact would not impair park resources or values.

Geologic Features, Including Soils

Analysis. With the exception of the new section of the Loop Road, the actions of alternative C would not affect the park's geologic features. Park soils would be altered or lost through the construction of several facilities, including the Sheep Mountain Table parking area, the Pinnacles employee housing and visitor contact station, the trailer pads for researchers at the bison handling facility, the new Cedar Pass visitor center, and the new Loop Road segment. Soils already have been disturbed in most areas of these developments, but some soils might be altered, and erosion might be temporarily increased by construction. However, with mitigation the effects would be minor and local.

Actions in alternative C in previously undisturbed areas would be the new Cedar Pass segment of the Loop Road, the Pinnacles visitor contact station, and the Cedar Pass visitor center. Soils in those areas would be permanently disturbed or lost, resulting in a long-term, moderate to major adverse effect on soils.

Ending the road at the base of Sheep Mountain Table would curtail erosion from vehicles being driven up the steep grade and on top of the table. This action would result in a long-term moderate beneficial effect on soils in the area.

A new Pinnacles visitor contact station would benefit all the park's resources, including soils: more visitors could be educated about the nature of park soils and learn to avoid or minimize the effects of walking in the park. This would result in a long-term, minor beneficial effect on soils.

Cumulative Effects. Soils would be lost or altered and erosion temporarily increased under alternative C by several developments in and outside the North Unit, including the construction of the Lakota Heritage and Education Center, the redesign of the Sage Creek campground, the installation of the Mni Wiconi water project (although it would be built primarily within the prism of existing roads), the development of the DM&E rail line, and the bombing range cleanup. The loss and alteration of soils from these actions, added to the potential for soil loss and alteration from the actions of alternative C would increase regional soil erosion and alteration, resulting in a cumulative long-term moderate adverse effect on area soils.

Conclusion. Most of the park's soils and geologic features would not be affected by alternative C, but constructing the new Loop Road segment could result in long-term moderate to major adverse effects on geologic features and soils along the corridor. The alternative also would cause minor to moderate long-term beneficial and adverse local effects on park

soils. The adverse soil impacts from construction and the use of new facilities would take place mostly in developed areas. The beneficial effects on soils would result from ending the road at the base of Sheep Mountain Table and adding education and interpretation (which could reduce the effects caused by visitors). When outside developments were added to new park developments under alternative C, the cumulative result would be a long-term minor to moderate cumulative adverse effect on area soils.

The effects on soils from alternative C would not constitute an impairment of park resources or values. Although the construction of the new Loop Road segment could result in a major adverse effect on geologic features, this would not impair park resources and values. The effect would be local, and its extent would depend on the road design (that is, whether the road would be elevated or cut through the Badlands Wall). Even if the adverse effect was major, the National Park Service still would be able to fulfill the purposes for which Badlands National Park was established.

The loss of geologic features under alternative C would not destroy the integrity of the park relative to its geologic features. Geologic features would continue to be present throughout the park (albeit potentially in fewer numbers), and the park staff still would protect and interpret the features and provide opportunities for scientific research on the park's geology. People still could come to Badlands and enjoy the park's values, including its geologic features.

Paleontological Resources

Analysis. Most developments and improvements of alternative C would be in previously disturbed areas that are not known to be highly fossiliferous. These include the Sheep Mountain Table road and parking area, the Pinnacles employee housing and visitor contact station, and the trailer pads for researchers near the bison handling facilities.

Little more bedrock disturbance would be needed in most of those areas, but if drilling into bedrock was necessary, some fossils could be damaged or lost. With surveys and monitoring, the potential for impacts in these areas would be minor.

The new Pinnacles visitor contact station would be built in an area above the Badlands Wall that is not likely to be highly fossiliferous. Some fossils could be affected by construction and underground utility lines for the new visitor center. Careful siting of the center would help reduce the potential for such damage. Constructing the new gravel parking area near Sheep Mountain Table could cause the loss of some fossils, but in all the above cases, surveys and monitoring would keep the impacts minor.

The new Cedar Pass segment of the Loop Road probably would not be in a highly fossiliferous area, but even with surveying and monitoring, fossils would be damaged, given the extent of ground disturbance. This would result in a long-term moderate adverse impact on paleontological resources.

Some beneficial effects on paleontological resources in the park would result from alternative C, as follows:

- ◆ Closing the Sheep Mountain Table road at the base of the table would reduce erosion and the consequent loss of fossils from vehicles being driven up the table and from road maintenance.
- ◆ Adding a visitor contact station would increase some visitors' awareness of the significance of the park's fossils, reducing the potential for fossil collection.
- ◆ More visitor educational efforts and ranger patrols would help decrease fossil collecting.
- ◆ The presence of the trailers pads for researchers could encourage research that would benefit the protection and management of the park's paleontological resources.

- ◆ The boundary expansion along SD 44 would give rangers, researchers, and resource managers better access into the Badlands Wilderness, increasing fossil protection in that area.

Cumulative Effects. Like alternatives A and B, alternative C could result in cumulative adverse effects on the area's paleontological resources. Actions in and outside the North Unit (including, cleaning up the bombing range, constructing the DM&E rail line and Mni Wiconi waterline, increased use of the adjacent national grassland, and fossil collecting on lands near the park) could result in the loss or vandalism of fossils.

All the effects from other actions in and outside the park, added to the effects of new developments in alternative C, could lead to the damage of more of the region's fossils, even though surveys and monitoring would be carried out. Thus, alternative C would contribute to a long-term adverse cumulative effect of unknown magnitude on the area's fossils.

Conclusion. Alternative C would result in some beneficial effects on paleontological resources from increased staffing, educational efforts, and research and from the closure of part of the Sheep Mountain Table road. However, there would be a slightly higher potential for long-term adverse effects on park paleontological resources from alternative C than from alternative A, especially from constructing the new Loop Road segment. Even with mitigation, alternative C could cause long-term minor to moderate local adverse effects on park paleontological resources, and these effects, added to other actions inside and outside the park, could result in a long-term cumulative adverse impact of unknown magnitude.

Although alternative C would lead to adverse effects on paleontological resources, this would not constitute an impairment of park resources or values. The National Park Service still would be able to fulfill the purposes for

which Badlands National Park was established. The loss of resources under alternative C would not destroy the integrity of the park relative to its paleontological resources. Fossils still would be present in the park, and the park staff would be able to protect and interpret paleontological resources and offer opportunities for scientific research on that subject. People still could come to Badlands National Park and enjoy its values, including its fossils.

Vegetation

Analysis. Vegetation would be lost or altered in local areas under alternative C as in alternative B, primarily from the development or improvement of facilities and visitor services. Most new developments would be placed within the existing footprint of disturbed areas in which the vegetation already has been altered; therefore, little additional loss of native vegetation would result from constructing staff housing at Pinnacles, and trailer pads for researchers. Given the previous vegetation disturbance in most of these areas, and with the use of appropriate mitigative measures to minimize impacts (such as ensuring that the equipment would stay within project area boundaries, revegetating disturbed areas, taking steps to avoid the spread of exotic species), the adverse effects on native vegetation from these actions would be negligible to minor.

As in alternative B, constructing the new Cedar Pass segment of the Loop Road would cause the loss and alteration of native grassland vegetation. Some native plants would be lost permanently because of the road footprint. Even with mitigative measures, construction equipment in the project area would damage or cause the loss of other plants. Several indirect impacts also could result from constructing the road segment, including the introduction and spread of nonnative plants. If visitors created "informal" pulloffs by parking off the roadside, some plants might be crushed, trampled, or picked. Road maintenance also might indirectly affect roadside

vegetation. Depending on the road's location and design, the long-term adverse local effects on native vegetation from the new road segment would range from minor to moderate.

The new Pinnacles visitor contact station and the Cedar Pass visitor center would be built in previously undisturbed areas. Despite the use of mitigative measures to help reduce the loss of native prairie vegetation, some vegetation would be permanently disturbed or lost in these areas, a long-term minor adverse impact. Building a small parking area on Sheep Mountain Table also would cause the loss of vegetation, a long-term minor adverse effect.

Vegetation also would be altered or lost through visitation in alternative C. As in alternatives A and B, people walking over and trampling plants in and around existing facilities would result in the loss of native vegetation, a long-term, minor to moderate adverse effect.

Several beneficial effects on vegetation would result from alternative C. Ending the Sheep Mountain Table road at the base of the mountain would help prevent the crushing of vegetation from vehicles driving up the table. Vegetation also could be planted along the portion of the road that would be closed to restore the area and prevent additional erosion. The long-term beneficial effects on vegetation from these actions would be minor to moderate in this area. Converting the Sage Creek campground to a day use area would reduce the presence of people and horses in that area, resulting in less trampling of native vegetation around the campground and on nearby trails and less potential for the introduction of exotic species than in alternative A. This would be a long term, minor to moderate beneficial effect on native vegetation.

Adding the Pinnacles visitor contact station would help to increase visitors' appreciation for native and rare plants and minimize effects on vegetation caused by people, a minor beneficial effect on vegetation. The presence

of the trailer pads for researchers could encourage research that could benefit the protection and management of the park's vegetation. The research efforts could result in a long-term, moderate beneficial effect, depending on the type and extent of research being conducted.

Surveys for rare plants would be conducted before developments were constructed in alternative C, and in most cases developments (new trails, visitor facilities) could be sited to avoid effects on these populations. Two species of rare plants, Easter daisy and largeflower Townsend daisy (and possibly other state-listed rare plants) can be found in the park's prairies and could occur in the area where the new Cedar Pass road might be built. It might be possible to locate the road to avoid populations of these plants, but impacts still could be caused by construction equipment in the project area, and indirect impacts could result from visitors pulling their vehicles off the roads or from roadside maintenance activities. On the other hand, given the relatively small populations of these plants in the park, it is unlikely that the new road would be constructed in the same area and affect the park's populations of these rare plants.

The boundary adjustments proposed in alternative C would result in a moderate beneficial effect on native vegetation. Although much of the land near SD 44 and on the west side of the North Unit that would be added to the park has been grazed, the protection of existing native grassland vegetation would be increased by including these areas in the park. Over time native vegetation would become reestablished in much of the areas, and more native vegetation would be protected in the Prairie Homestead addition.

Cumulative Effects. Other actions in and outside the park, added to the actions of alternative C, would result in a potential for cumulative adverse and beneficial effects. In the North Unit the redesign of the Sage Creek campground, and park maintenance activities along roads would result in a minor loss or

alteration of vegetation. Outside the North Unit actions such as the construction of the Lakota Heritage and Education Center, the bombing range cleanup, and cattle grazing on surrounding private, public, and reservation lands could alter or cause the loss of native plants (see pg 148).

The designation of the Crazy Horse Scenic Byway (which could increase visitation to the park), the construction and operation of the DM&E rail line, and the construction of primitive campgrounds and trails in the national grassland adjacent to the park could alter or cause the loss of native plants. These other actions, added to the developments of alternative, would result in a long-term, minor to moderate, adverse cumulative effect on the region's native vegetation. The increment added by alternative C to this cumulative effect would be negligible.

Some cumulative effects could be beneficial. NPS prescribed burning efforts, the reintroduction of native plants, and weed management efforts in Badlands could beneficially affect native plants. Increases in prescribed burns in the adjacent national grassland also would beneficially affect native plants. Those actions, added to the effects of closing part of the road to Sheep Mountain Table, and encouraging more research and education, and the boundary adjustments under alternative C, would result in better protection of native vegetation and its possible increase in previously disturbed areas. The beneficial long-term cumulative effect of these actions on regional native vegetation would be minor to moderate.

Conclusion. Most native vegetation in Badlands National Park would continue to be protected and sustain itself under alternative C. Constructing the new Loop Road segment and a few other new developments, along with more visitation from improved trails and routes and general visitor use would result in the loss of native plants, causing long-term, minor to moderate adverse effects in local

areas. The potential for the spread of exotic plants also would increase in these areas.

The loss of native vegetation would be reduced by better protection, and native vegetation would benefit from, closing part of the Sheep Mountain Table road, increasing education and research efforts, converting the Sage Creek campground to a day use area, and adding areas to the park. The long-term beneficial local effects on native vegetation from alternative C would be minor to moderate. The long-term cumulative effects on vegetation from this alternative and other actions in and outside the park would be minor to moderate and both beneficial and adverse. The levels of these effects would not be sufficient to constitute an impairment of park resources or values.

Wildlife

Analysis. Although several new developments would be made under alternative C, most would be done in already disturbed areas: Sheep Mountain Table road and parking area, the Pinnacles employee housing and visitor contact station, and the trailer pads for researchers at the bison handling facility. Most wildlife populations and their habitats have been altered by past human actions in these areas, and little habitat would be lost. Increased noise and human activity from construction activities could temporarily displace some animals such as rodents and birds, resulting in minor short-term adverse impacts on wildlife populations in local areas. The new developments would not affect bison or bighorn sheep populations and habitats. Prairie dogs could be affected by the new Pinnacles employee housing, but if the units are carefully sited, impacts would be avoided. Thus, the long-term adverse effects on wildlife and habitats from new developments or improvements would be negligible to minor.

As in alternative B, building the new Cedar Pass segment of the Loop Road would cause the permanent loss of grassland habitat, displacing wildlife along that corridor. Clearing

vegetation in that area would result in the loss of wildlife forage and shelter. Noise from construction equipment and from vehicles on the road could fragment the North Unit's bighorn sheep herd, affecting the animals' movements and wintering areas, but their lambing area would not be affected. Slower speed limits and signs would help reduce the potential for sheep to be hit by vehicles, but even with these measures there could be some sheep road kills. The road also would cross a major deer grazing area, and more deer could be hit by vehicles, especially at dusk.

Most birds, mammals, and reptiles would avoid the area during construction, but many would return after construction ended. Some animals, primarily invertebrates, would not be able to move out of the construction area and would be killed. An indirect effect of the road would be that some wildlife could be killed by vehicles or maintenance activities. Careful siting of the road and the use of other mitigative measures would help to reduce impacts, but the long-term adverse effect on some of the North Unit's wildlife populations would be moderate.

Building trailer pads to support researchers at the bison handling site could affect bison capture and culling efforts, which in turn would affect the general long-term health and well-being of the herd. However, it is expected that relatively few researchers would be in the area at the time bison roundups occur, and if necessary the facility could be temporarily shut down for other uses to avoid impacts. Thus, the new research facility would be expected to cause a negligible adverse impact on the bison herd.

The Pinnacles visitor contact station and the Cedar Pass visitor center would be built in previously undisturbed areas, causing the permanent loss of some grassland habitat. Construction activities also would temporarily disturb and displace animals near these facilities. The species primarily affected would be some smaller, less mobile wildlife species and species with smaller home ranges, such as

invertebrates. Some reptiles, small mammals, and birds would be displaced. The loss of habitat would result in a long-term minor adverse effect on these populations.

Wildlife populations and habitats in the park would be improved by several actions in alternative C, as follows:

- ◆ Ending the Sheep Mountain Table road at the base of the mountain would eliminate wildlife disturbance from vehicles being driven in that area, a beneficial effect for wildlife.
- ◆ Converting the Sage Creek campground to a day use area would reduce the presence of people and horses in that area, which in turn would reduce the disturbance and displacement of bison and other wildlife.
- ◆ Providing trailer pads at the bison handling facilities could encourage research that would benefit the protection and management of the park's wildlife.

The long-term beneficial effect of these actions would be minor.

The proposed addition of land along SD 44 and on the west end of the North Unit would add prairie dog towns to the park, which would give the animals more protection and help ensure their continued presence. The additions also would protect wildlife habitat for a variety of other species such as mule deer, bighorn sheep, pronghorn antelope, and bobcat. Thus, it is expected that the additions would have a long-term moderate beneficial effect on the park's wildlife. Some grassland wildlife habitat would be protected through the addition of the Prairie Homestead, but the need to relocate some white-tailed prairie dogs from the area would result in a negligible adverse impact.

Cumulative Effects. Several other actions in and outside Badlands National Park would affect area wildlife. Some wildlife would be killed or displaced by the construction and

operation of the DM&E rail line, and possibly by more traffic if the Crazy Horse Scenic Byway were designated. These actions would cause minor adverse impacts on wildlife. Those effects, added to the effects on wildlife from the actions of alternative C, would result in a slightly higher potential for wildlife to be displaced and would reduce the number of areas where wildlife could exist without people or facilities. The long-term cumulative adverse effects on area wildlife would be minor.

Actions within and outside the North Unit, independent of alternative C, would likely affect prairie dogs and their habitat in the future. Some potential habitat for prairie dogs could be lost due to developments outside the North Unit, such as the DM&E rail line. In addition, prairie dog control efforts on lands outside the North Unit would continue, resulting in the loss of animals. Some limited prairie dog control efforts probably also would occur within the North Unit, which would result in the loss of animals in areas adjacent to private lands. On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would continue to be managed to maintain and enhance prairie dog complexes. This would be a long-term beneficial effect. When the beneficial and adverse impacts of actions occurring within and outside the North Unit are added to the actions in alternative C there could be a long-term minor adverse cumulative effect on the area's overall prairie dog population. However, the boundary adjustments in alternative C would add a beneficial increment to this cumulative impact.

Conclusion. Alternative C would not affect most wildlife populations and habitats in Badlands National Park; they would continue to be protected and would not be changed by the actions of this alternative. The park's bison and prairie dog populations generally would not be affected by actions in the alternative, although the boundary additions would add additional prairie dogs into the park. Building the new Cedar Pass segment of the Loop Road

could result in long-term, moderate adverse effects on the North Unit's wildlife, particularly the bighorn sheep and deer populations. Most developments in the alternative would result in long-term negligible to minor adverse impacts on wildlife populations and habitats.

Closing part of the Sheep Mountain Table road, converting the Sage Creek campground to a day use area, increased research efforts, and the proposed boundary adjustments would produce long-term minor to moderate beneficial effects on wildlife. Overall, alternative C would result in long-term minor adverse and beneficial effects on the park's wildlife populations and habitats.

The cumulative effects of alternative C and actions outside the park on area wildlife and their habitat would comprise increased habitat fragmentation and wildlife displacement, and loss of prairie dogs in localized areas, resulting in a long-term minor adverse effect. None of the effects on wildlife from alternative C would impair park resources or values.

Special Status Species

Analysis. None of the proposed developments and improvements in alternative C would be in areas known to contain black-footed ferret or swift fox populations.

The proposed boundary adjustments along SD 44 and the west end of the North Unit would add prairie dog towns to the park, and thus would also protect additional potential black-footed ferret habitat.

Alternative C may affect, but would not be likely to adversely affect, swift fox and fox habitat in the area. The land acquisitions along SD 44 and on the west side of the North Unit would protect potential swift fox habitat that could support the fox in the future, and thus would be a beneficial impact. Most facilities proposed in alternative C, including the new Loop Road segment, would be in marginal potential fox habitat. Facilities that would be

developed at the bison handling facility and in the Pinnacles area would be in or near potential fox habitat, but the facilities and more people in those areas would not necessarily prevent foxes dispersing into and using the areas. Foxes, which are mostly nocturnal, would be in the areas when few people would be present. It is possible that a fox might be hit by a car on the new Loop Road segment, but that is unlikely, given the low levels of traffic in the park at night.

Cumulative Effects. Although some limited prairie dog control efforts likely would occur in the North Unit in the future, independent of alternative C, it is unlikely that such efforts would be permitted in areas where black-footed ferrets are known to occur, or would prevent the ferrets from using these areas.

Actions outside the North Unit could have both adverse and beneficial impacts on black-footed ferrets and their habitat. Some potential habitat for prairie dogs and black-footed ferrets could be lost due to developments outside the North Unit, such as the DM&E rail line. Prairie dog control efforts on lands outside the North Unit also could affect black-footed ferrets if they occur in these areas.

On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would continue to be managed to maintain and enhance prairie dog complexes, providing additional potential black-footed ferret habitat. This would be a long-term beneficial effect.

When the actions in alternative C are added to the other actions described above, there could be a potential loss of prairie dogs, which could result in a long-term adverse cumulative effect on the area's existing or potential for black-footed ferret populations. However, alternative C would add a beneficial increment to this cumulative impact, primarily due to the boundary adjustments.

Some potential swift fox habitat could be protected by two boundary adjustments under alternative C. When these actions are combined with efforts to reintroduce the fox, independent of alternative C, there could be a long-term, beneficial cumulative impact for swift fox in the area.

Conclusion. Before taking any action in alternative C that might affect federally listed species in the park, the National Park Service would consult with the U.S. Fish and Wildlife Service to ensure potential impacts are identified and avoided. Overall, alternative C might affect, but would not be likely to adversely affect, the populations of black-footed ferrets and swift fox in Badlands National Park. The proposed boundary adjustments would add potential black-footed ferret, and swift fox habitat, which would be a beneficial impact. Alternative C plus actions within and outside the North Unit (independent of alternative C) could result in an adverse cumulative impact to black-footed ferrets. However, alternative C would add a beneficial increment to this cumulative impact. Likewise, when the boundary adjustments under alternative C are combined with efforts to reintroduce the swift fox, independent of the alternative, there could be a long-term, beneficial cumulative impact for swift fox in the area. No impairment of park resources or values would result from this alternative.

EFFECTS ON CULTURAL RESOURCES

Historic Buildings and Other Structures

Analysis. This alternative calls for a boundary change that would bring the Prairie Homestead, a National Register of Historic Places listed property, into federal ownership. The Prairie Homestead consists of a single room dug into the side of a hill with an attached stacked sod addition. This site includes a modern structure that currently is used as a souvenir shop and for facility management.

Removing the Prairie Homestead visitor contact facility would contribute to the return of

the homestead to its historic condition and would result in a long-term moderate beneficial effect on the site. New trails and waysides would have to be added to give visitors access. These additions would result in an indirect long-term, minor adverse effect on the homestead.

The potential level of continuing visitation to the park is unknown, but wear caused by visitation could result in long-term adverse impacts on the structure of unknown intensity. However, the structure's condition would be stabilized through more research and by continuing maintenance and repair consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1996). These preservation actions would produce long-term minor to moderate beneficial effects. By removing the structure and restoring the immediate environs to more of a semblance of the historic conditions, an appearance would be created, resulting in a long-term moderate beneficial effect.

Including the Prairie Homestead in the park would afford it the protection of historic properties in federal ownership. The laws, regulations, and policies followed by the National Park Service mandate that specific conditions and processes be followed for historic properties; such regulations are not required under private ownership. Therefore, bringing the property into federal ownership would lead to a long-term minor beneficial effect.

Cumulative Effects. Several miles north of Badlands National Park, the development of the Minuteman Missile National Historic Site would affect the historic condition of the missile control and launch facilities. The alterations could include structural changes to accommodate public visitation, environmental control, and protective barriers. The long-term, adverse effects on the structures of the national historic site would range from negligible to moderate.

Bringing the Prairie Homestead within park boundaries would increase the protection and maintenance of the property which could result in a long-term, moderate beneficial impact.

While the overall cumulative impact would be slightly more adverse than beneficial, the beneficial effects of incorporating the Prairie Homestead into federal ownership under alternative C, would contribute a moderately beneficial effect to the adverse impact.

Conclusion. Bringing the Prairie Homestead into federal ownership would give the property a greater level of protection, resulting in a long-term minor to moderate beneficial effect on the structure.

The long-term, cumulative adverse effects of alternative C on area historic structures in and outside the park would be minor to moderate. There would be no impairment of historic buildings or other structures and no impairment of park resources or values.

Section 106 Summary. The Prairie Homestead, being brought into federal control, would receive a greater level of preservation and rehabilitation than at present. Any changes, alterations, or other preservation-related undertakings would be carried out in consultation with the South Dakota state historic preservation officer and according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1996).

Removing the contact station and installing walkways and waysides would be done after consultation with the South Dakota state historic preservation officer. After applying the criteria of adverse effects of the Advisory Council on Historic Preservation, the National Park Service finds that these actions would result in no adverse effect on the Prairie Homestead.

Ethnographic Resources

Analysis. NPS knowledge about the locations of traditional use is limited to areas identified by American Indian tribes as containing sacred sites. Alternative C would involve no change in the agreement that guarantees tribal members unrestricted access in perpetuity and requires their written consent to affect those sites. Before an area planned for development was disturbed, investigations would be undertaken to identify, document, and evaluate the eligibility of location for inclusion in the National Register of Historic Places. The National Park Service would consult with tribal officials to determine strategies for preserving ethnographic resources or mitigating any adverse impacts.

On the northern portions of Sheep Mountain Table, where traditional use is extensive, the proposed partial road closure would constrain participants' access to traditional use areas by restricting road use. These limitations on vehicular use could pose a hardship on elderly or handicapped persons because visitors would have to walk over the closed upper part of the road. The resulting long-term, adverse effect on the relationship between the site and the practitioner would be moderate.

Alternative C would result in long-term minor beneficial effects on ethnographic resources by limiting public visitation to American Indian sacred sites. This alternative would cause no effect on the viewshed of sacred and traditional use areas by implementation of this alternative.

Cumulative Effects. Actions in and outside the park could affect ethnographic resources, including traditional cultural properties.

Inside the park, excavation might be required for the bombing range cleanup; this could alter vegetation patterns and landforms, affecting the topographic relief of a viewshed of a sacred site. Surveys and cleanup plans would help to reduce the extent of these

impacts, but the long-term adverse effects would be moderate.

Outside the park, the development of coalbed methane fields by oil and gas companies that operate in northeast Wyoming could affect viewsheds, use, and tribal relationships to regional ethnographic resources. Depending on the location, the long-term, cumulative adverse effects could be widespread or limited and could range from minor to moderate.

Traditional use areas could be disturbed or destroyed through construction associated with the DM&E railroad near the South Unit or the installation of the Mni Wiconi waterline. However, the waterline is being placed along existing roads, which would limit any resulting effects. The long-term, adverse effects from installing the waterline would be minor; the long-term, adverse effects from the railroad would be moderate.

Ethnographic resources could be affected by actions in the adjacent Buffalo Gap National Grassland. The construction of trails, campgrounds, or other visitor accommodations could directly affect traditional use areas, and inadvertent camping on traditional use sites and hiking across areas of eroding landforms could result in long-term, adverse impacts ranging in intensity from negligible to moderate.

The planned development of the Minuteman Missile National Historic Site could result in the construction of a visitor facility and an administrative site. Any resulting adverse effects could be minimized by changing the location of the site, and the long-term, adverse effects would be minor.

The effects of all actions in or outside the park under alternative C, combined with the effects of continued development in the park, would result in long-term, cumulative adverse effects on area ethnographic resources ranging from minor to moderate.

The cumulative effects of all actions in or outside the park from implementing alternative C would be long-term, minor, and adverse.

Conclusion. Implementing Alternative C could result in long-term minor to moderate adverse impacts on ethnographic resources in the park. Primarily, these impacts would be caused by limiting American Indians' access by vehicle to traditional use sites for religious practices.

Cumulative impacts outside the park would be caused by changes in the viewshed and by possible harm to access. The effects would range from minor to moderate. Actions inside or outside the park, combined with the actions of alternative C, would result in a long term moderate adverse effect on ethnographic resources. Since there would be no major impacts, park resources and values would not be impaired.

Section 106 Summary. According to NPS policies and procedures, the park would continue to protect ethnographic resources to the greatest extent possible, avoiding disturbance wherever possible. If avoidance or preservation could not be achieved, appropriate mitigation would be carried out in consultation with American Indian tribes identified as having a cultural affiliation with the park and, if the resources were eligible for national register listing, with the South Dakota state historic preservation officer. Because there are no known traditional cultural properties within the boundaries of Badlands National Park, alternative C would have no effect on such resources, and the National Park Service finds that the determination of effect would be *no historic properties affected* (36 CFR 800.4(d)(1)).

EFFECTS ON VISITATION AND THE VISITOR EXPERIENCE

Access

Analysis. The focus of alternative C would be to protect resources and manage visitor access

to minimize the effects on resources from visitors.

The Loop and Sage Creek Rim Roads in the North Unit would continue to be the access routes for most park visitors. The roads accommodate most vehicle types and offer year-round access to the park. Access to the backcountry would be from the existing trailheads, although minor improvements could be made.

The road to Sheep Mountain Table would be ended at the base of the mountain, (approximately 3 miles from BIA Highway 27) and vehicles would not be permitted on the tabletop. This would mean that visitors would have to hike or use pack stock to reach the top of the table. Eliminating vehicle access to the tabletop would result in a long-term minor adverse effect on the visitor experience.

Cumulative Effects. Traffic projections indicate that a substantial increase in park visitation could result from the completion of the Heartland Expressway and the Crazy Horse Scenic Byway. The increase from these roads originating from the south and west, added to visitation projections for the Lakota Heritage and Education Center, could alter the current visitation patterns to the park.

This alternative would result in relatively little change concerning access over Alternative A. There would be long-term minor adverse impacts from eliminating vehicle access on to Sheep Mountain Table. These actions, coupled with proposed improvements to regional roads, would result in a long-term, moderate beneficial cumulative effect on park visitors.

Conclusion. Because Sheep Mountain would not be available for vehicle travel, the alternative would cause some minor adverse effects on visitor access.

Availability of Information

Analysis. Because alternative C would involve developing an orientation facility near the Pinnacles entrance station to offer year-round orientation and interpretation and onsite staff near the second most popular entrance to the park, visitors no longer would have to travel more than 20 miles along the Loop Road to the Ben Reifel Visitor Center to get information about the park. Having NPS staff at this location also would also meet a goal of the “Long-Range Interpretative Plan,” which calls for the addition of a facility with restrooms, potable water, orientation, and interpretation in this general vicinity.

Cumulative Effects. The Lakota Heritage and Education Center would be an additional outlet disseminating information to the public. This facility would be near the proposed Crazy Horse Scenic Byway, which, if designated, would increase traffic in this area. The visitor center that would be developed for the Minuteman Missile National Historic Site in the I-90 corridor also would be an outlet for information. Although the focus of that facility would be on the historic site, it could offer regional information, including information about Badlands National Park. These projects would produce long-term, major beneficial effects on the availability of information for visitors.

The proposed demonstration transportation system would provide a forum for visitors to obtain information about the park. Shuttle drivers would be knowledgeable about the park could give information to visitors. In addition, the shuttles could include signs to provide information for visitors. These services would be a minor benefit for visitors. The testing period for the transportation system is expected to last one to two years. If it was determined that the system met the goals of the project, the beneficial effects could be long term.

By improving the opportunity for visitors to receive information about the park and devel-

oping a facility near the second most popular entrance station, alternative C would result in a long-term, moderate beneficial effect on the visitor experience. The long-term moderate benefits of alternative C, combined with regional improvements, would result in moderate beneficial cumulative effects on the visitor experience.

Conclusion. Alternative C would bring about long-term, moderate beneficial effects on the availability of information about the park. A new information facility at the west side of the North Unit would improve the visitor experience.

Range and Enjoyment of Visitor Activity

Analysis. Vehicle use, hiking and pack stock use, camping, and picnicking are the four most popular activities.

Vehicle Use — Designating the part of SD 44 that crosses the park as part of the driving/sightseeing zone and seeking to partner with the South Dakota Department of Transportation in constructing waysides could substantially improve the visitor experience along this section of highway. At present no information about the park is available to visitors passing through the park, nor is there a location to stop and view the park safely. Adding waysides would give visitors a safe place to stop along this scenic highway and get information about the park, creating long-term, minor beneficial effects for visitors.

Maintaining the Sheep Mountain road to the base of the mountain and prohibiting vehicle travel on the mountain would mean a lost opportunity for some visitors, a minor to moderate adverse effect on visitors seeking driving opportunities. The loss of the opportunity to drive to this popular destination would reduce the number of visitors, but the total number affected would be a relatively small part of the total visitors to the park.

Overall, alternative C would enhance visitor experience for travelers along SD 44 by

providing waysides, which would be a negligible to minor long-term beneficial effect. The elimination of vehicles on to Sheep Mountain Table would be a long-term negligible adverse impact to visitors seeking this type of driving experience.

Hiking and Pack Stock Use —Developing trailheads and designating trails in the natural area / recreation zone on Sheep Mountain Table would lead to a small increase in opportunities for hiking and riding. Designating trails would expand opportunities for hiking beyond the current limited number of trails. Many visitors are reluctant to explore the backcountry except in areas with designated trails or routes. Designating trails would result in minor long-term beneficial effects on the visitor experience.

The proposed demonstration transportation system would allow visitors to complete through hikes on the Castle Trail complex. Hikers could use the shuttles to return to their point of origin. This would result in minor benefits for visitors. The demonstration would last one to two years; however, if the demonstration was found to meet the goals of the project, the benefits could be long term.

Camping — Camping opportunities would be the same as Alternative A. The Cedar Pass and Sage Creek Campgrounds would remain.

Picnicking — Picnicking opportunities would be the same as Alternative A.

Cumulative Effects. Various plans for road improvements in the region would increase opportunities for driving and sightseeing. The Crazy Horse Scenic Byway would be a designated, signed route offering opportunities for more regional scenic driving. The management plan for Buffalo Gap National Grassland (USFS 2001b) calls for the development of a primitive campground near the park, which would expand opportunities for camping in the region. These projects would bring about long-term, moderate

beneficial effects on visitors seeking recreational opportunities in the region.

More opportunities for visitor enjoyment would be available under alternative C. Waysides, and trailheads, would be distributed throughout the park. Some of these facilities would be in areas of the park where access is difficult at present.

The actions of alternative C, coupled with other projects in the region, would result in long-term, moderate cumulative beneficial effects on visitor enjoyment.

Conclusion. Alternative C would create more opportunities for visitors; however, this alternative would offer fewer opportunities than alternative B. The long-term, beneficial effects on the visitor experience from alternative C would be minor to moderate.

Scenic Resources

Analysis. There would be no changes to existing park facilities under alternative C. These facilities would continue to cause long-term, minor adverse impacts on park visitors.

Constructing the proposed Pinnacles orientation facility would create a new intrusion on the landscape. This building, which would be adjacent to the Loop Road, would be visible to visitors traveling along this corridor, but it would be smaller in scale than the facility proposed in alternative B. This facility would create a new source of artificial light at night. Since most park visitors travel along this road, there would be a long-term, minor to moderate adverse effect on scenic resources.

Cumulative Impacts. Activities outside the park boundary would have the potential to affect the viewsheds from within the park. The construction of the DM& E Railroad would affect the viewshed. These adverse impacts would be long term and minor to moderate.

Developments on private lands adjacent to the park have affected the views from the park.

The construction of new buildings, signs, and communications towers has resulted in long-term minor adverse impacts on the viewshed. There is the potential that additional communications towers could be constructed within the park viewshed, but none are proposed at present. However, if additional towers were built, they would cause long-term, minor adverse impacts.

Alternative C would result in long-term, minor to moderate adverse impacts on scenic resources. Activities outside the park, combined with the effects from implementing alternative C, would result in long-term, minor to moderate adverse cumulative effects on scenic resources.

Conclusion. Alternative C would result in long-term, minor to moderate adverse impacts on scenic resources. The existing facilities would continue to cause minor adverse impacts on the scenic resources.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

Analysis. Alternative C would add to and improve the park's infrastructure and increase the staff for resource education, resource protection, maintenance, and cultural resource management. More employee housing at Pinnacles and some road improvements would improve the efficiency and effectiveness of park operations. Capital improvements would cost \$12,442,000 in current dollars; additional staff would add an annual cost of \$328,400 to the park's operating budget.

Capital expenditures would be mostly in the construction industry for labor and materials. These one-time short-term expenditures of funds would not happen all at one time; rather, they would occur over the lifetimes of

the various development projects, thus spreading the benefits out over time and moderating their effects on the local economy.

Some additional employment opportunities would be available locally under alternative C. A few individuals would receive long-term benefits from employment opportunities with the park, and a few individuals and firms (mostly in the construction industry) would receive short-term opportunities relating to capital improvements from the various improvement projects of this alternative. Although this alternative would create some short-term and long-term economic benefits that would be important to a small number of individuals and business firms, the overall effect on the economic conditions and socioeconomic factors such as population, income, employment, and earnings of the three-county region would be minor. Overall, this alternative would result in a long-term, minor beneficial effect on the socioeconomic environment.

Boundary adjustments, if achieved, would result in some one-time payments of federal monies to a few private landowners. Such acquisitions would be accomplished on a willing seller-willing buyer basis so that the landowners and the public would benefit from the transactions. Some private land would become public land, so there would be some decrease in the local real estate tax base. Any loss of real estate taxes would be minor and perhaps could be mitigated through the through the payments-in-lieu-of-taxes program.

Cumulative Effects. The additional capital improvements and extra staff would combine with the actions described for alternative A to enable the park to be managed in compliance with all applicable laws, rules, regulations, and policies governing the management and operation of Badlands National Park.

Conclusion. The present value of the annual operations cost of alternative C is \$86,011,000.⁴

Alternative C would require \$12,442,000 (2002 dollars) more than alternative A for capital improvements. For comparison purposes, it is assumed that these capital costs would occur during the first year of implementation, which would make the total present-value of this alternative \$98,453,000, an increase of \$15,606,000 (+18.8%) over the present value of the no-action alternative.

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

In alternative C, the National Park Service would build and operate new facilities, which would increase energy use by the park. To maintain, operate, and protect the facilities, NPS travel in the park also would increase, which in turn would increase energy consumption.

UNAVOIDABLE ADVERSE IMPACTS

Human use and the construction of new facilities under alternative C would result in minor adverse impacts on natural resources in some areas throughout the park. The impacts on wildlife, vegetation, and the visitor experience, which are discussed in detail above in the specific impact topics, would be unavoidable.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

The additional energy requirements identified above would result in an irreversible commitment of resources. In addition, there would be a commitment of material used to construct new visitor facilities such as the wilderness orientation facility.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

As in alternatives A and B, most of the park would be protected in a natural state and would maintain its long-term productivity under alternative C. Only a small percentage of the park would be converted to development. In addition, more than 9,500 acres of land included in the proposed boundary adjustments would be placed under federal ownership and managed by the National Park Service. No actions of this alternative would jeopardize the long-term productivity of the environment. Short-term impacts might result from construction, such as local air and water pollution, as detailed in the analyses of specific impact topics. Noise and human activity from construction and restoration might displace some wildlife from the immediate area. However, these activities would not jeopardize the long-term productivity of the environment.

4. For alternative C, the stream of income necessary to support park operations would be \$9,019,744 annually, the interest rate would be 6.125% (federal discount rate for fiscal year 2002), and the time period is 15 years (life of this *General Management Plan*).

EFFECTS FROM ALTERNATIVE D: PROTECT RESOURCES AND USE RESEARCH TO FURTHER KNOWLEDGE OF THE PARK

EFFECTS ON NATURAL RESOURCES

Air Quality

Analysis. In alternative D the addition of a new collection storage facility and research support facilities would result in short-term minor local adverse effects largely from fumes (hydrocarbons, carbon monoxide, and nitrogen oxides) from particulates emitted by construction machinery, and from increased dust due to the excavation of earth and in the immediate project areas. However, any air quality impacts from this construction work would be temporary and local.

Building a new Loop Road segment in the Cedar Pass area would result in the emission of fumes and particulates by construction equipment. Emissions would be greater in this alternative than in the others because the new road would be longer. Asphalt would be needed to build the new road; this would result in emissions from an asphalt batch plant, a storage pile, and haul trucks. Volatile hydrocarbons and other organic compounds in the asphalt would enter the air for a short time after the road surface was completed. These emissions would result in short-term, moderate adverse effects on air quality.

The new section of the Loop Road would not increase traffic volume; however, depending on the design of the road, if vehicles had to be driven up a higher grade, emissions could increase compared to the no-action alternative. On this new route, drivers would have to travel farther to reach the visitor center than on the existing route; this would increase emissions. The impact would vary, depending on the level of traffic, the time of day, the season, and weather conditions, but it could range from a

negligible to moderate short-term adverse impact.

Cumulative Effects. As in the other alternatives, several actions in and outside the North Unit would affect air quality and visibility in the park. Construction activities, including the development of the Lakota Heritage and Education Center, would result in short-term local minor adverse effects on air quality. Periodic prescribed burns in the North Unit could cause moderate to major, short-term impacts to air quality in local areas. However, sources outside the park would add far more pollutants to the airshed. Energy and industrial developments in the Powder River Basin in Wyoming could cause substantial adverse effects on air quality in the park, as was described in the no-action alternative. Other actions outside the park likely to affect the park's air quality would be prescribed fires, wildfires, the construction and operation of the DM&E rail line and the Mni Wiconi water project, and the possible designation of the Crazy Horse Scenic Byway.

All the above actions, added to the actions of alternative D, would result in a cumulative long-term, major adverse effect on the air quality in Badlands National Park. However, the actions of alternative D would add a minimal increment to this cumulative effect because the air quality effects resulting from alternative D would be short term, local, and spread out over time.

Conclusion. Alternative D would result in minor to moderate short- and long-term adverse effects on air quality in local areas, primarily from construction. Combined with emissions from sources outside the park, this would result in a long-term cumulative major adverse effect on regional air quality, but the incremental contribution of alterna-

tive D to this impact would be minor. These impacts would not constitute an impairment of park resources or values.

Soundscape

Analysis. Facility construction and improvement projects in alternative D would affect the park's soundscape in local areas.

Construction workers and equipment would generate noise during the construction of trails and research support facilities, a new collection storage facility, improvement of the Sheep Mountain Table road, and the new Loop Road alignment in the Cedar Pass area. However, the noise levels from construction would be temporary and would take place at different times and places through the park. Most noise from new developments would be in or near developed areas that already are exposed to noise from vehicles, park equipment, and visitors. Excluding noise from constructing the new Loop Road segment, the noise from construction would cause negligible to moderate short-term adverse impacts on the natural soundscape in local areas, depending on the presence of other facilities and people, vegetation, wind, and time of day.

Substantial noise both inside and outside the park would come from demolition and excavation equipment building the new Loop Road segment, causing temporary major short-term adverse impacts on the soundscape during the construction period. Depending on the design of the new road alignment, vehicular noise also might increase — if the grade was higher than the current road, and if there were no natural features to absorb sound, noise could carry farther from vehicles being driven up and down the road. There would be more noise from trucks and other vehicles on the part of the road outside the park, which is now relatively quiet. Thus, the short-term adverse effects on the soundscape in the vicinity of the new part of the Loop Road from alternative D, both inside and outside the park, would be moderate to major.

Noise might increase in the Castle Trail area if additional trails were built, which would encourage more use of this area. Noise also might increase at the research support facilities. Improvements to the Sheep Mountain Table road might lead to more driving on that road. However, the adverse effects on the soundscape from these causes would be local, temporary, and minor because visitor numbers would not increase substantially.

Stopping vehicles at the bottleneck on Sheep Mountain Table (the road would end in the center of the mountain approximately 4 miles from BIA 27) would eliminate vehicle noise on part of the table, resulting in a minor, long-term beneficial effect on the soundscape.

Cumulative Effects. As in the other alternatives, noise in parts of the park would increase from construction activities, the operation of machinery and vehicles, and the presence of people. There could be a cumulative long-term minor adverse noise effect in local areas from increased noise levels under alternative D (construction of facilities, and visitor and administrative use) added to actions independent of this plan such as the redesign project at the Sage Creek campground, continued commercial tour helicopter overflights, commercial traffic through the park, the construction of the Mni Wiconi water project, and increased traffic on the Crazy Horse Scenic Byway (assuming increased traffic resulted from that designation).

Conclusion. The soundscape in most of Badlands National Park would continue be natural under alternative D, with few unnatural sounds. The construction and operation of most new facilities would cause short-term and long-term minor adverse impacts on the soundscape in local areas. Most noise impacts would be in areas already subject to some noise. The construction and use of a new section of the Loop Road both inside and outside the park would result in moderate to major short-term and long-term

adverse effects. Overall, from a parkwide perspective, this alternative would result in fewer long-term sources of noise than alternative A, but several areas in and outside the park would be noisier. There would be the potential for minor long-term adverse cumulative effects on the soundscape in local areas from the construction and operation of new park facilities added to construction activities and other noise sources outside the park.

There would be the potential for major short- and long-term adverse effects on the soundscape from the construction and use of the new Loop Road segment in alternative D, but this would not result in an impairment of park resources or values. The changes would affect only a small part of the park, and the park's natural and cultural integrity would not be compromised, nor would opportunities for visitor enjoyment. The National Park Service would not be prevented from conserving resources or values necessary to fulfill the park's specific purposes, as identified in the establishing legislation, nor from achieving the goals in the park's *General Management Plan* or other relevant NPS planning documents.

Geologic Features, Including Soils

Analysis. Except for the new Loop Road segment, none of the actions of alternative D would affect the park's geologic features. Depending on the design of the new road segment, some parts of the Badlands Wall (eroding walls, cliffs, buttes) might have to be modified or removed, resulting in a long-term moderate to major local adverse effect. Soils along the new road alignment, both within and outside the park, also would be permanently lost and disturbed, and even with mitigative measures, some soil would be lost to erosion. If people parked their vehicles in informal pulloffs off the side of the road, that could cause a secondary adverse effect on soils. All these changes could result in a moderate to major long-

term adverse impact on soils along the route of the new road.

The soils in Badlands National Park also would be affected by several other actions in alternative D. Disturbing ground or building new facilities would not be necessary for the new visitor contact station. The two research support facilities would be built in already disturbed areas where soils have been altered by past activities. Some soils in those areas might be altered, and construction there could increase erosion, but with mitigation the adverse effects on soils from these actions would be local and minor.

The construction or designation of new trails in the Castle Trail area would increase visitation in an area with fragile cryptogamic soils. Some soils would be altered by foot traffic both in and adjacent to the trail corridors, and some erosion could occur, resulting in a long-term minor to moderate adverse impact.

Improvements to the Sheep Mountain Table road would reduce erosion from vehicles on the road below the hill and on top of the table, a long-term moderate beneficial effect.

Adding a visitor contact station in the town of Wall would benefit all the park's resources, including soils. More visitors could be educated about the park's resources and learn to avoid or minimize effects on soils caused by walking in the park. This would be a long-term, minor to moderate beneficial effect on park soils.

Cumulative Effects. Soils would be lost or altered and erosion temporarily increased by several developments in and outside the park, including the construction of the Lakota Heritage and Education Center, the redesign of the Sage Creek campground, the installation of the Mni Wiconi water project, the development of the DM&E rail line and the bombing range cleanup. That loss and alteration of soils, added to the potential effects from construction and improvements

under alternative D, would increase soil erosion and alteration on more lands in the region. Thus, alternative D and other developments in and outside the park would result in a cumulative long-term, minor to moderate adverse effect on area soils.

Conclusion. Most of the park's soils and geologic features would not be affected by alternative D, but constructing the new Loop Road segment could result in long-term moderate to major adverse effects on geologic features and soils along the corridor. Adding new developments would cause long-term minor adverse effects on soils in local areas within the North Unit. Long-term, minor to moderate adverse soil impacts could occur due to new trails and increased use in the Castle Trail area. Reducing erosion along the Sheep Mountain Table road and additional education efforts due to a new visitor contact station would result in long-term minor to moderate beneficial effects. Outside developments added to new park developments and improvements would result in long-term, minor to moderate adverse cumulative effects on area soils. The effects on soils from alternative D would not constitute an impairment of park resources or values. Although the construction of the new Loop Road segment could cause a major adverse effect on geologic features, this would not impair park resources and values. The effect would be local, and its extent would depend on the road design (that is, whether the road was elevated or cut through the Badlands Wall). Even if the adverse effect was major, the National Park Service still would be able to fulfill the purposes for which Badlands National Park was established.

The loss of geologic features under alternative D would not destroy the integrity of the park relative to its geologic features. Geologic features would continue to be present throughout the park (albeit potentially in fewer numbers), and the park staff still would protect and interpret the features and provide opportunities for scientific research

on the park's geology. People still could come to Badlands and enjoy the park's values, including its geologic features.

Paleontological Resources

Analysis. With the possible exception of the new Loop Road segment, all the developments in alternative D, including the research support facility, would be placed in already disturbed areas that are not known to be highly fossiliferous. Little bedrock disturbance would be needed in most of those areas, but if drilling into bedrock was necessary, some fossils could be damaged or lost. With surveys and monitoring, the potential for impacts in these areas would be minor. The improvements to the Sheep Mountain Table road would need to be carefully surveyed and monitored to avoid affecting fossils.

In alternative D, much of the route of the new Loop Road segment outside the park would go through prairie; therefore, the construction of that segment under alternative D would not be as likely to cause the loss of fossils as in the other alternatives. But even with surveying and monitoring as mitigation, fossils probably would be lost when the road-building passed through the Badlands Wall. Fossils could be damaged through several actions: drilling, demolition, excavation, placement of fill, paving, and crushing by construction equipment. Erosion along the road could increase, indirectly causing the loss of fossils. The extent of damage to paleontological resources would depend on where the new road segment would cross through the Badlands Wall (generally, the narrower the affected section of the highly fossiliferous Wall, the fewer the adverse impacts) and the design of the road (that is, whether it would be elevated on piers or a cut-and-fill road). The long-term adverse effects on paleontological resources from the new road segment could range from moderate to major.

With new trails in the Castle Trail area, access into that part of the park would be improved, but visitation (and subsequent illegal fossil collecting by visitors) probably would not increase much. Some beneficial effects on paleontological resources in the park would result from alternative D as follows:

- ◆ Adding a visitor contact station would increase some visitors' awareness of the significance of the park's fossils, reducing the potential for fossil collecting.
- ◆ Added staffing could increase ranger patrols, which would help reduce fossil collecting.
- ◆ The presence of research zones could encourage research that would benefit the protection and management of paleontological resources in the park.
- ◆ The boundary expansion along SD 44 would give rangers, researchers, and resource managers better access into the Badlands Wilderness, increasing fossil protection in that area.

All these actions taken together would result in a long-term beneficial effect in local areas.

Cumulative Effects. Like the other alternatives, alternative D could result in cumulative adverse effects on the area's paleontological resources. Actions in and outside the North Unit (such as cleaning up the bombing range, constructing the DM&E rail line and the Mni Wiconi waterline, increased use of the adjacent national grassland, and fossil collecting on lands near the park) could result in the loss or vandalism of fossils.

All the impacts from other actions in and outside the park, added to the effects of new developments in the North Unit, could lead to the damage of more of the region's fossils, even though surveys and monitoring would be carried out. Thus, alternative D would contribute to a long-term cumulative

adverse effect of unknown magnitude on the area's fossils.

Conclusion. Alternative D would result in some long-term beneficial effects on paleontological resources from increased staffing, educational efforts, and research. However, there also would be a higher potential for long-term adverse effects on park paleontological resources in alternative D than in alternative A, primarily due to construction of the new Loop Road segment. Even with mitigation, alternative D could cause long-term moderate to major local adverse effects on park paleontological resources. In addition, minor long-term adverse impacts could result from other new developments in the North Unit. The effects of alternative D added to those from developments and uses outside the park could result in a long-term cumulative regional adverse impact of unknown magnitude.

Although alternative D would have a higher potential for affecting paleontological resources than alternative A, this would not constitute an impairment of park resources or values. The National Park Service still would be able to fulfill the purposes for which Badlands National Park was established. The loss of resources under alternative D would not destroy the park's integrity relative to its paleontological resources. Fossils still would be present in the park, and the park staff would be able to protect and interpret paleontological resources and offer opportunities for scientific research on that subject. People still could come to Badlands National Park and enjoy its values, including its fossils.

Vegetation

Analysis. As in the other alternatives, most new developments or improvements in alternative D would be placed within the footprint of disturbed areas where the vegetation already has been altered. Little additional loss of native vegetation would be

caused by constructing the research support facility at the bison corral. New ground disturbance would not be necessary to build the Wall visitor contact station, so vegetation would not be affected by this project. Given the previous vegetation disturbance in the area, and with the use of appropriate mitigative measures to minimize impacts (such as ensuring that equipment would stay within project area boundaries, revegetating disturbed areas, taking steps to avoid the spread of exotic species) the adverse effects on native vegetation from these actions would be negligible to minor.

Building the new Cedar Pass segment of the Loop Road would result in the loss and alteration of native grassland vegetation, causing direct and indirect adverse impacts inside and outside the park. Of the three possible corridors, this is the longest; consequently, it would cause the greatest loss of grassland vegetation, primarily outside the park. Some native plants would be permanently lost because of the road footprint. Even with mitigative measures, construction equipment in the project area would damage or cause the loss of other plants.

Several indirect impacts also could result from constructing the road segment, such as the loss of plants from possible increased erosion along the road and the introduction and spread of nonnative plants. If visitors created “informal” pull-offs by parking off the roadside, some plants might be crushed, trampled, or picked. Road maintenance also might indirectly affect roadside vegetation. Depending on the road’s location and design, the long-term adverse local effects on native vegetation from the new road segment would range from minor to moderate.

Vegetation would be altered or lost through visitation in alternative D. As in the other alternatives, people walking over and trampling plants in and around existing campgrounds, campsites, road overlooks, picnic areas, and trailheads would cause the loss of native vegetation. These actions

would result in long-term minor to moderate adverse effects on vegetation.

More hiking would result from the new trails in the Castle Trail area. This could result in the trampling and loss of vegetation along these corridors, and any increased erosion in these areas also could cause some plant loss. The potential for visitors to inadvertently carry in and spread exotic species also would increase. Depending on the level of use, the time of use, and the vegetation, there could be a minor to moderate long-term adverse impact on vegetation in this area.

Surveys for rare plants would be conducted before developments were constructed in alternative D, and new trails could be sited to avoid effects on these populations. It is not known if populations of Barr’s milk-vetch, Easter daisy, largeflower, and Townsend daisy (and possibly other state-listed rare plants), would be found in the route of the new Cedar Pass segment road outside the park. If they are found in the area where the new road might be built, it still might be possible to locate the road to avoid populations of these plants. Although it is considered unlikely, impacts could be caused by construction equipment in the project area, and indirect impacts could result from visitors pulling off the roads or from roadside maintenance activities. If populations of these plants do indeed occur along the route, even with mitigation there could be minor to moderate long-term adverse effects on rare plant populations in this area, depending on the size of the populations and the extent of disturbance.

The boundary adjustments proposed in alternative D would result in a moderate long term beneficial effect on native vegetation. Although much of the land near SD 44 and the land at the west end of the North Unit that would be added to the park has been grazed, the protection of existing native grassland vegetation would be increased by including the areas in the park. Over time

native vegetation would become reestablished in much of the areas.

Several other beneficial effects on vegetation would result from alternative D, as follows:

- ◆ Improving the Sheep Mountain Table road and ending vehicle access at the bottleneck would decrease the loss of native plants because there would be less driving of vehicles over plants. This action would result in a minor to moderate long-term beneficial effect on plant populations in the area, depending on the level of vehicle use.
- ◆ Adding a visitor contact station would help to increase visitors' awareness and appreciation of native and rare plants, possibly reducing vegetation damage by visitors, a minor beneficial effect on park vegetation.
- ◆ Adding a research support facility and research zones would encourage research that could benefit the protection and management of park vegetation. The research efforts could result in a moderate long-term beneficial effect, depending on the type and extent of research conducted.

Cumulative Effects. Some other actions in and outside of the park, added to the actions of alternative D, would result in a potential for cumulative adverse and beneficial effects. In the North Unit the redesign of the Sage Creek campground and park maintenance activities along roads would result in a minor loss or alteration of vegetation. Native vegetation also could be lost or altered outside the North Unit due to such actions as the construction of the Lakota Heritage and Education Center, the bombing range cleanup, cattle grazing on surrounding private, public, and reservation lands, the designation of the Crazy Horse Scenic Byway (which could increase visitation to the park), the construction of primitive campgrounds and trails in the national grassland adjacent to the park, and the

construction and operation of the DM&E rail line. These other actions, added to the developments in alternative D, and a possible increase in visitation in the Castle Trail area could result in a long-term minor adverse cumulative effect on the region's native vegetation. The increment added by alternative D to this cumulative effect would be negligible.

Some cumulative effects could be beneficial. NPS prescribed burning efforts, the reintroduction of native plants, and weed management efforts in Badlands would beneficially affect native plants. Increases in prescribed burns in the adjacent national grassland also would result in a positive effect on native plants. Those effects, added to the effects from more research efforts under alternative D, would result in better protection of native vegetation and its possible increase in previously disturbed areas. The beneficial long-term cumulative effect of these actions on regional native vegetation would be minor to moderate.

Conclusion. Most native vegetation in Badlands National Park would continue to be protected and to sustain itself under alternative D. There would be more potential for both beneficial and adverse effects on native vegetation under alternative D than in the no-action alternative. Building the new Loop Road segment and a few other new developments, along with more hiking on new trails in the Castle Trail area, would result in the loss of native plants and more potential for the spread of exotic species in those areas, resulting in minor to moderate long-term adverse impacts in local areas.

The loss of native vegetation would be reduced by better protection, and native vegetation would benefit from improving the Sheep Mountain Table road, increasing research efforts, and adding two areas to the park. The long-term beneficial local effects on native vegetation from alternative D would be minor to moderate.

The overall long-term local effects on vegetation from alternative D and other actions in and outside of the park would be minor to moderate and both beneficial and adverse. There also could be long-term minor to moderate beneficial and adverse cumulative effects due to alternative D and other actions in and outside the park. These levels of these effects would not be sufficient to impair park resources or values.

Wildlife

Analysis. In alternative D, new developments or improvements of existing facilities would be done in already disturbed areas: the research support facility, and the improvements to the Sheep Mountain Table road. Wildlife populations and their habitats have been altered by past human actions in these areas, and no more habitat would be lost. Increased noise and human activity from construction activities could temporarily displace some animals such as rodents and birds, resulting in minor short-term adverse impacts on wildlife populations in local areas. However, the new developments would not affect bison, prairie dog, or bighorn sheep populations and habitats. Thus, the long-term adverse effects on wildlife and habitats from the new developments or improvements would be negligible to minor.

As in alternatives B and C, building the new Cedar Pass segment of the Loop Road would cause the permanent loss of grassland habitat, displacing wildlife along this corridor. Clearing vegetation in that area would result in the loss of wildlife forage and shelter. Noise from construction equipment and from people would displace some wildlife. Most birds, mammals, and reptiles would avoid the area during construction, but many would return after construction ended. Some animals, primarily invertebrates, would not be able to move out of the construction area and would be killed. An indirect effect of the road would be that some wildlife could be disturbed by mainte-

nance activities or could be hit and killed by vehicles.

Bison in the park would not be affected by the new road segment. The road could cut off bighorn sheep from some watering holes, but other watering holes could be provided, or it might be possible to locate the road so as to decrease the fragmentation of the habitat for forage, escape, and lambing. If the road was designed correctly, putting traffic at one end of the park, east of Cedar Pass, the bighorn sheep population could be beneficially affected. With careful siting of the road and the use of mitigative measures, the long-term adverse effect on wildlife from adding the road segment would be minor to moderate.

As in alternative C, building trailer pads to support researchers at the bison handling site could affect the bison capture and culling efforts. However, it is expected that relatively few researchers would be in the area at the time bison roundups occur, and if necessary the facility could be temporarily shut down to other uses to avoid impacts. Thus, the impact of the new research facility would be expected to have a negligible adverse impact on the bison herd.

New trails in the Castle Trail area would improve access, probably increasing visitation to that part of the park. Most effects on wildlife from this action would be temporary displacement during the construction period. These effects would be minor. If visitation increased, the behavior of some wildlife might be affected, but the long-term effect still would be minor.

The proposed addition of land along SD 44 and on the west end of the North Unit would add prairie dog towns to the park, which would give the animals more protection and help ensure their continued presence. The additions also would protect wildlife habitat for a variety of other species such as mule deer, bighorn sheep, pronghorn antelope, and bobcat. Thus, it is

expected that the boundary additions would have a long-term moderate beneficial effect on the park's wildlife.

Wildlife populations and habitats in the park would be improved by several actions in alternative D, as follows:

- ◆ Designating research zones in the North Unit would eliminate some wildlife disturbance from pack stock and hikers.
- ◆ The research support facility could encourage research that would benefit the protection and management of the park's wildlife.

The long-term beneficial effects from these actions would be minor to moderate.

Cumulative Effects. As in the previously described alternatives, several other actions in and outside of the park would affect wildlife in the region. Some deer and small mammals would be killed or displaced by the construction and operation of the DM&E rail line, and possibly by more traffic if the Crazy Horse Scenic Byway were designated. These actions would cause minor adverse impacts on these populations. Those effects, added to the effects on wildlife from the actions of alternative D, would result in a slightly higher potential for wildlife to be displaced and would reduce the number of areas where wildlife could exist without people or facilities. The long-term adverse cumulative effects of alternative D on area wildlife would be minor.

Actions within and outside the North Unit, independent of alternative D, would likely affect prairie dogs in the future. The loss of some potential habitat for prairie dogs outside the North Unit could be caused by developments such as the DM&E rail line. Prairie dog control efforts on lands outside of the North Unit would continue, resulting in the loss of animals. Some limited prairie dog control efforts probably also would occur within the North Unit, which would result in the loss of animals in areas adjacent

to private lands. On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would continue to be managed to maintain and enhance prairie dog complexes. This would be a long-term beneficial effect. When the potential loss of prairie dogs due to actions within and outside the North Unit are added to the actions in alternative D, there could be a long-term minor adverse cumulative effect on the area's overall prairie dog population. However, the boundary adjustments in alternative D would add a beneficial increment to this cumulative impact.

Conclusion. The proposed developments and improvements in alternative D would result in long-term negligible to minor adverse impacts on wildlife populations and habitats in Badlands National Park. The alternative would not affect most wildlife populations and habitats in the park; they would continue to be protected and would not be changed by the actions of this alternative. The park's overall existing prairie dog, bighorn sheep, and bison populations would not be affected, although the boundary additions would add additional prairie dogs into the park. Building the new segment of the Loop Road would cause minor to moderate adverse impacts on wildlife in and outside of the park. A few minor long-term adverse effects on some animals also could be caused by constructing other park facilities and by increased use of the Castle Trail area. None of the actions of alternative D would substantially affect key migration routes or areas known to be important for breeding, nesting, or foraging. Overall, alternative D would result in long-term minor adverse and beneficial effects on the park's wildlife populations and habitats in local areas.

Alternative D also would have several beneficial impacts. The proposed boundary adjustments along SD 44 and on the west end of the North Unit, encouraging research, and improving the Sheep

Mountain Table road would produce long-term minor to moderate beneficial effects on wildlife.

The cumulative long-term adverse effects of alternative D and other actions outside the park on the region's wildlife and their habitat would be minor, primarily from displacement of wildlife and the loss of prairie dogs in local areas. These effects would not constitute an impairment of park resources or values.

Special Status Species

Analysis. None of the proposed developments in alternative D would be in areas known to contain black-footed ferret or swift fox populations. The Castle Trail area, where new trails could result in more visitors, is not known to support these populations.

The proposed boundary adjustments along SD 44 and the west end of the North Unit would add prairie dog towns to the park, and thus would also protect additional potential black-footed ferret habitat.

Alternative D may affect, but would not be likely to adversely affect, swift fox in the area and fox habitat. The land acquisitions along SD 44 and on the west side of the North Unit would protect potential swift fox habitat that could support the fox in the future, and thus would be a beneficial impact. Most facilities proposed for alternative D, including the new Loop Road segment, would be in marginal potential fox habitat. The facilities that would be developed at the bison handling site would be near potential fox habitat, but the facilities and more people in these areas would not necessarily keep foxes from dispersing into and using the areas. The foxes, which are mostly nocturnal, would be in the areas when few people were present.

Cumulative Effects. Although some limited prairie dog control efforts likely would occur in the North Unit in the future, indepen-

dent of alternative D, it is unlikely that such efforts would be permitted in areas where black-footed ferrets are known to occur, or would prevent the ferrets from using these areas.

The loss of some potential habitat for prairie dogs and black-footed ferrets outside the North Unit could be caused by developments such as the DM&E rail line. Prairie dog control efforts on lands outside the North Unit also could affect black-footed ferrets if they occurred in these areas.

On the other hand, lands in the Buffalo Gap National Grassland that are adjacent to the eastern part of the park would continue to be managed to maintain and enhance prairie dog complexes, providing additional potential black-footed ferret habitat. This would be a long-term beneficial effect.

The potential loss of prairie dogs due to actions within and outside of the North Unit, added to the actions in alternative D, could result in a long-term adverse cumulative effect on the area's existing or potential for black-footed ferret population. However, the boundary adjustments in alternative D would add a beneficial increment to this cumulative impact.

Some potential swift fox habitat could be protected by two boundary adjustments under alternative D. When these actions are combined with efforts to reintroduce the fox, independent of alternative D, there could be a long-term, beneficial cumulative impact for swift fox in the area.

Conclusion. Before taking any action in alternative D that might affect federally listed species in the park, the National Park Service would consult with the U.S. Fish and Wildlife Service to ensure potential impacts are identified and avoided. Overall, alternative D might affect, but would not be likely to adversely affect, the populations of black-footed ferrets and swift fox in Badlands National Park. The proposed boundary

adjustments would add potential black-footed ferret and swift fox habitat, which would be a beneficial impact. Alternative D plus actions within and outside the North Unit (independent of the alternative) could result in an adverse cumulative impact to black-footed ferrets. However, alternative D would add a beneficial increment to this cumulative impact. Likewise, when the boundary adjustments under alternative D are combined with efforts to reintroduce the swift fox, independent of the alternative, there could be a long-term beneficial cumulative impact for swift fox in the area. No impairment of park resources or values would result from this alternative.

EFFECTS ON CULTURAL RESOURCES

Historic Buildings and Other Structures

Analysis. None of the structures identified as being eligible for inclusion in the National Register of Historic Places would be impacted by the implementation of alternative D.

Cumulative Effects. Several miles north of Badlands National Park, the development of the Minuteman Missile National Historic Site would affect the historic condition of the missile control and launch facilities. The alterations could include substantial structural changes to accommodate public visitation, environmental control, and protective barriers. The long-term, adverse effects on the structures of the national historic site would range from negligible to moderate.

Since there are no actions affecting historic buildings and structures associated with implementation of alternative D, the adverse effects associated with Minuteman Missile National Historic Site would constitute the entire cumulative impact.

Conclusion. Alternative D would not result in any effects on historic buildings or other

structures in Badlands National Park, and the park's resources and values would not be impaired.

Section 106 Summary. This summary (like all section 106 summaries in this document) has been prepared with the use of definitions consistent with section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations of the Advisory Council on Historic Preservation (36 CFR 800).

In accordance with the regulations of the Advisory Council on Historic Preservation implementing section 106 of the National Historic preservation Act, the National Park Service finds that no historic properties would be affected (36 CFR 8004(d)(1)).

Ethnographic Resources

Analysis. NPS knowledge about the locations of traditional use is limited to areas identified by American Indian tribes as containing sacred sites. Alternative D would involve no change in the agreement that guarantees tribal members unrestricted access in perpetuity and requires their written consent to affect those sites.

Traditional use areas would continue to be identified before ground-disturbing or other activities that could affect the current use, viewshed, or perception of the locality. Investigations would be undertaken to determine whether there were any resources in the area and what would be the best ways to preserve them or to mitigate any adverse effects. The National Park Service would consult with tribal officials to determine strategies for preserving ethnographic resources or mitigating any adverse impacts.

Before an area planned for development was disturbed, investigations would be undertaken as appropriate to identify ethnographic resources and evaluate their eligibility for inclusion in the National Register of Historic Places. Depending on

the nature or severity of an impact that would result from development, alternative D would result in negligible to minor long-term adverse effects on ethnographic resources.

There would be access to the research zone would in alternative D. The focus in this alternative would be on resource values. Vehicle access to research sections of the park for visitors and tribal members would be restricted and limited by permit or agreement for purposes of research in the research zone. Except for researchers or individuals conducting preservation-related activities, access would be permitted only to support the safety of the researchers, for purposes of scientific research, or other well-justified special uses. These limitations on access to traditional use areas would cause long-term major adverse effects on ethnographic resources.

Access to other areas would be limited by permit or agreement for purposes of research, tribal access to sacred and traditional use sites, or other well-justified special uses subject to existing agreements and arrangements established in the future. These limitations would cause long-term negligible adverse effects on tribal use.

Traditional use of Sheep Mountain Table is extensive. Limiting road access to this area would result in long-term moderate adverse effects on associated ethnographic resources.

Alternative D would result in a long-term minor adverse impact on the use or perception of sacred or traditional use areas by its practitioners. It would not affect the viewshed of sacred and traditional use areas. The cumulative effects of all actions in or outside of the park from implementing alternative D would be long-term, minor, and adverse.

Cumulative Effects. Actions in and outside of the park could affect ethnographic resources, including traditional cultural

properties. Inside the park, excavation might be required for the bombing range cleanup; this could alter vegetation patterns and landforms, affecting the viewshed of a sacred site. Surveys and cleanup plans would reduce the extent of these impacts, but the long-term adverse effects would be moderate.

Outside of the park, traditional use areas could be disturbed or lost through construction associated with the DM&E railroad near the South Unit or the installation of the Mni Wiconi waterline. However, the waterline is being placed along existing roads, which would limit any resulting effects. The long-term adverse effects from installing the waterline would be minor; the long-term adverse effects from the railroad would be moderate.

Ethnographic resources could be affected by actions in the adjacent Buffalo Gap National Grassland. The construction of trails, campgrounds, or other visitor accommodations could directly affect traditional use areas, and inadvertent camping on traditional use sites and hiking across areas of eroding landforms could result in long-term adverse impacts ranging in intensity from negligible to moderate.

The effects of all actions in or outside of the park under alternative D, combined with the effects of continued development in the park and use of the park by visitors, would result in long-term cumulative minor adverse effects on area ethnographic resources.

Conclusion. Implementing Alternative D could result in long-term minor to moderate adverse impacts on ethnographic resources in the park. Cumulative impacts of unknown magnitude from actions outside the park could result in long-term adverse impacts. Until inventories of the park's ethnographic resources could be completed, the National Park Service would conduct site-specific surveys and consult with American Indians for each development activity, as appropri-

ate. Because there would be no major adverse effects on park resources or values, such resources and values would not be impaired.

Section 106 Summary. According to NPS policies and procedures, the park would continue to protect ethnographic resources to the greatest extent possible, avoiding disturbance wherever possible. If avoidance or preservation could not be achieved, appropriate mitigation would be carried out in consultation with American Indian tribes identified as having a cultural affiliation with the park and, if the resources were eligible for national register listing, with the South Dakota state historic preservation officer. Because alternative D would result in no adverse effects on traditional cultural properties within the boundaries of Badlands National Park, the National Park Service finds that the determination of effect would be *no historic properties affected* (36 CFR 800.4 (a)(1)).

EFFECTS ON VISITATION AND THE VISITOR EXPERIENCE

Access

Analysis. The focus of alternative D would be on the research value of the park; therefore, areas of high scientific value would be placed in the research zone. Access to that zone would be limited to researchers working under approved permits or to visitors participating in NPS-led trips.

In the North Unit, the Loop and Sage Creek Rim roads would continue to be the primary access for most park visitors, accommodating the widest range of vehicle types. The existing trailheads and waysides would be retained, but part of the North Unit would be zoned for research, and those areas would be closed to visitors. Most of that area is relatively remote, so the restriction would have little effect on visitors; however, two areas in that zone are relatively popular for day trips: an area east of Cedar Pass and part

of an area near the Sage Creek campground. Since the number of visitors affected would make up a small portion of the total park visitation, the long-term adverse effect on visitor access from these restrictions would be minor to moderate.

In this alternative, as in alternative B, the road to Sheep Mountain Table would be improved and would end at the bottleneck in the center of the mountain approximately 4 miles from BIA 27. Vehicles would not be permitted beyond that point. Eliminating vehicles throughout the tabletop would result in a long-term moderate adverse effect on the visitor experience because Sheep Mountain Table is a destination for many visitors with high-clearance vehicles. However, seasonally maintaining the road would improve access for passenger vehicles, possibly increasing interest in this area of the park.

Cumulative Effects. Traffic projections indicate that a substantial increase in park visitation could result from the completion of the Heartland Expressway and the Crazy Horse Scenic Byway. The increase from these roads originating from the south and west, added to visitation projections for the Lakota Heritage and Education Center, could alter the current visitation patterns to the park. Visitors' access to the park's South Unit would be improved by the upgrading of the roads and by their being emphasized with designations. The routes for these two road projects already exist, but typically park visitors do not use them.

The actions of alternative D, coupled with proposed improvements to regional roads, would result in a long-term cumulative moderate beneficial effect on park visitors. Regional projects would improve access in the region, but alternative D would not contribute to those cumulative benefits; it would result in a long-term minor adverse effect on visitor access.

Conclusion. Having more area in the research zone than any of the other alternatives would limit access for visitors, but because the areas affected by this zoning are little visited at present, the long-term adverse effects on visitor access from alternative D would be minor.

Availability of Information

Analysis. With a new outlet for visitors to get information about the park at a visitor contact station in the town of Wall, alternative D would result in moderate beneficial effects on visitors' ability to learn about the park.

With Wall a popular tourist destination because of the famous Wall Drug, information would be available at a major stopping point along I-90. In addition, the station would be near to the second most used park entrance. Establishing the contact station in Wall would result in a long-term, major beneficial effect on the availability of information.

Cumulative Effects. The Lakota Heritage and Education Center would be an additional outlet disseminating information to the public. This facility would be near the proposed Crazy Horse Scenic Byway, which, if designated, would bring more traffic into the area. The visitor center that would be developed for the Minuteman Missile National Historic Site in the I-90 corridor also would be a new outlet for information. Although the focus of that facility would be on the historic site, it could offer regional information, including information about Badlands National Park. These projects would produce long-term major beneficial effects on the availability of information for visitors.

The visitor contact station in Wall would make available detailed information about the park. The station in Wall would be highly visited because the town is a major stopping point along I-90. This added source of infor-

mation would produce moderate beneficial effects on the visitor experience.

The actions of alternative D, combined with other projects in the region, would result in cumulative moderate beneficial effects on the availability of information for visitors.

Conclusion. Alternative D would result in long-term moderate beneficial effects on the availability of information about the park. The benefits would come from the visitor contact station in Wall, which would have the potential to reach many regional visitors.

Range and Enjoyment of Visitor Activity

Analysis. Vehicle use, hiking and pack stock use, camping, and picnicking are the four most popular activities.

Vehicle Use — Alternative D would not involve any changes in the opportunities for visitors to drive and sightsee along established roads in the park. The Loop Road and the Sage Creek Rim Road would continue to be the major travel corridors in the North Unit.

Improving the Sheep Mountain Table road and maintaining it to the bottleneck (as in alternative B) would offer driving and sightseeing opportunities to a wider range of visitors than at present, because lower clearance vehicles would be able to travel the improved road.

Overall, alternative D would not offer new opportunities for visitors seeking a driving and sightseeing experience. The improvements at Sheep Mountain would be a long-term negligible beneficial impact to visitors.

Hiking and Pack Stock Use — More areas of the park would be closed to hiking and pack stock use in alternative D than in any of the other alternatives because of the size of the research zone in this alternative. Access in this zone would be limited to people with permits for purposes of

research, American Indian traditional uses, or other well-justified special uses.

Camping — Camping opportunities in alternative D would be unchanged; camping would continue to be available at the Sage Creek and Cedar Pass campgrounds.

Picnicking — Picnicking opportunities under alternative D would be the same as in alternative A.

Cumulative Effects. Various plans for road improvements in the region would increase opportunities for driving and sightseeing. The Crazy Horse Scenic Byway would be a designated, signed route offering opportunities for more regional scenic driving. The management plan for Buffalo Gap National Grassland (USFS 2001b) calls for the development of a primitive campground near the park's South Unit, which would expand opportunities for camping in the region. These projects would bring about long-term beneficial effects on visitors seeking recreational opportunities in the region.

More areas of the park would be closed to hiking and pack stock use in alternative D than in any of the other alternatives because the research zone would be largest in this alternative. These actions would result in long-term cumulative negligible to minor adverse effects on the range and enjoyment of visitor activity.

The actions of alternative D, coupled with other projects in the region, would result in long-term cumulative beneficial effects on the visitor experience; however, the actions of this alternative would reduce the overall benefits.

Conclusion. The actions of alternative D would diminish the areas open to hikers and pack stock users. The long-term adverse effects on the range and enjoyment of visitor activity would be negligible.

Scenic Resources

Analysis. There would be no major changes to the park's existing facilities under alternative D, and the facilities would continue to cause minor long-term adverse impacts on park visitors. This alternative would result in no new impacts on scenic resources.

Cumulative Impacts. Activities outside the park boundary would have the potential to affect the viewsheds from within the park. The construction of the DM& E Railroad would affect the viewshed. These adverse impacts would be long term and minor to moderate.

Developments on private lands adjacent to the park have affected the views from the park. The construction of new buildings, signs, and communication towers has resulted in long-term, minor adverse impacts on the viewshed. There is the potential that additional communications towers could be constructed within the park viewshed, but none are proposed at present. However, if additional towers were built, they would result in long-term adverse impacts.

Implementing alternative D would result in no new effects on the park's scenic resources; therefore, there would be no cumulative impacts from implementing this alternative.

Conclusion. Alternative D would result no new effects on the park's scenic resources. The existing facilities would continue to cause long-term, minor adverse impacts on the park's scenic resources.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

Analysis. Alternative D would make limited improvements to the park infrastructure through increased staff for resource education, resource protection, maintenance, and cultural resource management.

Capital improvements would cost \$3,334,000 in current dollars, with \$3,000,000 going toward improving Sheep Mountain Road and trailheads. Additional staff would add an annual cost of \$367,000 to the park's operating budget. Realigning the Sheep Mountain Road would ensure easy access from the Northeast entrance, solving a long-standing problem. In this alternative the use of the road as a farm-to-market route would continue, even though the average travel time might increase.

Some additional employment opportunities would be available locally under alternative D. A few individuals would receive long-term benefits from employment opportunities with the park, and a few individuals and firms (mostly in the construction industry) would receive short-term benefits from the various improvement projects of alternative D. Although this alternative would create some short-term and long-term opportunities relating to capital improvements — economic benefits that would be important to a small number of individuals and businesses. The overall effect on the economic conditions and socioeconomic factors of the three-county region (population, income, employment, and earnings) would be minor. Overall, this alternative would result in a minor long-term beneficial effect on the socioeconomic environment.

Boundary adjustments, if achieved, would result in some one-time payments of federal monies to a few private landowners. Such acquisitions would be accomplished on a

willing seller-willing buyer basis so that the landowners and the public would benefit from the transactions.

Some private land would become public land, so that there would be some decrease in the local real estate tax base. Any loss of real estate taxes would be minor and perhaps could be mitigated through the through the payments-in-lieu-of-taxes program.

Cumulative Effects. The additional capital improvements and extra staff would combine with the actions described for alternative A to enable the park to be managed in compliance with all applicable laws, rules, regulations, and policies governing the management and operation of Badlands National Park.

Conclusion. The present value of the annual operations cost of the Alternative D is \$86,383,000.⁵ Alternative D would require \$3,344,000 (2002 dollars) more than alternative A for capital improvements. For comparison purposes it is assumed that these capital costs would occur during the first year of implementation, which would make the total present value of this alternative \$89,717,000, an increase of \$6,870,000 (+8.3%) over the present value of the no-action alternative.

5. For alternative D, the stream of income necessary to support park operations would be \$9,184,294 annually, the interest rate would be 6.125% (federal discount rate for fiscal year 2002), and the time period is 15 years (life of this *General Management Plan*)

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

In alternative D, the National Park Service would construct and operate new facilities, which would increase energy use by the park. To maintain, operate, and protect the facilities, NPS travel in the park also would increase, and the increased travel would increase energy consumption.

UNAVOIDABLE ADVERSE IMPACTS

Human use and the construction of new facilities under alternative D would result in minor adverse effects on natural resources in some areas throughout the park. The impacts on wildlife, vegetation, and the visitor experience, which are discussed in detail above in the specific impact topics, would be unavoidable.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

The additional energy requirements identified above would result in an irreversible commitment of resources. In addition, a commitment of material would be used to construct new facilities such as the trailer pads at the bison handling facilities.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

As in the other alternatives, most of the park would be protected in a natural state and would maintain its long-term productivity under alternative D. Only a small percentage of the park would be converted to development. In addition, more than 9,000 acres of land included in the proposed boundary adjustments would be placed under federal ownership and managed by the National Park Service. No actions of this alternative would jeopardize the long-term productivity of the environment. Short-term impacts such as local air and water pollution might result from construction, as detailed in the analyses of specific impact topics. Noise and human activity from construction and restoration might displace some wildlife from the immediate area. However, these activities would not jeopardize the long-term productivity of the environment.



Consultation and Coordination



PUBLIC AND AGENCY INVOLVEMENT

This *Final General Management Plan / Environmental Impact Statement* for Badlands National Park represents thoughts presented by the National Park Service, other agencies, American Indian tribes, and the public. Consultation and coordination among the tribes, agencies, and the public were vitally important throughout the planning process. The public had two primary avenues by which it participated during the development of the plan: participation in public meetings and responses to newsletters.

PUBLIC MEETINGS AND NEWSLETTERS

Public meetings and newsletters were used to keep the public informed and involved in the planning process for the park. A mailing list that was compiled consisted of American Indian tribes, governmental agencies, nongovernmental organizations, business, legislators, local governments, and interested citizens.

A notice of intent to prepare an environmental impact statement was published in the *Federal Register* on July 20, 2000. A newsletter issued in September 2000 described the planning effort. A total of 30 comments were received in response to that first newsletter.

The National Park Service conducted public meetings in Rapid City, Kyle, Wall, and Sioux Falls in October 2000. At total of 16 people attended those meetings.

A second newsletter distributed in February 2001 described the issues that would be addressed in the plan and presented preliminary management zones to be used in developing the alternatives. Six written comments were received in response to the second newsletter.

A third newsletter distributed in November 2001 described the draft alternatives for managing the park and identified the National Park Service's preferred alternative. In November the National Park Service hosted public meetings in Rapid City, Wall, Pine Ridge, Manderson, and Kyle. Those meetings were attended by 35 people. A total of 33 written comments were received in response to the third newsletter and the public meetings.

CONSULTATION WITH STATE HISTORIC PRESERVATION OFFICER

According to section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 270, et seq.), agencies that have direct or indirect jurisdiction over historic properties are required to take into account the effect of any undertaking on properties eligible for the National Register of Historic Places. To meet the requirements of 36 CFR 800, the National Park Service sent letters to the South Dakota historic preservation office and the Advisory Council on Historic Preservation on May 15, 2000, inviting their participation in the planning process. Both offices were sent all the newsletters, with a request for their comments.

Stipulation VI.E. of the 1995 programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers requires that the National Park Service, in consultation with the state historic preservation officer, who will make a determination about which are programmatic exclusions under IV.A and B, and all other undertakings, potential effects on those resources to seek review and comment under 36 CFR 800.4-6 during the plan review process.

The specific undertakings are listed in table 17, along with the National Park Service's determination of how those individual undertakings relate to the 1995 programmatic agreement.

CONSULTATION WITH AMERICAN INDIAN GROUPS

The National Park Service sent letters to the following American Indian groups on January 23, 2002, to invite them to participate in the planning process:

- Cheyenne River Sioux Tribe
- Crow Creek Sioux Tribe
- Flandreau Santee Sioux
- Lower Brule Sioux Tribe
- Oglala Sioux Tribe
- Omaha Tribe
- Rosebud Sioux Tribe
- Ponca Tribe
- Santee Sioux Tribe
- Sisseton-Wahpeton Sioux
- Spirit Lake Nation
- Standing Rock Nation
- Three Affiliated Tribes
- Trenton Indian Service
- Turtle Mountain
- Winnebago Tribe
- Yankton Sioux Tribe

In addition, the National Park Service presented the preliminary alternatives to the tribal council of the Oglala Sioux Tribe on January 22, 2002. The presentation included an overview of the alternatives, a description of the next steps that would be taken in the planning process, a summary of the public comments, and an opportunity for questions and discussion. The tribe was particularly interested in efforts to increase visitation to

the South Unit, opportunities for economic development on the reservation near the South Unit, and protection of sacred sites in the park. Park staff met with various committees and tribal offices to brief them on the planning effort. In addition, the tribes had an opportunity to review and comment on the draft plan.

CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

The Endangered Species Act of 1973, as amended, requires in section 7 (a) (2) that each federal agency, in consultation with the secretary of the interior, ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This section of the act sets out the consultation process, which is further implemented by regulation (50 CFR 402).

The National Park Service initiated informal consultation with the U.S. Fish and Wildlife Service in September 2000 to determine the presence of federally listed threatened and endangered species in Badlands National Park. To remain up to date about listed and proposed threatened and endangered species, the National Park Service has consulted the USFWS Web site. Copies of the three newsletters also were provided for the U.S. Fish and Wildlife Service, and the agency was given a copy of the draft document for review. The USFWS concurred with the NPS findings (see letters).

TABLE 17: SELECTED ACTIONS IN THE PREFERRED ALTERNATIVE THAT COULD AFFECT CULTURAL RESOURCES — WITH ASSOCIATED COMPLIANCE REQUIREMENTS

Action	Compliance Requirement
Construct visitor contact station near Pinnacles	Further SHPO review necessary at design stage of project
Develop education pavilion and group campsite at bison handling facilities	Further SHPO review necessary at design stage of project
Develop wilderness orientation facility and campground in the expansion along SD 44 (if acquired)	Further SHPO review necessary to facilitate use of the property for these purposes
Make detailed plans for the Prairie Homestead (if acquired)	Further consultation with SHPO necessary
Establishment of trailheads and picnic areas	Further SHPO review necessary at design stage of project

PUBLIC COMMENTS ON THE DRAFT PLAN, WITH RESPONSES

This section addresses the public comments received on the *Draft General Management Plan / Environmental Impact Statement* for Badlands National Park. The public comment period began with the publication of a notice of availability of the draft document in the October 19, 2005, *Federal Register*. The draft document was sent to all agencies and organizations on the planning team's mailing list and was posted on the Internet (<http://parkplanning.nps.gov/>). The 60-day comment period ended on January 10, 2006.

The National Park Service received comment letters and oral comments at public meetings held in Rapid City, Wall, and Pierre, South Dakota. The planning team reviewed and considered all comments in preparing the *Final Environmental Impact Statement*, consistent with the requirements of 40 CFR 1503. The comments allow the National Park Service and other interested parties to review and assess the opinions of other agencies, organizations, and individuals about the alternatives and their potential impacts.

This section begins with summaries of the public meetings. Next, all of the written comments on the draft plan are reproduced, and responses are provided to substantive comments.

Where appropriate, the text in this *Final General Management Plan / Environmental Impact Statement* has been revised to address the comments. These changes are identified in the NPS responses. No response was given to comments that simply expressed preference for an alternative or any actions within the alternatives. All page number citations in the responses refer to the draft document.

As defined in the *Handbook to Director's Order 12 — Conservation Planning*,

Environmental Impact Analysis, and Decision-Making (NPS 2001), comments are considered substantive when they

- (a) question, with reasonable basis, the accuracy of information in the environmental impact statement
- (b) question, with reasonable basis, the adequacy of environmental analysis
- (c) present reasonable alternatives other than those presented in the environmental impact statement
- (d) cause changes or revisions in the proposal

PUBLIC MEETINGS

The planning team arranged and conducted three public meetings on the *Draft General Management Plan / Environmental Impact Statement* from November 7 through November 9, 2005. These meetings were held in Rapid City, Wall, and Pierre. The meetings were attended by approximately 30 members of the public. The comments received at these meetings were similar in nature to the written comments received on the document.

LETTERS AND E-MAIL COMMENTS

A total of 14 separate written comments were received during the comment period, including letters and e-mail comments. The comments were from three federal agencies, one state agency, five nongovernmental organizations, one business, and four individuals. They are reproduced on the following pages along with NPS responses to substantive comments.

COMMENTS



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401



IN REPLY REFER TO:
DESCRM
MC-208

JAN 12 2006

MEMORANDUM

To: Superintendent, Badlands National Park
Attn: Badlands Planning Team

From: Regional Director, Great Plains Region

Subject: Comments on draft Environmental Impact Statement/General Management Plan for the North Unit of the Badlands National Park

This is a review of the draft Environmental Impact Statement/General Management Plan (EIS) for the North Unit of the Badlands National Park (Park) dated September 30, 2005.

General Comments

1. I would like to stress the need to clearly disclose the trust responsibilities that the Department of the Interior (Department) has to Native American Tribes and Tribal individuals. The Oglala Sioux Tribe (Tribe) has a relationship with the Department that is more than just a neighbor. You have a relationship that involves holding lands in trust for the benefit of the Tribe. This should be defined in the EIS such that readers understand that the consultations with the Tribe are not the same as discussions with neighbors.

2. It was not clear if the development of this plan and the negotiations with the Tribe for management of the South Unit are somewhat integrated. It seems intuitive that the overall management of the Park should be consistent throughout both units. If there is to be no overriding management plans, this should be clearly stated such that the reader understands that the North and South Units are managed independently. In addition all references to the South Unit management should be excluded from the document if the negotiations have not been completed (i.e. page 135, Access, Analysis, third paragraph).

3. Tribes have agencies similar to the States and Federal Agencies. The Park should have a working relationship with the professionals in the tribal agencies similar to the relationships with State and Federal agency professionals. This does not replace the need for government-to-government consultation, but it is a courtesy to the tribal agencies to work with them in conjunction with consultation.

RESPONSES

Responses to Bureau of Indian Affairs

1. We agree that the National Park Service has a responsibility to consult with the Oglala Sioux Tribe regarding the management of the North Unit of Badlands National Park. As noted on p. 14-15 of the draft plan, we recognize that the Badlands area is of special importance for American Indians of the Great Plains. We will continue to maintain a close working government-to-government relationship with the Oglala Sioux Tribe and respect the viewpoints and needs of the tribe. We also provided opportunities for the Oglala Sioux Tribe to provide input on the management of the North Unit (see p. 202). The North Unit is not on reservation lands, and there are no treaty rights associated with the use of the lands in the North Unit. As stated on p. 80 of the draft, there are no Indian trust resources in the North Unit - these lands are not held in trust by the secretary of the interior for the benefit of Indians due to their status as Indians. Nothing in this plan would affect trust resources or the use and management of the South Unit.
2. Negotiations are continuing on the management of the South Unit. As you noted, the South Unit poses great opportunities for the National Park Service and the Oglala Sioux Tribe. Although we would expect that overall management of the North and South Units would be integrated and consistent, we cannot state at this point to what degree they will be integrated or independently managed. We have allocated funds to start a general management plan for the South Unit this fiscal year and will work closely with the tribe throughout the planning process. With regard to the cited reference to the South Unit, this text should not have been included in the draft document and has been deleted in the final plan.
3. As noted on p.14, the National Park Service will work closely with tribal governments whose programs affect or are affected by the activities in the park.

COMMENTS

RESPONSES

Page 2

- 4. Figures in the document should depict the Pine Ridge Reservation boundary beyond its intersection with the White River. The South Unit and Stronghold Unit are one in the same and should be clarified between figures and text.
- 5. A specific road realignment suggestion for the Cedar Pass in each of the Alternatives is not consistent with later environmental analysis pursuant to the National Environmental Protection Act. If proper alternatives are to be analyzed in a future action, selection of a preference should not be taken in this document. In the future analysis of the Cedar Pass realignment, the use of wildlife crossings to decrease habitat fragmentation and other wildlife impacts should be investigated.
- 6. The analysis should include how increasing visitor education may have impacts from more use of areas of interest in the Park that were previously unexplored by visitor due to limited education opportunities. This may also have a beneficial impact on the Park's resources by dispersing visitors more.
- 7. The impacts from "social" trails should include potential erosion in sensitive areas because of these unplanned or mitigated trails.
- 8. The use of the prescriptions for management of sensitive areas, like sheep lambing habitat, should be explained.
- 9. Changes related to expansion of bison range should be documented such as potential expansion of prairie dog colonies with the introduction of a grazer. This could also impact the black-footed ferret population.
- Specific Comments**
Page 8, Direction for the Plan, first sentence – considered is misspelled.
- 10. Page 9, Badlands National Park Legislation and Special Mandates, second paragraph, last sentence – should be changed to "The lands in the reservation are lands held in trust by the U.S. Government for the Oglala Sioux Tribe and are administered by the National Park Service."
Page 17, Geologic Features, fourth bullet – "or when or intervention" needs to be changed to "or when intervention".
Page 17, Paleontological Resources, fourth bullet – assume "to" is missing from between "continue" and "educate".
- 11. Page 18, Threatened or Endangered Species – Are there species of concern to the Oglala Sioux Tribe that are being considered in the management of the Park?

- 4. We have corrected the maps in the final document to show the reservation boundary extends beyond the White River. Regarding the South Unit and Stronghold Unit names, the South Unit encompasses both the Stronghold and Palmer Creek Units. To clarify this, we have added the name South Unit in parentheses after the Stronghold and Palmer Creek Unit names on the maps.
- 5. We believe it is appropriate to select a general corridor as part of this conceptual, programmatic General Management Plan / Environmental Impact Statement (GMP/EIS). As stated on p.32 of the draft document, it is necessary to include the selection of a broad corridor because it would be difficult to move forward with the general management plan without this information - the road corridor will have a major effect on planning for the park, including zoning and planned uses of the park. A subsequent NEPA document, tiering off this EIS, will examine in more detail all of the potential future corridors and alignments, as well as such questions as wildlife crossings. We have clarified in the final plan that for purposes of analysis each alternative assumed a particular road corridor would be developed but that other alignments may be evaluated in the future. The GMP/EIS does not constrain the subsequent NEPA document in its analysis of alternative corridors. If a corridor were to be selected that differed from the corridor identified in this plan, then an amendment to the general management plan may be required. See also the general response to the EPA concerning the level of detail.
- 6. Although alternative B would increase the number of locations where visitors could obtain park information, and increase information for pre-trip planning, we do not believe this would necessarily result in increased use and more impacts in more areas. Most visitors would continue to stay in areas with existing or new infrastructure (e.g., trails), which was evaluated in chapter 4 in the Draft GMP/EIS - the park's geography, remoteness, and infrastructure, the type of visitors that come to the park, and the experiences visitors are seeking largely limits where people go in Badlands. Increased use also does not necessarily mean there would be increased adverse impacts on resources in unused portions of the park, nor does more dispersed use mean beneficial impacts would necessarily occur.
- 7. There are very few designated trails in the North Unit, and only a few social trails. (Most people follow bison trails in areas without trails.) We are not aware of any human-caused social trails being in sensitive areas, nor do we expect this to change. Thus, we do not agree that the discussion of impacts from social trails needs to address the potential for increased erosion in sensitive areas.

COMMENTS

RESPONSES

-
- 8.** Sensitive areas such as sheep lambing habitats would most likely be included in preservation or natural area/recreation zones. As described on pages 35 and 37 of the draft document, the emphasis in both of these areas would be on preserving or restoring native species and natural processes, and there would be a low to very low tolerance for resource modifications and degradation. In addition, the management principles and strategies described on pages 15-19 would also apply to the management of sensitive areas.

 - 9.** Comment noted. Under alternatives B, C, and D, the proposed boundary adjustment along the west side of the North Unit would provide for expansion of the park's bison range. However, the area being proposed for addition to the park is currently grazed by cattle. We would be replacing the cattle with bison, and we would expect that the resulting grazing pressure would be less than it is currently. Thus, we do not agree that the introduction of the bison will impact the black-footed ferret population. But as we pointed out in the environmental consequences chapter of the draft document, the proposed additional would add prairie dog towns to the park and protect additional potential black-footed ferret habitat (e.g., see pages 151, 152).

 - 10.** We have corrected the text in the Final GMP/EIS as you noted.

 - 11.** We are not aware of any federal or state-listed threatened or endangered species that are of concern to the Oglala Sioux Tribe, nor has the tribe advised us of any concerns.

COMMENTS

RESPONSES

	Page		
12.	Page 18, Threatened or Endangered Species – There are two tribes, Rosebud Sioux and Cheyenne River Sioux, which have reintroduced black-footed ferrets who should be partnered with in addition to the Federal and State agencies.		12. It is the role of the U.S. Fish and Wildlife Service to coordinate all the various black-footed ferret reintroduction efforts. We participate as a partner of the Black-footed Ferret Recovery Implementation Team, which coordinates the efforts of all federal, state, tribal (including the Rosebud River Sioux and Cheyenne River Sioux) and non-profit governmental groups that involved with the reintroduction efforts. To clarify this point, we have revised the text on p.18 in the Final GMP/EIS to note that we will continue to work with the American Indian tribes, as well as others, on the black-footed ferret recovery effort.
13.	Page 19, Wildlife and Fish, fifth bullet – Not sure why the Park would specifically exclude gray wolf or grizzly bear restoration if want to rely on ecological processes to control populations of native species. While no restorations of these species is presently being pursued there may come a time when it may be pursued by others nearby and this would preclude the Park from participating.		13. Comment noted. As you noted, we support the restoration of ecological processes and native species of the Great Plains/Badlands ecosystem. But without a substantial change in the land uses around the park, it is not feasible to successfully reintroduce the gray wolf or grizzly bear in the park – Badlands National Park does not contain enough habitat to successfully reintroduce these species. Thus, it is not our intention to pursue these restoration efforts at this time. Given our limited funds and staff, and the major difficulties in successfully reintroducing these species in the park, we believe our resource management efforts would be better spent in other areas.
14.	Page 35, Table 1 – There are a number of erroneous punctuations throughout the table.		14. Comment noted. "Molder" is the term we use in referring to the decay of cultural resources in our plans.
15.	Page 35, Table 1 – In the interest of common language, the use of the word "molder" should be changed to "decay".		15. We have checked the entire draft and have deleted all inappropriate references to the South Unit in the Final GMP/EIS.
16.	Page 65, Table 7 – There are a number of erroneous punctuations in the table. There are a number of references to the South Unit management that should be removed from the Table.		16. We have corrected the error in the table.
17.	Page 70, Table 7, Historic Buildings and other Structures – Prairie Homestead acquisition text is incorrectly identified in Alternative B.		17. We have deleted the statement that sylvatic plague has not been documented in prairie dogs in South Dakota.
18.	Page 93, black-tailed prairie dog, sixth paragraph – sylvatic plague has found in prairie dogs on the Pine Ridge Reservation. Coyotes have been found with exposure to plague near the Park.		18. We have revised the text to note that the South Unit lands held in trust also include individual Indians as you noted.
19.	Page 109, Population, third paragraph – The lands are held in trust by the U.S. Government for the Oglala Sioux Tribe and individual Indians.		19. We have corrected this error in the Final GMP/EIS.
19.	Page 156, Analysis, first paragraph – acquisition of the Prairie Homestead was not described in the description of Alternative B.	Please contact Diane Mann-Klager, Wildlife Biologist at (605) 226-7621 or Marilyn Bercier, Environmental Protection Specialist, at (605) 226-7656 if you have any questions.	



cc: President, Oglala Sioux Tribe
 Director, Oglala Sioux Parks and Recreation Authority
 Superintendent, Pine Ridge Agency

COMMENTS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8

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Received DSC-P

DEC 1 2005

Ref: 8EPR-N

NOV 30 2005

William Supernaugh, Superintendent
Badlands National Park
P.O. Box 6
Interior, SD 57750

National Park Service
Attn: Badlands Planning Team
P.O. Box 25287
Denver, CO 80225

Re: Draft General Management Plan and DEIS
North Unit of Badlands National Park, SD
CEQ #20050445

Dear Mr. Supernaugh and Badlands Planning Team:

The U.S. Environmental Protection Agency Region 8 (EPA) reviewed the Draft General Management Plan (GMP) and Draft Environmental Impact Statement (DEIS) for the North Unit of the Badlands National Park, South Dakota. Our review of the DEIS is in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act to evaluate the overall impacts to human and natural environments.

Project Summary

The Preferred Alternative, Alternative B, proposes to expand visitor opportunities, place 53 percent of the Park in the preservation zone and 23 percent in the natural area / recreation zone. In addition, two additional areas totaling 9,900 acres are proposed for addition to the Park including the purchase of over 7,400 acres of private land from willing sellers, to protect natural resources, wilderness values, and visitors' use. Additions to the Park also would protect wildlife habitats for black-tailed prairie dog and endangered black-footed ferrets that depend on dog towns, bison, and other wildlife. Road construction, including proposed new road alignment through the Park for visitors, is possible after completion of the GMP.

Environmental Concerns

Air quality impacts. Please disclose in the Final EIS the existing and proposed plans to reduce vehicle travel and minimize construction and maintenance activities that can contribute air quality impacts. Long-term impacts were noted for construction and maintenance activities and from vehicle emissions. The DEIS included qualitative evaluation of the potential impacts

1.

RESPONSES

Responses to the EPA

General Responses to Comments

Most of the environmental concerns in your letter relate to the development of the new Loop Road alignment in the Cedar Pass area and to the level of detail provided in the Draft GMP/EIS, the need for mitigation measures, and future NEPA compliance. In the Final GMP/EIS we have stressed that impacts of the new road on park resources will be avoided whenever possible.

Level of Detail. NPS general management plans (GMPs) are intended to be long-term, programmatic documents that establish and articulate a management philosophy and framework for decision making and problem solving in parks. Because of their conceptual nature, they do not go into detail in describing site-specific developments and related mitigation measures and environmental impacts. Such detailed planning and analysis are addressed in future implementation plans and accompanying environmental documentation, prepared in accordance with NEPA requirements.

As the Draft GMP/EIS notes in several places (see pages 24, 32, and 115), this GMP was intended to provide broad guidance for the future of the Loop Road and that further planning, design, and environmental analysis will be necessary before the realignment of the road can occur. The alternatives in the Draft GMP/EIS only present conceptual corridors as a first phase of tiered planning in order to facilitate zoning of the park and to ensure that the corridor that is selected is consistent with overall management direction laid out in the GMP. Details on the specific location and design of the road alignment, necessary mitigation measures, best management practices (BMPs), and likely impacts cannot be answered at this time and must await future planning and analysis. Thus, we cannot answer many of your questions and suggestions, such as disclosing actions that can be taken to reduce wildlife mortality through road alignment and infrastructure design methods - such detailed management actions we believe are inappropriate in a conceptual GMP/EIS like the Badlands plan. As noted on pages 32 and 115, a site-specific NEPA document, tiering off the GMP/EIS, will be prepared before constructing a new road.

Need for Mitigation Measures. The Draft GMP/EIS included some general mitigation measures (see pages 59-61). We have noted that new facilities will avoid wetlands and riparian areas wherever possible in the final document. But as noted above, a subsequent NEPA environmental document will explore in more detail relevant air, water, soil, vegetation, and other mitigation measures for construction of the road and other associated facilities. Please be assured that appropriate BMPs will be called for and used during all construction and maintenance activities associated with all new construction.

COMMENTS

1. (DEIS, pp. 141-142) and the proposed shuttle system's potential to improve visitor experiences and environmental management (Appendix B). However, we did not note planning strategies to reduce or minimize road miles and vehicle travel, based on new facilities siting, connecting existing facilities by footpaths, and other measures to reduce additional vehicle emissions and roads. Presuming information is available, please incorporate it in the Final EIS.

2. *Soil erosion and vegetation impacts.* Please describe and incorporate available best management practices (BMPs) that will be used for all construction activities related to road construction and maintenance, construction and maintenance of visitor facilities, and new trails and routes. The EPA appreciates the qualitative evaluation of the potential impacts to soils and vegetation. The DEIS projects the potential for moderate to major long-term impacts to both resources (e.g., page 144). Because of that disclosure, we suggest that BMPs, avoidance and mitigation measures, and any other actions which can reduce or eliminate those adverse impacts be discussed in the Final EIS.

3. Regarding possible realignment of the Loop Road and moving the road alignment for safety and other reasons, we would appreciate a short summary of the Federal Highway Administration's 2002 study and other available environmental information in the Final EIS. The BMPs, design characteristics (e.g., bicycle lanes and sight distances), aesthetic qualities, safety for Park visitors, and other features of highway construction may be unique for Park purposes and perhaps require more stringent design and construction BMPs than other highway construction, for frequent turnouts, visitor facilities, and other Park features. It would be helpful to better understand what the Park proposes for new road construction or modifications to existing roads. If this document will be used for NEPA 'tiering' for road construction (for example, if an Environmental Assessment is envisioned for road construction and reconstruction instead of an EIS), based on this GMP/EIS, extensive information regarding potential environmental effects and mitigation should be included if less NEPA clearance such as an EA is expected for road construction. On the other hand, if an EIS will be prepared for future road construction, a short summary of proposed road actions and their potential effects would suffice.

4. *Water resource impacts.* We ask that in the Final EIS there be some evaluation of the potential for adverse water resource impacts. Based on the paragraph describing why water quality was not evaluated in the DEIS (pp. 77-78), EPA understands that natural erosion and sediment delivery to stream channels is a major characteristic of the badlands ecosystem. However, we have some concern that omission of water resources from evaluation in the DEIS has the potential to overlook impacts to potentially important aquatic resources, migratory birds, and other organisms in riparian habitats and ephemeral streams, for example. If those are not significant concerns, please explain why in the Final EIS. Possible construction and maintenance activities, visitor use, water use and treatment, and other activities can affect water resources other than their physical and chemical quality, and localized impacts could be significant.

As we noted, BMPs are expected for all construction and maintenance activities to minimize or mitigate potentially adverse impacts. We noted that the National Park Service will implement those practices to the extent practicable (e.g., p. 78).

RESPONSES

Future of NEPA Compliance. Regardless of whether an EA or EIS is prepared, a future site-specific NEPA document on the new road alignment will provide extensive information on design, identify specific mitigation measures and BMPs, and provide a detailed environmental impact analysis focusing on the effects of the road. As noted above, we cannot do this now. See also response 5 to the Bureau of Indian Affairs.

Specific Responses to Comments

1. You noted transportation planning strategies to reduce or minimize road miles and vehicle traffic, based on new facility siting and connecting existing facilities by footpaths, were missing from the GMP. Given the nature of Badlands National Park and the use it receives, it is not realistic or practical to consider such measures. Badlands is a remote park, and most of the use it receives, and will likely receive in the foreseeable future, is by day users in personal vehicles who drive through and spend a relatively short time in the park. Most visitation occurs during the summer months, and use levels have not been increasing. There are few facilities in the park, which are concentrated in two areas, and the NPS preferred alternative proposes few new facilities. We also do not believe there are other roads in the park that are unneeded for visitor access, park maintenance, or local resident access that can be closed down or relocated.

Aside from the new road, the actions in the preferred alternative would be expected to result in negligible to minor and localized air quality impacts. Impacts due to the new road will be evaluated in depth in a subsequent NEPA document. As noted above, proposals to reduce vehicle traffic are not considered to be realistic in a park like Badlands.

2. The moderate to major impacts on soils described in the Draft GMP/EIS were due to road construction; impacts from other actions proposed in the preferred alternative were minor to moderate in localized areas. The draft document did include some general mitigation measures that would be taken (e.g., covering or seeding disturbed areas, replanting areas with native plant species). But even with mitigation and the use of BMPs, the construction of a new road would still be expected to result in unavoidable moderate to major impacts in the project area. We have noted in the analysis in the Final GMP/EIS why moderate-to-major impacts would likely occur along the road corridor even with mitigation efforts (i.e., soil impacts would occur due to the disruption of soil profile by construction equipment, and the loss of soil due to construction of the road surface). See also the response to the general comment on the need for mitigation measures.

COMMENTS

RESPONSES

3. With regard to the 2002 Federal Highway Administration (FHWA) report, as noted on p.32 this reconnaissance study strictly focused on identifying potential broad corridors for realigning the Loop Road to avoid geologically unstable areas from an engineering perspective. It did not address potential impacts of the alignments, propose design and construction BMPs, or provide additional environmental information that would be helpful in understanding the nature of the new road.

Concerning your points on the BMPs and NEPA tiering, see the responses to the general comments on the need for mitigation measures, level of detail, and the future of NEPA compliance.

4. As we noted in our dismissal of water resources (including water quality, wetlands, and floodplains) as an impact topic in the Draft GMP/EIS, we do not anticipate impacts occurring to these resources (see pages 77-78). Surface water resources and riparian areas are scarce in Badlands National Park. Riparian areas with important aquatic resources, including important migratory bird habitat, do not occur in areas proposed for development in the North Unit. Water that does occur in the park is usually ephemeral, occurring after storms and spring melt, and is not potable due to naturally occurring dissolved minerals and very fine sediment. It is possible that some ephemeral drainages might be affected by the new road, but we cannot evaluate the impact because it depends on the specific location of the alignment. We have added to the text in the Final GMP/EIS that to the extent possible riparian areas and water resources will be avoided, and we will address potential impacts in more detail when more information is available on the specific alignments being considered for the road.

With regard to minimizing new trails and other disturbances in highly sensitive areas, we are not proposing such actions in the preferred alternative, and the application of appropriate mitigation measures (e.g., surveying sites for rare plants before constructing developments, designating new visitor routes to avoid sensitive areas) should minimize impacts that do occur.

COMMENTS

RESPONSES

<p>4. cont.</p> <p>Please provide assessment or response to concerns about whether roads and stream crossings may contribute to wildlife habitat alteration and fragmentation, particularly at stream crossings or along stream channels.</p> <p>Please address potentially adverse riparian impacts, if any, in the Final EIS. If adverse impacts are expected, develop measures to avoid or mitigate them. Riparian areas in the arid western United States are a concern to the EPA. Undisturbed, functioning riparian areas are increasingly scarce, valuable ecological resources that provide water quality protection and hydrologic functions, fish and wildlife habitats, recreation, nutrient cycling, and many other benefits. For highly sensitive areas prone to off-trail exploration or other activities that can cause cumulative impacts, we recommend minimizing new trails and other disturbances in those areas. Impacts in riparian areas from additional trails and recreation may cause greater wildlife disturbances, particularly to nesting birds. Numerous studies have demonstrated adverse impacts to nesting birds. Additional development in riparian habitats should be avoided or minimized to protect them and the abundant wildlife that they support. We trust that BMPs will be used for construction activities for infrastructure and trails, but consider avoidance first, where feasible.</p>	
<p>5.</p> <p><i>Potential Wildlife Impacts.</i> In addition to our comments above related to riparian resources and road and facilities construction, please evaluate disturbance and mortality of wildlife from existing roads and from visitor travel and activities and how those adverse impacts can be reduced by management actions such as road alignment and infrastructure design.</p> <p>The EPA notes and appreciates the potential for new land purchases to provide additional Park lands that provide additional visitor opportunities and that secure habitat for black-footed ferret, bison, and other wildlife.</p> <p><i>EPA Recommendation.</i> We suggest the following information and actions in the Final EIS:</p>	<p>5. As with the other natural resources, most of the proposed actions in the preferred alternative would result in negligible to minor adverse impacts on wildlife populations and habitats in localized areas. Most of the impacts from the new road under the preferred alternative would also be expected to be minor to moderate. As noted in the mitigation measures (p.60), to the extent possible new facilities such as the road would be sited to avoid sensitive wildlife habitats. The future NEPA document on the new road section will explore in more detail habitat management and mitigation practices, including road alignment and infrastructure design, to limit impacts on wildlife. Although there likely is some disturbance and mortality of wildlife occurring on existing roads, existing data and the professional opinion of the park's natural resource managers indicate that such impacts are not adversely affecting park wildlife populations beyond a minor level. See also the above response to the general comment on the level of detail.</p>
<p>6.</p> <ul style="list-style-type: none"> ● Provide some evaluation, qualitative if sufficient, for potential adverse impacts to water resources from proposed construction and new recreation activities. Such evaluation should inform the differences among the alternatives for protecting water resources and assure that potentially adverse impacts to them are avoided first, minimized, or as a last resort mitigated. Quantified estimates of expected impacts, if any, would provide greater information for public disclosure and decision-making, again with an understanding of the differences among the alternatives as they may affect water resources. 	<p>6. See response 4.</p>
<p>7.</p> <ul style="list-style-type: none"> ● Consider evaluating and disclosing habitat management and mitigation practices for important wildlife habitats for species such as black-footed ferret, swift fox, or other sensitive species such as bighorn sheep and migratory songbirds. Especially for species with documented declines in the Park or nearby areas, we would appreciate understanding the potential to avoid or mitigate the adverse impacts that are listed for wildlife (e.g., p. 150). A better understanding of the proposed Cedar Pass / Loop Road segment would better inform decision-making and the public about mitigation measures and careful design that are mentioned as part of the Preferred Alternative (p. 150). 	<p>7. See response 5 and the responses to the general comments concerning the level of detail.</p>

COMMENTS

RESPONSES

8.

- To reduce cumulative effects – air emissions, erosion, sedimentation, wildlife habitat fragmentation – we encourage travel management actions in the Final EIS, if feasible and necessary. Closing, oblitterating, or relocating existing roads that are unneeded for visitor access or Park maintenance has the potential to reduce cumulative impacts to soil resources, water quality, wildlife habitats, and recreation resources.

EPA'S DEIS Rating

The EPA evaluates the potential effects of proposed actions and the adequacy of the information in a DEIS. The DEIS is rated "EC-2" (environmental concerns, insufficient information) under EPA's ratings criteria (enclosed). The "EC" rating means that the Preferred Alternative does not require substantial changes, but EPA has identified environmental impacts that should be avoided to fully protect the environment. The EC rating is based on EPA's concerns regarding potential adverse impacts to air quality, water resources, soils, and wildlife habitats from the Preferred Alternative.

9. The potential for significant environmental degradation can be reduced by modifying the project to reduce the overall impacts from road and other facilities' construction and maintenance activities, particularly in important wildlife habitats and sensitive-soil areas. That may require only clarification of how new road and visitor facility construction will be designed and implemented to minimize those potential impacts. We trust that appropriate BMPs will be used for all construction and maintenance activities.

The "2" rating means that the DEIS lacked sufficient information to understand all potential water resource effects and to minimize or fully mitigate potentially adverse impacts to soils, water, wildlife, and other resources. Impacts to those resources could be quantified and better described in the Final EIS, including avoidance or disclosure of mitigation measures for those impacts that are unavoidable.

If you have any questions or would like to discuss our comments, please contact Brad Crowder of my staff at (303) 312-6396 or by email at crowder.brad@epa.gov.

Sincerely



Larry Syoboda
 Director, NEPA Program
 Office of Ecosystems Protection and
 Remediation

8. See response 1.

9. We believe that specific details on how to reduce potential impacts due to the new Loop Road should be addressed in a future project-specific NEPA document. See the responses to the general comments concerning the level of detail, the need for mitigation measures, and future NEPA compliance.

COMMENTS

RESPONSES

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements

Definitions and Follow-Up Action*

Environmental Impact of the Action

LO -- Lack of Objections: The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC -- Environmental Concerns: The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO -- Environmental Objections: The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU -- Environmentally Unsatisfactory: The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 -- Adequate: EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 -- Insufficient Information: The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 -- Inadequate: EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

RESPONSES

COMMENTS

Responses to USDA-APHIS



Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

P O Box 250
Pierre, SD 57501
605/224-1713
605/224-0172 fax

October 21, 2005

RECEIVED
OCT 25 2005
DSC-P

National Park Service – Denver Service Center
P.O. Box 25287
Denver, CO 80227

Attr: Badlands Planning Team

We have received the draft Environmental Impact Statement and General Management Plan for the North Unit of the Badlands National Park. This document shows considerable evaluation and analysis in formulating a long term management plan. Because of the long range nature of this plan we would like to offer the following comments to help improve its content and accuracy.

1. First, page 204 lists the different agencies and organizations that this document was distributed to. Although our agency USDA-APHIS, PPQ received a copy we were not listed under the U.S. Department of Agriculture. Please include our agency in the listing. Also please be advised that within APHIS we have sister agencies, i.e. Wildlife Services and Veterinary Services that likely would offer comments. If you need their addresses we can help.

2. Secondly, in the Affected Environment section the Park Service painstakingly listed nineteen species of butterflies under the Insects portion. Yet when mentioning grasshoppers and crickets, the document states "Several species of grasshoppers and crickets (Orthoptera) are common in the park". Since our agency is actively involved with rangeland grasshopper surveys that cover the entire western half of South Dakota, we can assure the Park Service that more than several species of grasshoppers can be found within the north unit of the Badlands National Park. We have census data taken over a four year period from the nearby counties: Pennington, Jackson, and Shannon, which shows up to seventeen different grasshopper species. Some of these species are unique and would have a narrow host range. To insure completeness of this long range management plan, we request that all grasshopper species be listed that would be found in the north unit.

If we can be of help or assistance in this effort, please let us know.

Sincerely,

J. Bruce Helbig
State Plant Health Director – SD

cc: William R. Supernaugh

1. We have included APHIS under USDA in the list of agencies and organizations that the document was distributed to.
2. We do not believe it is necessary in the "Affected Environment" chapter for a general management plan like this one to list all the species that occur in a national park. (There are many other invertebrates that occur in the park that we are not listing here.) We also do not have an inventory of all the grasshopper species that occur in the North Unit - even though there are up to 17 different species in the three counties you noted, they may not all occur in the park. However, we have changed the text on p.94 to state that many species of grasshoppers and crickets are common in the park.

COMMENTS



Department of Tourism and State Development

30 January 2006

National Parks Service
Attn Badlands Planning Team
Denver Service Center
PO Box 25287
Denver CO 80225-0287

Attn. Badlands Planning Team:

The South Dakota State Historic Preservation Office (SHPO) would like to take this opportunity to comment on the proposed alternatives identified in the draft *General Management Plan/Environmental Impact Statement for the Badlands National Park North Unit*.

In the draft, Alternative B was identified as the preferred alternative. While the SHPO is in support of the overall objectives of this alternative, we would also like to stress the importance of resource protection identified in Alternative C. The acquisition of Prairie Homestead under this alternative would protect this valuable resource and offer an excellent interpretive opportunity for the park. Furthermore, the emphasis on resource protection would minimize the potential damage or loss of cultural materials, which may see an increased threat if hiking trails and routes are expanded under the preferred alternative. The SHPO also feels that closing parts of the park known to be culturally sensitive will not in itself detract from the overall quality of visitor opportunities.

The SHPO can appreciate the complex planning process in place in establishing and identifying a preferred alternative. However, the protection of the archeological, cultural, and historic resources within the park could be strengthened in the preferred alternative without compromising the objectives identified or significantly reducing the goal of increasing the range of opportunities for visitor experiences. Thank you for the opportunity to comment on the draft *General Management Plan/Environmental Impact Statement for the Badlands National Park North Unit*.

Sincerely,

Jay D. Vogt State Historic Preservation Officer

Chris B. Nelson

Historic Preservation Specialist

Office of Tourism
Governor's Office of Economic
Development
Tribal Government Relations
711 E. Wells Ave. / Pierre, SD 57501-3368
Phone: 605-773-3201 / Fax: 605-773-3256
travel@sd.com / sdgovaffairs.com /
sdtribalrelations.com

South Dakota Arts Council
800 Governor Dr. / Pierre, SD 57501-2264
Phone: 605-773-3181 or 1-800-423-6888 in S.D.
Fax: 605-773-6562
sdac@state.sd.us / sdarts.org

South Dakota State
Historical Society
900 Governor Dr. / Pierre, SD 57501-2217
Phone: 605-773-3468 / Fax: 605-773-6041
sdhistory.org

South Dakota Housing
Development Authority
PO Box 1237 / Pierre, SD 57501-1237
Phone: 605-773-3181 / Fax: 605-773-5154
sdhda.org



RESPONSES

Response to the South Dakota State Historic Preservation Office

1. We believe that alternative B would continue to protect the park's cultural resources. As noted on page 31 of the draft document, under all of the alternatives the park would be managed according to statewide mandates and policies and special mandates. All of the strategies described on page 21 would be followed under alternative B. Although some trails and routes may be established under this alternative, we do not believe they would damage cultural resources - no potential impacts to traditional cultural properties were identified resulting from the alternative. However, please be assured that the park staff would continue to consult with your office as the GMP is implemented to ensure that cultural resources are protected to the greatest extent possible.

With regard to the Prairie Homestead, we have revised our direction in the Final GMP/EIS. We believe the Prairie Homestead property has many values and additional study is needed. Upon approval of the final plan, we will be seeking additional funding to prepare this study.



January 10, 2006

National Park Service - Denver Service Center
 Attn: Badlands Planning Team
 P.O. Box 25287
 Denver, CO 80225-0287

RE: Draft Environmental Impact Statement/General Management Plan for the North Unit of Badlands National Park

Dear Badlands Planning Team,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement/General Management Plan for the North Unit of Badlands National Park. Please accept these comments on behalf of the 490,000 members and supporters of Defenders of Wildlife.

America's Great Plains is the most under-represented region within the National Park Service (NPS). Badlands National Park is the largest NPS Unit within the region. This makes Badlands incredibly significant to our nation. It is, for example, one of the only publicly-owned places where people can see a fully-protected, livestock-free Great Plains ecosystem with an almost-complete assemblage of native flora and fauna. It also contains the largest official wilderness area in the Great Plains which offers a unique recreational opportunity not found anywhere else.

Badlands National Park is also very significant to the local and regional economy of western South Dakota. Protecting the Park environment to maintain the tourism and recreational opportunities that now exist and expanding the Park boundaries to allow development of additional tourism and recreational opportunities are in the best interests of the local economy and of future visitors to the Park.

Defenders of Wildlife supports Alternative C. Alternative C protects the existing Park environment while allowing for development of additional tourism and recreational opportunities that would give visitors more reasons to stay longer. Alternative C:

- maintains the wilderness experience by protecting designated wilderness from development of trails and other facilities;
- protects the important wildlife corridor at the southwest corner of the North Unit from possible future trail and facility development;
- allows Congress to consider Park expansion through land acquisition from all three adjoining willing sellers, including the Prairie Homestead interpretive site; and
- proposes a shuttle system that would increase visitor recreational opportunities while also protecting the Park environment.

Colorado Office
 1425 Market Street
 Suite 225
 Denver, CO 80202
 Telephone: 303-825-0918
 Fax: 303-825-0594

National Headquarters
 1130 Seventeenth Street, NW
 Washington, DC 20036
 Telephone: 202-682-9400
 Fax: 202-682-1331
 www.defenders.org

COMMENTS

RESPONSES

Responses to Defenders of Wildlife

Defenders of Wildlife cannot support the preferred Alternative B as written in this draft. While we agree with expanding visitor opportunities at Badlands (in fact, we would like to see some additional visitor opportunities added to Alternative B), we are concerned with the impact of two development possibilities found in Alternative B:

- proposed and/or allowable development of trails in designated wilderness areas; and
- proposed and/or allowable development of trails and facilities in the important wildlife corridor at the southwest corner of the north Unit.

Due to these issues, Alternative B is not consistent with the National Park Service's many policies and mandates – including the National Park Service Organic Act and the reaffirming Redwood Act – that clearly favor resource protection over all other uses.

Alternative B also misses a few good opportunities. Alternative B lacks:

- the proposed boundary expansion to include Prairie Homestead even though there is a willing seller, the property houses a significant interpretive site, and the property is important for maintaining the open vistas in the exact location where most visitors first enter the Park;
- additional boundary expansion proposals on the north boundary of the Park to include other areas important to maintaining the expansive open vistas that are so important to the Park;
- wilderness recommendations; and
- a demonstrations shuttle system.

We believe that Alternative C is in fact the environmentally preferable alternative. The Draft EIS lists Alternative B as the environmentally preferable alternative only because the zoning of Alternative B is less restrictive than Alternative C. It is argued, therefore, that Alternative C does not allow as wide a range of uses as would Alternative B. We would argue, however, that just as with the concept of “multiple use” on the adjacent National Grassland a “wide range of uses” does not mean every use in every area. Restrictive zoning in fact allows for a wider range of uses of the Park.

For example, by allowing development of trails in Sage Creek Wilderness – the largest and most significant wilderness in the entire Great Plains (and currently trail-free) Alternative B would reduce the range of uses by eroding the ability to experience a large, trail-free wilderness. Alternative C, however, would maintain this trail-free wilderness opportunity

and also create new opportunities not found in Alternative B, such as the proposed shuttle system. A shuttle would allow hikers to use trails located in the northeast portion of the park and then be able to catch a ride back to the car or campground. In these ways, Alternative C would maintain existing opportunities, add new opportunities, and even improve the environment by reducing traffic within the park. In addition, Alternative C would protect the important bighorn sheep migration corridor found in the southwest portion of the North Unit whereas Alternative B would allow development here for heavier use by the public, which could interfere with wildlife movement through this corridor.

1. We disagree with your assertion that alternative B is not consistent with NPS policies and mandates. As noted on pp. 13-21, a number of guiding principles and strategies, based on legal mandates and NPS policies, would continue to shape the way Badlands would be managed under all of the alternatives, including alternative B. Ecosystem management, protection of natural and cultural resources, protection of wilderness qualities, and monitoring and management of visitors to avoid resource impacts would all occur under alternative B. With these principles and strategies we believe it is possible to fully protect the park's resources and still provide additional opportunities for visitors as called for under alternative B.

2. We disagree that alternative C is the environmentally preferable alternative. As noted on pp. 62-63, when all six national environmental policy goals expressed in Section 101 of the National Environmental Policy Act are examined, we believe alternative B surpasses the other alternatives in realizing the full range of policy goals. We are not proposing "every use in every area" in alternative B, but rather that it provide the opportunity for a wider range of acceptable visitor uses in more areas than would alternative C. We also do not believe it is true that restrictive zones necessarily allow for a wider range of uses of the park. See also response 6 below.

3. With regard to providing trails in the Sage Creek Wilderness, we disagree that including all of the Sage Creek Wilderness in the preservation zone would reduce the range of uses by decreasing the opportunity for visitors to experience a trail-free wilderness. There are many trails created by bison in parts of the wilderness. Indeed, we believe designating trails would allow more people to enjoy part of the wilderness without degrading wilderness values. Trails in fact are an allowed facility in wilderness areas. Designated trails can help manage visitors and reduce impacts in the wilderness area, such as the creation of social trails, and avoid sensitive resource areas. We should also point out that the vast majority of the wilderness area would not have maintained trails.

4. Given the levels of visitation Badlands receives and the types of visitors that come to the park, we do not believe the system would substantially reduce traffic within the park. Shuttle systems are expensive to develop, operate, and maintain. With the current constraints on federal government spending expected to last for the foreseeable future, we believe funds that would be used in such a system could be put to better use in managing the park's resources and providing visitor services.

5. We are not proposing new developments that result in heavier public use in the southwest part of the North Unit. It is true that the natural area recreation zone would allow trails to be built in this area in the future. But we do not believe that if

RESPONSES

5. such a trail(s) were built it would interfere with the movement of bighorn sheep and other wildlife in this area. We would not expect heavy use of this area by the public. We would also locate a trail(s) to avoid or minimize impacts to wildlife. Thus, we do not believe it is necessary to include this area in a preservation zone.

6. We do not agree that your proposed changes to alternative B would make it the environmentally preferable alternative. See response 3 on zoning of the Sage Creek Wilderness, response 4 on the shuttle system, response 5 on the bighorn sheep wildlife corridor, response 7 on proposing additional areas for wilderness designation, and response 8 on proposing additional expansion of the park boundary.

With regard to adding the Prairie Homestead interpretive site to the park in alternative B, see response 1 to the South Dakota State Historic Preservation Office.

7. Designating additional wilderness in Badlands National Park was not raised as an issue during the general management planning process. Although the U.S. Forest Service recommended wilderness in the Indian Creek area, we are under no obligation to propose the adjacent Sheep Mountain area for wilderness. Congress has already designated wilderness in this park, and the National Park Service studied wilderness for the park back in 1973 when it completed an environmental statement on designating wilderness in the park. We also wish to point out that much of the roadless portion of the Sheep Mountain Table area would be included in preservation and natural area recreation zones, which generally would be managed in a manner consistent with wilderness.

8. We are not currently aware of, nor have reason to expect, major changes in land uses adjacent to the North Unit's northern boundary that would likely affect the area's viewshed and vistas. Nor are we aware of landowners willing to sell or donate their land to the park. With our existing knowledge, we believe our limited dollars would be best spent on acquiring the two areas proposed under alternative B. If new developments were to be proposed in the future that might affect the park's viewshed, we would work with the landowner(s) to avoid or minimize the visual impacts on the park.

COMMENTS

Our proposal for an improved final preferred Alternative B

Alternative B contains some positive ideas that are not included in the other alternatives. For example, the proposal to coordinate with Rails-to-Trails to convert the rail route along SD 44 to a bicycle trail would be a new recreational use that would attract more visitors. The outdoor classrooms would enhance visitors' experience and understanding of the ecology of the region. And the research area along Sage Creek would better protect this area's heavy concentration of fossils.

Defenders of Wildlife would support Alternative B with a few changes. We ask that you revise draft Alternative B in the following ways to make it the environmentally preferable alternative and one that all of us can support:

- maintain the existing high-quality wilderness experience found in the Sage Creek Wilderness by including the entire wilderness area in the "preservation zone" which would prevent development of trails and other facilities;
- protect the important bighorn sheep wildlife corridor at the southwest corner of the North Unit from possible future trail and facility development by including this narrow area -- as well as any portion of the Kudrva/USFS boundary expansion properties that are used by bighorn sheep -- in the preservation zone;
- allow Congress to consider Park expansion through land acquisition from all three adjoining willing sellers, including the Prairie Homestead interpretive site from Alternative C;
- consider additional boundary expansion on the north boundary of the Park to include other areas important to maintaining the expansive open vistas that are so important to the Park;
- identify and nominate areas for wilderness designation, specifically the Sheep Mountain area adjacent to the Buffalo Gap National Grassland's Indian Creek roadless area; and
- include the demonstration shuttle system from Alternative C that would greatly increase visitor recreational opportunities while also protecting the Park environment.

This EIS is silent on the issue of wilderness recommendations to Congress. The new management plan for Buffalo Gap National Grassland recommends to Congress that the 23,890-acre Indian Creek area be designated as wilderness. Due to this new condition on the adjacent National Grassland, the Park plan should evaluate and recommend for wilderness designation the contiguous roadless area within the Park.

Additional property boundary adjustments should be considered to protect Park values. The attached viewshed analysis could be used to identify the most critical property boundary adjustments for maintaining the open expansive vistas from the Loop Road and Sage Rim Road. Our analysis takes view measurements every 500 meters along these roads, which is where the vast majority of visitors spend their time in the Park. Private lands close to the park and containing the darkest red categories are most visible and should be considered for inclusion or easements to prevent building, cell towers, and sodbusting that could destroy the open vistas that are so important to the Park.

6.

7.

8.

COMMENTS

RESPONSES

8.

The Loop Road comes very close in several locations to the Park boundary and private land. Owners of private property that may be included within the Park's new property boundary would not lose anything but rather would gain a new opportunity should the owners one day become interested in selling or exchanging property with the Park. Please consider this information in selecting additional property boundary adjustments.

Thank you for considering these comments.

Sincerely,



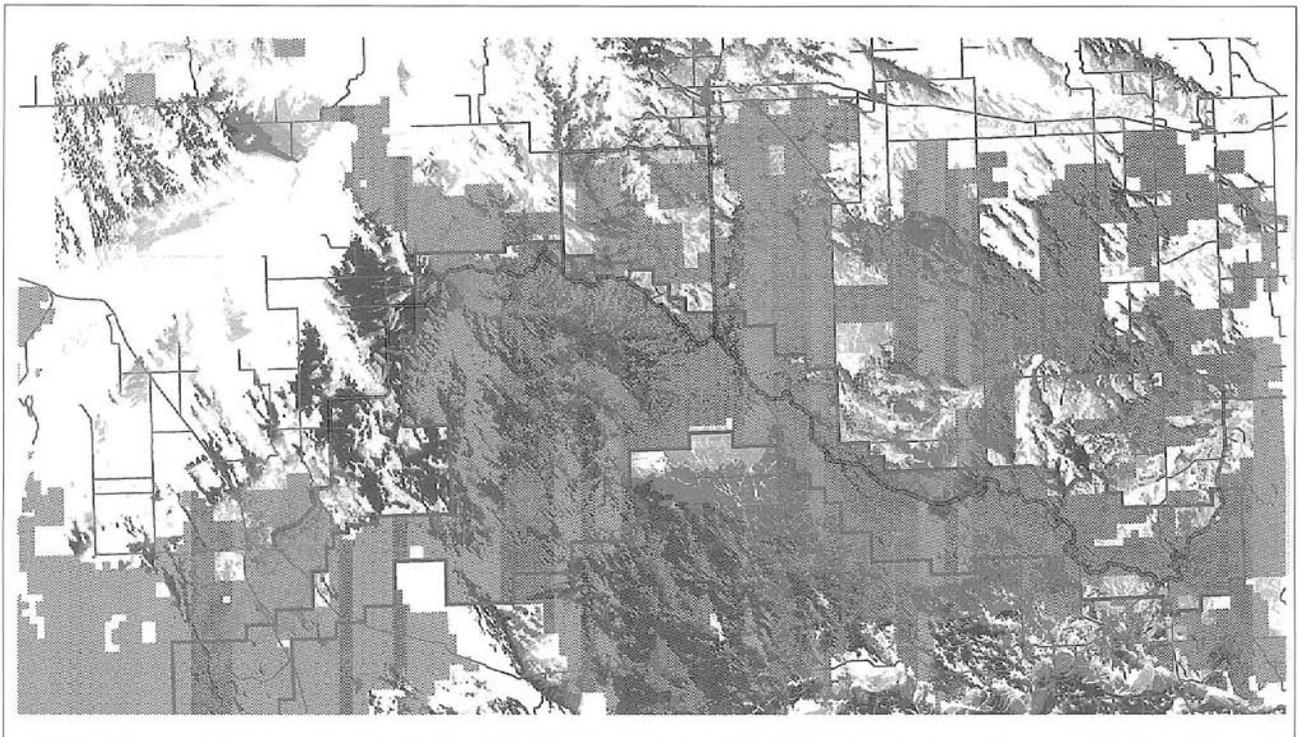
Jonathan Proctor
Great Plains Representative

Defenders of Wildlife is recognized as one of the nation's most progressive advocates for wildlife and its habitat. With more than 490,000 members and supporters, Defenders of Wildlife is an effective leader on endangered species issues. For more information, go to www.defenders.org.

RESPONSES

COMMENTS

Viewshed from Badlands National Park roads



-  Roads used to calculate viewshed
-  Other roads
-  Park boundary
-  Public lands



-  Least visible from roads
- 
-  Most visible from roads

COMMENTS

RESPONSES

Responses to the National Wildlife Federation

1. See response 2 to the Bureau of Indian Affairs.

NATIONAL WILDLIFE FEDERATION®
People and Nature: Our Future Is in the Balance



Rocky Mountain Natural Resource Center

January 9, 2006

Dr. Paige Baker, Superintendent
Badlands National Park
c/o Badlands Planning Team
P.O. Box 25287
Denver, CO 80225

Subject: Draft Badlands National Park-North Unit General Management Plan

Dear Superintendent Baker:

The National Wildlife Federation respectfully submits the following comments on the *Draft Badlands National Park-North Unit General Management Plan*. As the nation's largest member-supported conservation education organization, the National Wildlife Federation (NWF) unites people from all walks of life to protect nature, wildlife, and the world we all share. NWF has educated and inspired families to uphold America's conservation tradition since 1936. Our common sense approach to environmental protection brings individuals, organizations, and governmental agencies together to ensure a brighter future for people and wildlife.

The National Wildlife Federation has a long history of working on wildlife issues in the Great Plains. Throughout our involvement in the region, NWF has advocated for science driven decision-making and management of wildlife. This plan presents alternatives for the management of the North Unit of Badlands National Park for the next 15 years.

Having reviewed the plan we have the following comments concerning the alternatives proposed for the park:

1. We are disappointed that the South Unit of the park was not included in this plan. It was our understanding that this plan would result in a comprehensive plan for the park. We understand that the National Park Service (NPS) and the Oglala Sioux Tribe (OST) are negotiating the future of South Unit. We encourage the National Park Service to continue the dialogue with the tribe. NWF believes that the South Unit is an area of national significance and should remain part of Badlands National Park. We believe that the South Unit presents great opportunities for the NPS, OST and the public. Additionally, the South Unit presents an opportunity for the OST to educate the public about Native people, the OST and their wildlife conservation efforts. We see the South Unit as area that has great wildlife habitat value and would allow for restoration of the prairie ecosystem. For example, NWF would be supportive of the NPS and OST reintroducing bison on these lands.

COMMENTS

Badlands National Park General Management Plan
 January 9, 2006
 Page 2

We are very supportive of the boundary adjustments proposed in Alternative B. We have been involved in the restoration and management of black-footed ferrets in the Great Plains for 25 years and acquisition of the lands for additional wildlife habitat would be a major step in the recovery of this species. Additionally, we are encouraged with the potential that the existing area utilized by bison could be expanded with the acquisition of these lands. NWF has been active in the management of bison within western North American for over 10 years. We encourage the NPS to expand the bison fence as soon as possible following the acquisition of the lands. We recognize that some will argue that additional lands should not be added to the park, but we recognize that the proposed land acquisition would only occur from willing-sellers.

We recognize that the relocation of the Loop Road will require further analysis in accordance with the National Environmental Policy Act. However, we are concerned that all the road corridors have the potential to significantly impact wildlife habitat. The NPS should not select the road corridor at this time, since you lack the complete analysis of the impacts from construction of the road. NWF believes that this segmented decision-making does not meet the legal requirements of NEPA. We also believe that when the analysis of the road is completed you should evaluate alternatives that use existing roads versus constructing a new road that could have major impacts on the resources of the park.

Thank you for your consideration of our comments. If you have any questions about this letter, please feel free to contact me at 303/441-5157 or torbit@nwf.org.

Sincerely,



Stephen C. Torbit, Ph.D., Director
 Rocky Mountain Natural Resource Center
 National Wildlife Federation

RESPONSES

2. We disagree that we are doing segmented decision making that violates the legal NEPA requirements. The future of the Loop Road is major issue and concern for Badlands National Park. As we noted on page 24, we included guidance for the future of the Loop Road in this GMP/EIS primarily to facilitate the development of an overall management strategy for the park. We recognized that further planning, design, and environmental analysis will be necessary before a decision can be reached on the future of the Loop Road. Although the preferred alternative B identified a general corridor for the Loop Road, the text noted that more studies and subsequent NEPA documentation would be necessary. In other words, we are not precluding the possibility of selecting a different corridor once further analysis is completed. (We do not believe, however, that there are other existing roads that are designed to accommodate the same anticipated traffic flows as the Loop Road.) See also the responses to the general comments of the Environmental Protection Agency and response 5 to the Bureau of Indian Affairs.

2.

COMMENTS

RESPONSES



January 10, 2006

National Park Service - Denver Service Center
 Attn: Badlands Planning Team
 P.O. Box 25287
 Denver, CO 80225-0287

Board of Directors

- Nick Davis
Financial Advisor
Bozeman, MT
- Diane Hargreaves
Wildlife Photographer
Bozeman, MT
- Steven Hargreaves
Environmental Insurance
Bozeman, MT
- Rosalie Little Thunder
Lakota Activist
Rapid City, SD
- Jacqueline Rieder Hud
Artist
Bozeman, MT
- Julie Stein
Conservation Biologist
Lovettsville, VA
- Lyler Sutton
President, CAGP
Lincoln, NE
- Becky Weed
Rancher
Belgrade, MT
- Jim Wingard
Attorney
Missoula, MT

RE: Draft Environmental Impact Statement/General Management Plan for the North Unit of Badlands National Park

Dear Badlands Planning Team,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement and General Management Plan for the North Unit of Badlands National Park. Please accept these comments on behalf of the 1,500 members and supporters of Predator Conservation Alliance.

Predator Conservation Alliance works to conserve, protect, and restore native predators and their habitats in the Northern Rockies and Northern Plains. The Badlands National Park is particularly significant and important for our efforts because of the restoration of black-footed ferrets and swift-fox that is occurring within and near Badlands National Park. We are commenting on the draft environmental impact statement and general management plan for the North Unit of Badlands of National Park because of its potential impacts on wildlife in and near the park.

Of the alternatives listed, Predator Conservation Alliance supports Alternative C. Alternative C protects the existing Park environment and also protects an important wildlife corridor at the southwest corner of the North Unit. It will also allow for park expansion through land acquisition from adjoining landowners to the park. We cannot support the preferred Alternative B because of the proposal to allow development of trails in designated wilderness areas and facilities in the wildlife corridor. In addition, it favors visitors' use over resource protection, which is not consistent with the National Park Service Organic Act. We are also concerned because none of the alternatives consider prairie dog management or other wildlife issues.

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Responses to the Predator Conservation Alliance

1. We disagree that alternative B favors visitor use over resource protection and is inconsistent with the National Park Service Organic Act. It is true that under alternative B the National Park Service would expand opportunities for visitors to use the park, but this does not mean we would emphasize visitor use over resource protection. Under alternative B the National Park Service would continue to protect natural and cultural resources as noted on p.65. As stated on page 31 in the draft document, under all of the alternatives the park still would be managed according to service-wide mandates and policies. All of the guiding principles and management strategies concerning ecosystem management, and the protection of natural and cultural resources, described on pages 13-21, would apply under alternative B. We believe we can increase opportunities for visitors under alternative B with relatively few minor resource impacts, as described in the "Environmental Consequences" chapter. And as stated on pages 19-20, if monitoring were to indicate signs of resource degradation occurring due to visitor use the park staff would take action to address such impacts.

With regard to the development of trails in the wilderness area, see response 3 to Defenders of Wildlife.

2. General management plans are intended to provide overall direction and guidance for the management of national parks, not describe specific management of wildlife populations. Such topics as prairie dog management are addressed in more detailed implementation plans. However, the guiding management principles and strategies for wildlife, described on pages 15-16 and 18-19, would apply to all of the alternatives.

Predator Conservation Alliance would support Alternative B with some changes, however. Our main concern is making sure that future park developments do not damage the Sage Creek Wilderness area. In addition, the wildlife corridor for Big Horn Sheep should also be protected from future trail and infrastructure development. Most importantly, Alternative B should be revised to allow Congress to consider park expansion from willing sellers. We would also like to encourage the park service to consider including other opportunities for land acquisition, especially those private properties that are along the Loop Road into the park.

Once again, thank you for considering these comments, and offering us the chance to participate in your planning process.

Sincerely,

Janelle Holden
Executive Director

COMMENTS

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JAN 06 2006

SOUTH DAKOTA CHAPTER - SIERRA CLUB

P.O. BOX 1624, RAPID CITY, SD 57709

Telephone: (605) 348-1345

DSC-P

January 4, 2006

National Park Service - Denver Service Center
 ATTN: Badlands Planning Team
 P.O. Box 25287
 Denver, CO 80225-0287

RE: Comments on Draft EIS/General Management Plan for
 the North Unit of Badlands National Park

After reviewing the Draft EIS/General Management Plan for the North Unit of Badlands National Park (hereinafter referred to as the Draft GMP), I wish to submit the following comments on behalf of the South Dakota Chapter of the Sierra Club and myself, as a member of Wilderness Watch.

Our greatest concern is the manner in which the Draft GMP treats the Congressionally designated 64,000 acre Badlands Wilderness under Alternatives B, C and D. Alternatives B, C and D all provide management direction that will require Badlands National Park to disregard the use and management prescriptions mandated under the Wilderness Act of 1964. This was immediately apparent from an examination of the maps included for each Alternative in the Draft GMP. Only the map for Alternative A, the no-action alternative, depicted the existing boundary lines for the Badlands Wilderness. All of the maps for the other Alternatives eliminate the wilderness area's boundaries. Instead, combinations of management prescription zones are shaded into various portions of the areas comprising the Badlands Wilderness. Having discovered that the wilderness boundaries had been eliminated on the maps, we next checked the Draft GMP to determine what legislation had been referred to in putting together the plan. We were dismayed to see that the Badlands Planning Team had not seen fit to cite the Wilderness Act of 1964 (Pub.L. 88-577) (16 U.S.C §1131, *et seq.*) or the legislation designating the Badlands Wilderness a part of the National Wilderness Preservation System (Pub.L. 94-567, §1(1), Oct. 20, 1976).

These omissions are especially significant since the designation of the Badlands Wilderness occurred two years before Congress created the Badlands National Park. The final General Management Plan must include these pieces of legislation in its list of legislative mandates and special commitments applicable to the Badlands National Park.

The Draft GMP develops six management prescriptions for application in the North Unit of Badlands National Park. These are applied in the North Unit in various combinations in Alternatives B, C and D. The Alternatives provide for only three of the six management

RESPONSES

Responses to the Sierra Club, South Dakota Chapter

1. We disagree that the management prescriptions (zones) identified for the Badlands Wilderness are contrary to the provisions of the Wilderness Act. In alternative B all of the wilderness area would be within the preservation and natural area recreation zones, in alternative C all of the wilderness area would be within the preservation zone, while in alternative D the wilderness area was included within the preservation and research zones. None of the desired resource, visitor experience, visitor use, or management conditions in these zones conflict with the intent and mandates of the Wilderness Act. In all of the zones there would be a low to very low tolerance for resource degradation, including degradation of wilderness values. No facilities would be permitted in the preservation zone, while only trails would be permitted in the natural area recreation zones - facilities that are permitted in wilderness. Temporary administrative facilities for the purpose of supporting research may be permitted in the research zone in the wilderness area - and then only if the facilities meets the minimum requirement for the administration of the wilderness area. This is consistent with Sections 6.3.6 and 6.3.10 of NPS Management Policies 2001. We also point out that pages 20-21 in the draft document provided overall guiding management principles and strategies for managing the wilderness area. As noted on p.20, all the alternatives were developed to ensure that lands within the wilderness area are managed in accordance with the mandates of the Wilderness Act.
- None of the alternatives eliminated or changed the wilderness area's boundaries - the management zones shown in the maps were within the wilderness area boundaries. However, to clarify the maps we have revised the alternative B, C, and D maps in the final document to indicate the boundaries of the wilderness area.
2. The Wilderness Act was cited on page 20 as one of the mandates for managing the Badlands Wilderness area. Although the text noted the park had designated wilderness, we neglected to cite the public law designating wilderness. The final plan references this law on p.20 and also under the description of park legislation and special mandates on p.9.

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prescriptions to be applied to the 64,000 acre Badlands Wilderness. Additionally, Alternative C and D each provide that two sites in the Badlands Wilderness are designated for "proposed NPS development."

Under Alternative B (the preferred Alternative) the majority of the Badlands Wilderness becomes a "preservation zone" with a thick wedge north from the Sage Creek Campground designated as a "natural area recreation zone." Alternative C provides that the Badlands Wilderness will be designated as a "preservation zone" and include two small areas that are to be designated for "proposed NPS development." Alternative D divides the Badlands Wilderness into "research zones" and a "preservation zone" which includes two small areas designated for "proposed NPS development." After examining the management prescriptions for preservation, research, and natural area recreation, and determining what the National Park Service proposed to develop on the two sites located within the Badlands Wilderness, we are of the opinion that none of these management prescriptions, zones and proposed developments are compatible and in accordance with the management directions prescribed by the Wilderness Act of 1964.

Our first objection goes to the resource condition envisioned under each of these management prescriptions. Irrespective of the use emphasized under the three management prescriptions, they all permit an erosion of existing wilderness condition and wilderness values. Presumably the level of degradation that will be found acceptable is supposed to be the subject of subsequent project planning. However, no standards are set by the Draft GMC.

With respect to use and management, the Wilderness Act provides that wilderness areas

... shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for the future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness (16 U.S.C. §1131(a)).

The Wilderness Act defines wilderness as:

A wilderness, in contrast with those areas were man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which:

- (1) generally appears to have been affected primarily by the forces of nature, with the imprints of man's work substantially unnoticeable;
- (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- (3) has at least five thousand acres of land or is of sufficient size as to

3. To address your point regarding which management zones are within the wilderness area boundaries we have revised the alternative C and D maps to show the wilderness area boundary and to indicate that the two development zones are not within the wilderness area.

4. We disagree that the three management zones would result in the degradation of wilderness values and character. No new management actions or uses are being proposed in the alternatives that would adversely affect wilderness values, as noted on p.80. Both of the preservation and research management zones state there would be a very low tolerance for resource degradation due to visitor use, while the natural area recreation zone would have a low tolerance for resource degradation - the intent is to keep the wilderness area as pristine as possible under all of the alternatives, recognizing that a very limited amount of inevitable degradation may occur simply by permitting people to hike, use pack stock, and camp in this area.

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4. Page 3

make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. (16 U.S.C. §1131 (c)).

All management planning and actions for the Badlands Wilderness must be firmly grounded in the prescriptions contained in the Wilderness Act. The NPS must abide by Congressional mandate to manage wilderness to achieve its objective of the long range preservation of a national wilderness system. Any decision affecting Congressionally designated wilderness must ensure that it preserves the area's existing wilderness character. And any use of a designated wilderness area must be carried out in such a manner that the area's existing wilderness character is preserved. The management prescriptions designed in the Draft GMP disregard these principles and permit the degradation of the existing wilderness character and values of the Badlands Wilderness.

We also make the following objections to the preservation, research, and semi-primitive management prescriptions set forth in the Draft GMP:

Research management prescription: We support non-manipulative research within the Badlands Wilderness. Research is necessary to determine ecosystem health, determine and monitor wilderness management standards, and to provide baseline data to measure the health of ecosystems not included in the wilderness area.

However, the underlying question with respect to the Badlands Wilderness is whether scientists and collectors should be licensed to excavate and remove paleontological resources from the designated wilderness area. We believe that such a use is prohibited under the Wilderness Act. As fossils are exposed by natural processes and discovered by scientists and back-country users they may be photographed, cataloged, and the locations disseminated among the scientific community and interested visitors, but fossils should not be excavated and removed.

In addition to allowing establishment of excavation sites, the research management prescription as applied to the Badlands Wilderness allows man-made "temporary developments" to be established within the designated wilderness area. It is claimed that such developments are necessary for the safety of the licensed researchers and the preservation of the paleontological resources. The use of the adjective "temporary" is disingenuous since the use is not permitted in a designated wilderness area to begin with. It is much like claiming a mining operation only involves temporary structures and improvements. Both are assaults that destroy wilderness values. Attempting to justify placement of temporary developments as necessary for researcher safety also falls short. All visitors to a wilderness area should expect to encounter and deal with opportunities for risk and challenge, and the manager's only responsibility is to remove man-made safety hazards. In the Badlands Wilderness the researcher is going to have to operate without a safety-net, just like other visitors to the wilderness.

We also object to the research management prescription's restricting visitor access and use of the "research zone" in the Badlands Wilderness to only administrators, licensed scientists and collectors, and specially permitted groups or individuals. In 1976 the 64,000 acres of the

5. Research is a valid use of the Badlands Wilderness. Neither the Wilderness Act nor NPS management policies distinguish between manipulative and non-manipulative research, or specifically prohibit the removal of paleontological resources. Indeed, Section 6.3.6.1 of NPS Management Policies 2001 states that even those scientific activities ... that involve a potential impact to wilderness resources or values (...including ground disturbance...) should be allowed when the benefits of what can be learned outweigh the impacts on wilderness resources or values. However, all such activities must also be evaluated using the minimum requirements concept and include documented compliance that assesses impacts against benefits to wilderness.

This means that paleontological resources could be extracted and removed from the Badlands Wilderness, provided the above criteria are met. We are not proposing in this plan that all scientists would be permitted to excavate and remove paleontological resources in the wilderness area. But in some cases it may be necessary to extract and remove the fossils in order to protect them from erosion or illegal collecting - assuming that such an activity fulfills the minimum requirements concept and the scientific benefits of extracting the fossils outweigh the impacts on the wilderness.

6. Comment noted. We believe that such temporary developments to support research, unlike your example of a mining operation, are permitted under NPS management policies and the Wilderness Act, and that such developments can be designed and planned to minimize impacts on wilderness values. See also response 1. We should note that no temporary facilities are being proposed as part of alternative D, and that this is not the NPS preferred alternative. In other words, we are not proposing that the Badlands Wilderness area include a research zone. Rather, we included this zone in the range of alternatives we believed should be considered for the area.

7. As in all national park units, public access in a wilderness area within a park can be limited if necessary to protect resources or to aid scientific research (see 36 Code of Federal Regulations Section 1.5). In addition, much of the wilderness area in alternative D would not be included in a research zone and would be open to public use. We also wish to point out again that the NPS preferred alternative does not include a research zone in the wilderness area.

COMMENTS

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<p>7. Badlands Wilderness were Congressionally designated as a part of the National Wilderness Preservation System and it was mandated that the entire Badlands Wilderness would "be administered for the use and enjoyment of the American people in such manner as will leave [it] unimpaired for future use and enjoyment as wilderness."</p>	<p>8. Although the preservation zone calls for paleontological resources to be actively maintained, monitored, and protected, this does not mean that the zone allows for manipulation of wilderness condition and values. Nowhere do we state in the description of the zone or in the alternatives that the condition of the wilderness area would be manipulated. With regard to the tolerance for resource degradation, see comment 4.</p>
<p>8. <u>Preservation management prescription:</u> While this management appears to have the most benign effect on the existing wilderness condition and values in the Badlands Wilderness, it is still objectionable because it allows for manipulation of the wilderness condition and values. The envisioned resource condition for this management prescription references actively maintaining, monitoring and protecting paleontological resources, and provides that the management tolerance toward "resource modifications and degradation related to visitor use or facility development" will be "very low." The only inference that can be drawn is that the NPS is going to tolerate some level of degradation to the existing wilderness conditions and values. The NPS must abide by Congressional mandate to manage wilderness to achieve its objective of the long range preservation of a national wilderness system. Any decision affecting Congressionally designated wilderness must ensure that it preserves the area's existing wilderness character. And any use of a designated wilderness area must be carried out in such a manner that the area's existing wilderness character is preserved. <u>The Draft GMC provides no standards or way to implement monitoring of effects from the application of the preservation management prescription.</u></p>	<p>9. As noted on p.42, under the preferred alternative applying the preservation zone would result in no major changes from the current management on the wilderness area. The draft plan also states on p.20 that the park staff will monitor the wilderness to ensure that management actions and visitor impacts on wilderness resources and character do not exceed acceptable conditions. A future detailed wilderness management plan will further address monitoring of the area to ensure that the area's wilderness character is maintained.</p>
<p>9. <u>Natural area recreation management prescription: We object to this management prescription being applied to any portion of the Badlands Wilderness. The result the application of this prescription to any zone in the Badlands Wilderness is to create a faux wilderness for the sandal and bottled water tourists arriving by motor vehicles. The prescription sacrifices all wilderness values to increased risk-free visitor utilization. This management prescription is wholly incompatible with the Wilderness Act.</u></p>	<p>10. As stated in our response to comment 1, we believe the application of the natural area/recreation zone is compatible with the Wilderness Act and NPS management policies. As the Draft GMP/EIS stated on p.33, the natural area/recreation zone in the wilderness area would be compatible with legal requirements associated with wilderness - management actions or uses that conflict with the Wilderness Act would not be permitted. To further clarify the description of the zone we have noted in the table that all management actions in the natural area/recreation zone in wilderness, such as manipulation of vegetation, would be subject to the minimum requirement concept. The natural area/recreation zone was included in part of the Badlands Wilderness in alternative B to enable more people to see and enjoy part of the wilderness area close to the Sage Creek Campground - an area that already receives higher use levels than the rest of the wilderness. There is nothing in the law or policies that states wilderness should only be used by backpackers and wilderness experts - we believe wilderness should be available for the use and enjoyment of all Americans. We strongly disagree with your contention that this zone would sacrifice "all wilderness values to increased risk-free visitor utilization." The zone would provide for the designation of routes or trails in part of the wilderness area, but the intent is to help limit impacts (i.e., formation of social trails) in an area that serves as a primary access point into the wilderness area, not to reduce risks for visitors (see page 45). No other management actions would be taken in this zone that would make this area "risk-free."</p>
<p>11. The [wilderness opportunity spectrum] and other zoning approaches are appropriate in certain situations. We offer three criteria for judging their utility and appropriateness. <i>First</i>, remember the cardinal rule of wilderness management - <i>do only what is necessary</i>. Implement zoning restrictions only when required to protect the wilderness resource and consider the impact that the</p>	<p>11. Management zoning is a required element of GMPs and identifies how different areas in a park will be managed to achieve different appropriate desired resource and visitor experiences. Management zones are intended to indicate the management emphasis for various areas within a park. Zoning wilderness areas is</p>

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<p>zoning would have on visitor perceptions and use. <i>Second, make zoning clear to users.</i> To be effective, any zone that requires different visitor behavior must be indicated by some reliable means such as a use permit or map. <i>Third, zoning should not be used to justify nonwilderness conditions that presently exist;</i> when such conditions exist, they should be corrected, <i>not</i> assigned as a “special management zone.” Congress established wilderness as a land classification and agencies should not try to change its status through zoning.</p> <p>Hendee, John C., Stankey, George H., Lucas, Robert C. <i>WILDERNESS MANAGEMENT</i>, 1990, 2d edition, North American Press, at p. 209. (Emphasis in original text)</p>	<p>The Draft GMP does not select indicators of resource and social conditions for each of the zoning classifications. It is also apparent that the Badlands Wilderness has not been inventoried to determine what might be used as condition indicators. Without such indicators it is impossible to set specific standards for the resource within each of the zoning class proposed in the Draft GMP, and meaningful monitoring plans can not be developed and implemented. Without standards and monitoring it is impossible to undertake management of the wilderness resource.</p>	<p>Other than opening its paleontological resources to scientists and attempting to disperse visitors throughout the Badlands National Park by drawing more of them into the designated wilderness area, the Draft GMP has no general management strategy for the Badlands Wilderness. The planning for the Draft GMC should reflect an organized approach to setting objectives and deciding what needs to be done to meet those objectives. The planning for the Badlands Wilderness fails to produce those results. The Draft GMP was prepare out-of-house and managers who administer the Badlands Wilderness on a daily basis were not directly involved in its preparation. Had they been involved the Draft GMP might reflect the issues and management concerns actually facing the managers of the Badlands Wilderness.</p>	<p>We also want to register our objection to the Draft GMP's consideration of placing the Sage Creek Campground in the “development zone.” Its function is to serve the wilderness area and it is a relatively primitive site. Development of the campground will change its character and the complexion of the wilderness area immediately surrounding it. This is an unacceptable adverse impact on the resource and the wilderness values in the area. Likewise, for the same reasons, we object to the Park erecting any administrative and/or visitor facilities in the Badlands Wilderness on the two sites identified in Alternatives C and D.</p>	<p>We do not oppose the development at the bison handling facility west of County Road 502 and north of the Sage Creek Rim Road, provided that the new developments are sited sufficiently north of the Sage Creek Rim Road so as not to be visible from the Sage Creek drainage in the wilderness area. The wilderness view scape should be preserved. Neither should the new facilities at the bison handling facility include outdoor lighting sources. Many of our members have enjoyed the night sky in the Badlands Wilderness while camping or assisting in black-footed ferret surveys. The Draft GMP repeatedly references the value of the quality of the</p>
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11. widely accepted because of varying resources, human uses, and desired conditions. As stated in the NPS Management Policies 2001 (Section 6.3.4.1), zoning "cannot, and will not, be used to diminish or reduce the maximum protection to be afforded lands with wilderness values." In the case of the Badlands GMP, the wilderness zoning in each of the alternatives is consistent with the Wilderness Act, NPS policies, and the alternative concepts. Although there are no user conflicts in the wilderness area presently, the zones are intended to guide future management of the wilderness area to prevent or limit the development of user conflicts. In the case of the NPS preferred alternative, part of the wilderness area by the Sage Creek campground was zoned differently because this part of the area already receives more use, and because we wanted to be able to provide some additional opportunities for visitors to enjoy this part of the park.

12. As noted on page 33 of the draft document, the management zones provide qualitative descriptions of the wilderness area conditions. A future wilderness management plan will address in more detail potential indicators and standards for the area, as well as monitoring of the area. If monitoring of the area determines that resource conditions are deteriorating and approaching an unacceptable level, or visitor feedback indicates the quality of visitor experiences are becoming unacceptable, then the park staff will take appropriate management actions in the relevant zones.

13. Comment noted. We believe that the Draft GMP did provide sufficient general direction for management of the wilderness area, as indicated by the management zone conditions and the guiding management principles and strategies described on pages 20-21.

14. The plan was prepared by a planning team that consisted of both park staff and planners from the NPS Denver Service Center (see pp. 276-277). Park staff were deeply involved in all aspects of preparing and reviewing the plan, including identifying issues and concerns facing management of the park.

15. We believe the Sage Creek campground belongs in the developed zone because it is a campground with road access and has relatively more infrastructure (e.g., tent pads, shade structures, pit toilets) and more people than does not mean we would improve the facility. As noted on p.46 in the preferred alternative the National Park Service has no intention of altering this primitive camping experience.

16. No administrative or visitor facilities are being proposed in the wilderness in alternatives C and D. See also response 3.

COMMENTS

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night sky and the need to preserve that quality. We concur. The Park should undertake no development which results in a source of light pollution.

We also believe that the Draft GMP minimizes the wilderness values and experiences available to a visitor in the Badlands Wilderness. Solitude, natural sounds, and the night sky are the only wilderness values that receive recognition. That is a shame because the Badlands Wilderness is a unique and special place. The vast openness and lack of visible human developments allow a person to experience the Badlands much as the Native Americans and early settlers did. Summer temperatures exceed 100° Fahrenheit and drinkable water sources are at a premium. In winter temperatures can drop to -30° Fahrenheit, with wind-chill factors running considerably lower. The broken terrain and open landscapes in the wilderness are deceptive and can be disorienting; a visitor may have trouble marking his directions and finding his way. Hiking is much more difficult that most visitors anticipate due to steep slopes, seasonal temperatures, and need to carry a water supply.

Solitude is not the only reason to visit the wilderness. Visitors to the Badlands Wilderness will find plenty to excite their curiosity. They will have the opportunity to observe the area's geological and fossil resources, the ecosystems and wildlife of the Badlands, and the region's weather patterns, as well as the night sky.

The wilderness challenge in the Badlands is the ability to survive in a dry, harsh environment relying on one's own resources. Compass and map work, moving through rugged terrain, precautions for snake and spider bites, heat stroke frostbite, and keeping a primitive camp will all test the visitor. The visitor stands to gain an understanding of the Badlands, and an appreciation of his relationship with this natural setting.

We consider the Badlands Wilderness to be the jewel of the Badlands National Park and consider it the most important management unit in the Park's North Unit. Because of that we can not do anything except oppose the adoption and implementation of Alternatives B, C and D in the Draft GMP. With respect to the Badlands Wilderness the Alternatives are a pernicious assault on the area's designation as wilderness. As the Draft GMC is written we can only support and recommend Alternative A, the no-action alternative, for adoption as the Park's general management plan.

What we really believe needs to be done is to drop the entire Badlands Wilderness from the Draft GMP and prepare a separate wilderness management plan for it. It is the only way the public can be assured that the principles of wilderness management are observed and that the Badlands Wilderness will not be degraded. We commend the 13 principles of wilderness management treated in WILDERNESS MANAGEMENT (*supra*, pp. 181 - 193) for your consideration:

1. Manage wilderness as one extreme on the environmental modification spectrum.
2. Manage wilderness as a composite resource, not as a separate parts.
3. Manage wilderness and sites within, under a nondegradation concept.
4. Manage human influences, a key to wilderness protection.

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RESPONSES

17. The proposed education pavilion, comfort station, and group campground at the bison handling facility would be designed to minimize visual impacts on the rest of the park. Although the GMP does not address specific locations of new facilities, if possible the new facilities near the bison handling facility would be located sufficiently north of the Sage Creek Rim Road so as to not affect the wilderness viewshed. Outdoor lighting sources would likely be included in the group campsite, but would be few in number and designed to have a minimal impact on the night sky.

18. Comment noted. The Draft GMP/EIS was not intended to focus on the values available to visitors in the wilderness area. Rather, it provides overall guidance for the management of the North Unit. Because the alternatives being proposed would not affect the wilderness values and experiences you identified, we did not address these values in detail.

19. The Badlands Wilderness is an important integral portion of the North Unit and cannot be dropped from consideration in the GMP. However, as noted earlier we will prepare a separate wilderness management plan that will be addressing in more detail the management of this area. And as we stated throughout the Draft GMP, please be assured that we will not take actions, or permit actions, that would degrade the values of the wilderness area.

COMMENTS

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5. Manage wilderness to produce human values and benefits.
6. Favor wilderness dependent activities.
7. Guide management with written plans that state specific objectives for specific areas.
8. Set carrying capacities as necessary to prevent unnatural damage.
9. Focus management on threatened sites and damaging activities.
10. Apply only the minimum regulations and tools necessary to achieve wilderness area objectives.
11. Involve the public as a key to the acceptance and success of wilderness management.
12. Monitor wilderness conditions and experience opportunities as a key to long-term wilderness management.
13. Manage wilderness in coordination with management of adjacent lands.

Thank you for this opportunity to comment on the Draft GMP. We ask that you provide us with a copy of the record of decision as soon as it is issued.

Respectfully submitted,

SOUTH DAKOTA CHAPTER-SIERRA CLUB



James F. Margadant

JFM/lm
cc. Paige Baker, Superintendent
Badlands National Park
P.O. Box 6
Interior, SD 57750

COMMENTS



South Dakota Chapter
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tel 605.348.1345 fax 605.348.1344

Attn: Badlands Planning Team
National Park Service – Denver Service Center
P.O. Box 25287
Denver, CO 80225-0287

January 9, 2006

Dear Badlands Planning Team,

Please allow this comment letter to serve as an addendum to the Badlands National Park Draft GMP/EIS comments submitted by South Dakota Chapter Chair Jim Margadant in his 1/4/06 letter.

We have a number of additional concerns with and suggested changes to the Draft GMP/EIS we would like to share with you.

1) We ask that the Park explore alternatives to building four employees houses at the Pinnacles entrance. While we appreciate the need to house law enforcement rangers in or very close to the park—and that park housing indeed helps to attract professional, long-term employees—our concern is the potential for the Pinnacles entrance to end up looking like the Ben Reifel Visitor Center compound. We believe most or all of the housing behind the Visitor Center should have been located outside the Park boundary in Interior. We very strongly urge the Park to do everything in its power to keep non-essential development to a minimum, and strive to explore all possible alternatives for providing employee housing close by in Wall. Badlands does not have the luxury of forest cover to screen employee housing and other development. Thus, the Park must take extra care when planning for these provisions. Has the Park looked into buying lots and building employee housing in Wall, which is only seven miles north of the Pinnacles entrance? This being said, we also believe law enforcement rangers should have priority for in-park housing.

2) We are very strongly in favor of the proposed boundary expansion via the acquisition of all three adjacent private properties. These three acquisitions will only enhance what is already the gem of western South Dakota.

3) We are concerned about the viewshed northeast of the Loop Road. This is the most heavily traveled scenic byway in the park, and the high boundary fence is only a hundred or so yards from the road in places. There now exists the potential for conflicting uses on the private land outside the boundary. What if a landowner were to sell to a developer, who began clearing land for a trailer court or other housing complex? We believe the Park should actively explore opportunities to expand its boundary northeast of the Loop Road to mitigate the potential destruction of the Loop Road viewshed.

4) We are intrigued by the Park's plan to implement a demo shuttle system on the Loop Road from Door and Window to the fossil exhibit (Alternative C). We are gratified that other parks in the NPS have already implemented a visitor shuttle system, and believe Badlands is right to explore this option. We encourage the Park to utilize clean-burning vehicles for this proposed demo system.

5) We strongly urge the Park to include in the Final GMP/EIS an evaluation and recommendation for wilderness of approximately 2,749 acres on Sheep Mountain Table, adjacent to the proposed Indian Creek Wilderness on Buffalo Gap National Grassland. (Please see enclosed map.) There is no development planned for this area—nor should there be—and it is wilderness-quality land. It makes much more sense to add this small area in to the proposed Indian Creek Wilderness, extending the boundary to the top of the cliff, rather than arbitrarily end the boundary at the Grassland/Park boundary. This issue must be addressed in the final park plan.

RESPONSES

Responses to the Sierra Club Addendum, South Dakota Chapter

1. We agree that nonessential development should be kept to a minimum in the park. NPS Management Policies 2001 (Section 9.4.3) also state that the National Park Service will rely on the private sector for NPS employee housing, and that if housing is not available the Park Service will provide only the number of housing units necessary to support the NPS mission. The policies further state that occupation of housing units in a park

is permitted or required to provide for timely response to park protection needs, to ensure reasonable deterrence to prevent threats to resources, and to protect the health and safety of visitors and employees.

In the case of housing in Badlands National Park, a need for additional staff housing was identified at Pinnacles in the approved 2003 Badlands National Park Housing Management Plan. Although the town of Wall is only 7 miles from the Pinnacles entrance, we believe that in-park housing is needed at this location for the protection of park resources and facilities on this side of the park. Building new facilities at the edge of the park and careful design of the site should help minimize impacts to park resources. We should also point out that the preferred alternative calls for up to four housing units - not all of these units may be needed or be built immediately.

2. Although there is the potential for conflicting uses to occur in the future on private land outside the boundary that you suggested, we have no information to indicate that such changes are likely to occur. The existing land use around the North Unit - ranching - does not conflict with the park, and we do not envision it substantially changing in the future. Even if there were a potential conflict, the National Park Service would need to have willing sellers to pursue land acquisition - a condition that does not exist now. We also do not have funds, nor are likely to obtain funds in the foreseeable future, to protect all of the lands north-east of the Loop Road to protect the existing viewshed. See also response 8 to Defenders of Wildlife.

3. See response 7 to Defenders of Wildlife.

COMMENTS



South Dakota Ct
P.O. Box 1624, Rapid City, SD, 57709
tel 605.348.1345 fax 605.348

6) As proposed in Alternative B, the Park should coordinate with the National Rails-to-Trails program to convert rail route along Hwy. 44 to a bicycle trail. This would provide a new recreational opportunity that would attract r visitors and different visitors.

Thank you very much for your time and consideration. We very much appreciate this opportunity to comment c Badlands' Draft GMP/EIS.

Best wishes,

Sam N Clauson, Conservation Chair
South Dakota Chapter

RESPONSES

COMMENTS



World Wildlife Fund
 Northern Great Plains Ecoregion
 Post Office Box 7276
 Bozeman, MT 59711 USA
 Direct Phone: 406-582-7571
 Fax: 406-585-7910
 Steve.Fornest@wwf.us
 www.worldwildlife.org

January 9, 2006

National Park Service - Denver Service Center
 Attn: Badlands Planning Team
 P.O. Box 25287
 Denver, CO 80225-0287

RE: Draft Environmental Impact Statement/General Management Plan for the North Unit of Badlands National Park

Dear Badlands Planning Team,

On behalf of the 1 million members of World Wildlife Fund (WWF) in the U.S. and the Northern Great Plains Ecoregion Program, I want to thank you for providing the opportunity to comment on the Park's Draft Environmental Impact Statement/General Management Plan for the North Unit of Badlands National Park. Badlands National Park anchors one of the northern Great Plains' richest areas in terms of biodiversity, is one of the few protected areas in the region where grassland processes are largely maintained without domestic livestock grazing, and provides an outstanding opportunity for the public to appreciate grassland ecology.

In general we would like to support the Park in its continuing efforts to maintain its grassland wilderness, expand its management opportunities through acquisition, and provide habitat for wildlife.

All of the action alternatives described (Alternatives B, C, and D) would, to various degrees, accomplish the above goals. Our comments, therefore, relate to specific issues raised across the range of alternatives, as follows:

- | |
|--|
| <ul style="list-style-type: none"> • Trail development in designated wilderness should be carefully limited in scope. While designated trails will likely encourage people to get out away from roads and into the grasslands, there may be other ways to accomplish this beyond the traditional "trail" paradigm in the grassland environment without an extensive network of trails, since there are no physical barriers preventing people from strolling out onto the prairie at present. • All alternatives should allow expansion of the park boundaries to the extent needed to protect park resources — it is not clear why acquisition potential is limited in some alternatives and not others; • The shuttle system is also a good idea that should also not be limited to a single alternative. |
|--|

In general, WWF would like to encourage the Park to take the best aspects of Alternative B and blend these with the very positive ideas contained in the other alternatives. There doesn't appear to be a reason why Alternative B needs to exclude, for example, additional land acquisition. Moreover, engaging visitors to remain longer in the park need not result in impaired opportunities for resource management or

- 1.
- 2.
- 3.

RESPONSES

Responses to the World Wildlife Fund

1. We are not proposing an "extensive network of trails." See also response 3 to Defenders of Wildlife.
2. All of the action alternatives propose the same boundary adjustments with the exception of the Prairie Homestead. See also response 1 to the South Dakota State Historic Preservation Office and response 8 to Defenders of Wildlife.
3. See response 4 to the Defenders of Wildlife.

RESPONSES

COMMENTS

research. We encourage the Park to take the broadest approach possible, recognizing that future activities will likely be constrained by funding limitations and limits on other resources available to management.

Good luck and please let us know if we can assist the Park in the future in any of its activities.

Sincerely,



Steve Forrest
Senior Program Officer
Northern Great Plains Ecoregion Program

COMMENTS

RESPONSES



21290 SD HWY. 240
 PHILIP, SD 57567
 E-MAIL: gbc@gmc.net

(605) 433-5411
 FAX: (605) 433-5412
 HOME: (605) 837-2111

January 5, 2006

GRADY & BERNICE CREW

National Park Service-Denver Service Center
 Attn: Badlands Planning Team - Patrick Kenny

PO Box 25287
 Denver CO 80225-0287
 1-303-969-2674
 1-303-969-2736 fax
 Pat_Kenney@nps.gov

Dear Patrick,

It has come to our attention that in your long term plan for the Badlands National Park our families Prairie Homestead is not on your priority list for possible acquisition. We feel very strongly that this is a mistake for the Badlands National Park. Following is a brief list of our reasons why.

- First, as you probably know the Prairie Homestead is one of the only original sod homes on public display in the US. Truly, this national treasure tells a very important story of the westward expansion of this country. We know that the Badlands National Park understands the importance of preserving, protecting, and interpreting the human history of this area and this would fit perfectly. We strongly feel the National Park Service would preserve and protect this important piece of history better than anyone protects and we would like the option to work with the National Park Service.
- The location of the Prairie Homestead is another big factor in why we feel so strongly the National Park Service should consider acquiring the Prairie Homestead. The location is just ½ mile from the northeast entrance and this is a strategic spot for the National Park Service; because if the Homestead were to go into other private hands the economic development there may not create a view shed as appropriate as one would like for the Badlands National Park. Our family is very sensitive to the look we maintain into the National Park but future owners of this property may not be.
- In addition, it may be of importance to the National Park Service that my Uncle Merle Crew owns the Helicopter site located at the entrance to the BNPark and he has indicated to me that he may consider selling this property also. If this were the case the BNPark could acquire and control the frontage on both sides of the road for 1 mile, farther north at the northeast entrance and acquire the Prairie Homestead at the same time. What an opportunity to preserve the view shed to actually 2 of our national treasures. The Prairie Homestead and the Badlands National Park.

Because of these reasons, we are simply asking that you reconsider putting the possible acquisition of the Prairie Homestead back on your long-term plan.

Sincerely,

Grady Crew

Bernice Crew

Enclosure: Oct 11, 2000 letter of proposed sale of Prairie Homestead by Keith L. Crew
 CC: Paige Baker, Superintendent of Badlands National Park

1.

Response to the Badlands Trading Post

1. We have revised our direction regarding the Prairie Homestead property in the Final Badlands General Management Plan. See response 1 to the South Dakota State Historic Preservation Office.

COMMENTS

Bill Supernaugh, Superintendent
Badlands National Park
Interior SD 57750

Dear Mr. Supernaugh,

In your capacity as Superintendent of the Badlands National Park, you are responsible for developing and maintaining one of our nations most prized and historic treasure. This area offers all Americans the opportunity to view "our natural history" and share some perspective of what our adventurous forefathers encountered on their trek westward as part of the expansion of the United States.

Recognizing your appreciate for the historical significance of this area and your endeavor for the continued development of our country's historical past, the Crew family would like to propose for your consideration the pioneer history of this area by offering for sale The Prairie Homestead for inclusion as part of Badlands National Park.

The Prairie Homestead is located 1/2 mile north of the northeast entrance to Badlands National Park. The homestead consists of the original earthen sod dugout house and associated outbuildings on 160 acres. Homesteaded in 1909 by Ed Brown and inhabited until 1949, it remains one of only two original sod homes still on public display in the United States. Renovated in 1963, this historical landmark remains exactly how it looked when originally homesteaded. The Prairie Homestead has a state of South Dakota historical designation and is listed on The National Register of Historic Places.

The Crew family is very proud of the Prairie Homestead and the part it played in the history of the westward expansion of the United States. It is our feeling that the National Park Service is best suited to interpret the historical significance of this property and provide for the preservation of this "human history". Located nearly adjacent to the Badlands National Park, the Prairie Homestead would be convenient for the National Park Service to administer.

We hope that you will consider including The Prairie Homestead as part of the National Park Service. The Crew family looks forward to hearing from you regarding our proposal and the opportunity to further discuss what arrangements might be made to provide for the sale of this property from our family to the National Park Service.

Should you have any questions regarding this matter please contact me.

Sincerely,



Keith L Crew

RESPONSES

RESPONSES

Responses to Ken Bartlett

1. Comment noted. We believe the two proposed additions to the park can be adequately managed by the National Park Service. As stated on pages 260 and 263, we believe they would be feasible to administer and would not substantially add to the NPS workload to manage these lands. Also, we are not requesting an additional \$4,343,400 and 125 full-time-equivalent employees to maintain the park under alternative A (see page 58).

COMMENTS

Correspondence ID Correspondence	Organization	Name	Address	City	State/ Province	Postal Code	E-mail Address	Kept Private
135175 DEAR NATIONAL PARK SERVICE, BADLANDS PLANNING TEAM. I will keep this very short as you have a lot to do. I feel alternative A (no action) should not have even been in the draft general management plan. We need to make BADLANDS NATIONAL PARK a destination park and not just on the way to MT RUSHMORE. That leaves alternative B, this alternative with a few changes is the best plan. Your idea of improving visitor opportunities and contact stations and network of hiking trails is a must.		bartlett, ken .	p.o. box 130	interior	SD	57750	ken@gwtc.net	No
1. I feel your proposed boundary adjustments should be removed from this alternative. I do not feel the park can properly manage what they already have. BADLANDS NATIONAL PARK has an operating budget of approximately 3.6 million dollars annually and is asking for an additional \$ 4,343,400 and 125 full time equivalent employees for a total of approximately 8 million dollars just to maintain what they presently have, even under alt A (no action). So I feel adding any more land would not be feasible to maintain without any more money and man power.								

RESPONSES

2. It is true that acquisition of the two proposed additions would reduce land from the county tax base and that payments in lieu of taxes probably wouldn't make up for reduction in tax revenue to the county. However, as noted on pages 260 and 263, the acquisitions of these lands was discussed in public meetings, and local communities did not raise concerns about the lack of tax revenues. No comments on the Draft GMP/EIS were received from the local officials or from the Pennington County board. We should also point out that Badlands National Park generates tourism revenues for the area, which in turn results in tax income for the county. Under the preferred alternative, we would increase visitor opportunities in the park, and we would expect more visitors would come to the park and spend dollars in the surrounding area.
3. See response 1 to the Sierra Club addendum.

COMMENTS

2.	Removing land from county tax base shorts the budget of that county. Payment in lieu of taxes pays less then 30% then if paid by the private sector.						
	Keeping the loop road within your current boundaries is also a great idea.						
3.	In your development zone it shows a need for housing what's wrong with the town of wall it's not very far away?						
	Your 238-acre research zone should be removed from this plan, this is public land and should not be off limits.						
	Your friend and neighbor KEN BARTLETT						

RESPONSES

COMMENTS

Dear Mr. Supernaugh: We certainly enjoyed the opportunity to study the State's General Management Plan for the North Unit of Bandelier National Park which the Study shared with us.

It brought to mind a wonderful vacation we enjoyed in that Park just a year ago. We stayed in a cabin in Coote State Park, which is just from Michigan had highly recommended.

We feel we have a much better understanding of the function

COMMENTS

RESPONSES

of this facility after studying the
draft.

If our vote would count
for anything; we're most impres-
sionable with "Plan B".

We thank you for the
opportunity to be better informed
about this Beautiful Park and all
of the efforts that go into preserving
it and enhancing it for our
children to come.

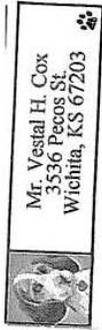
"Plan B" - yes

Sincerely,

Yvonne and Margaret Clonace
426 S. Sheridan

RESPONSES

COMMENTS



William R Supernough:
Have reviewed your book regarding
The Bad Lands National Park. We support
Alternative Plan B, we will look forward
to visiting the area in the future
Sincerely Vestal H + Caryl Cox
Caryl Cox
Vestal H Cox

COMMENTS

RESPONSES

December 7, 2005

Mr. William R. Superbaugh,
 we are thanking you for
 the opportunity to look over your
 plans for this park. And to have
 an opportunity to express our
 opinion and desire for this area.
 We are so glad for the Concern
 and Care of these National Parks.
 Preserving and updating them for
 future generations to come.

We have reviewed the information
 that you sent out regarding "The
 Badlands National Park". After studying
 the information we support Plan B.
 We have shared this information with
 two other couples and they have
 written a note as to their views
 on this project. They are included
 We will look forward to visiting
 the area in the future.

Sincerely,
 Virgil and Theba
 Stuckey



AGENCIES AND ORGANIZATIONS TO WHICH THIS DOCUMENT WAS SENT

Federal Agencies

Advisory Council on Historic Preservation
U.S. Department of Agriculture
Animal and Plant Health Inspection
Service*
Forest Service
Natural Resource Conservation Service
U.S. Department of the Interior
Bureau of Indian Affairs*
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Environmental Protection Agency*

State-elected Federal Officials

Senator John Thune
Senator Tim Johnson
Representative Stephanie Herseth

American Indian Tribes

Cheyenne River Sioux Tribe
Crow Creek Sioux Tribe
Flandreau Santee Sioux Tribe
Lower Brule Sioux Tribe
Oglala Sioux Tribe
Omaha Tribe
Rosebud Sioux Tribe
Ponca Tribe
Santee Sioux Tribe
Sisseton-Wahpeton Sioux Tribe
Spirit Lake Nation
Standing Rock Nation
Three Affiliated Tribes
Trenton Indian Service
Turtle Mountain Tribe
Winnebago Tribe
Yankton Sioux Tribe

Elected State Officials

Mike Rounds, Governor of South Dakota

State of South Dakota Agencies

Department of Agriculture
Department of Environment and Natural
Resources
Department of Game, Fish and Parks

Department of Tourism and State
Development*
Department of Transportation
State Historic Preservation Office

Local Governments

Jackson County
Pennington County
Shannon County
Mayor of Wall
Mayor of Interior

Organizations and Businesses

A&M Cafe
Badlands Petrified Gardens
Badlands Trading Post*
Corn Palace
Defenders of Wildlife*
Devils Tower National Monument
Fossil Butte National Monument
Handicapped Travel Club
Jewel Cave National Monument
Kadoka Depot Museum
Keystone Area Historical Society
National Wildlife Federation*
Prairie Homestead Museum
Predator Conservation Alliance*
Sierra Club, South Dakota Chapter*
South Dakota Stockgrowers Association
World Wildlife Fund*

Media

Bennett County Booster
Chamberlain-Oacoma Register
Custer County Chronicle
Denver Post
Indian Country Today
Kadoka Press
KBHE News
KCLO News
KEVN News
KILI Radio
KOTA News
Midwest Living
Minneapolis Star-Tribune
Mitchell Republic

Murdo Coyote
Rocky Mountain News

Individuals

Ken Bartlett*
Vestal H. Cox*

Keith L. Crew*
Mr. and Mrs. Virgil Stukey*
Don and Margaret Clemence*

*An * identifies an agency or individual who
commented on the draft plan.



**Appendixes, References, Preparers
and Index**

APPENDIX A: LEGISLATION

U.S. Code Title 16 Chapter 1

Section 441. Badlands National Park; establishment

When a quantum, satisfactory to the Secretary of the Interior, of the privately owned lands lying within the area hereinafter described shall have been acquired and transferred to the United States for park purposes, without expense to the Federal Treasury, such areas are dedicated and set apart as a national park for the benefit and enjoyment of the people, under the name of the Badlands National Park: Provided, That the State of South Dakota shall have first constructed the highways hereinafter described.

Section 441a. Boundaries

The areas to be included in said Badlands National Park are situated in the State of South Dakota and lie within the boundaries particularly described as follows: Beginning at the northeast corner section 13, township 3 south, range 18 east, Black Hills meridian; thence west one-fourth mile; thence south one mile; thence west one-fourth mile; thence south one-fourth mile; thence west one mile; thence south one-fourth mile; thence west one-fourth mile; thence north one mile; thence west one and one-fourth miles; thence north one-half mile; thence west three miles, to the northwest corner section 18, township 3 south, range 18 east, Black Hills Meridian.

Thence north one-fourth mile; thence west one-half mile; thence north one-fourth mile; thence west three-fourth mile; thence south one-fourth mile; thence west one-fourth mile; thence north one-fourth mile; thence west one-fourth mile; thence north one-fourth mile; thence west three-fourths mile; thence south one-fourth mile; thence west one-half mile; thence south one-half mile; thence west one mile; thence north one-fourth mile; thence west one-fourth mile; thence north one-fourth mile; thence west one and one-fourth miles; thence north one-fourth mile; thence west one-fourth mile; thence north three-fourths mile; thence west one and one-fourth miles; thence north one-half mile, to the northeast corner section 2, township 3 south, range 16 east, Black Hills meridian.

Thence west one-half mile; thence north one mile; thence west one-fourth mile; thence north one-half mile; thence west three-fourths mile; thence north one-half mile; thence west one-half mile; thence north two miles; thence west eight miles; thence south one-half mile; thence west one mile; thence north one-half mile, to the northeast corner section 13, township 2 south, range 14 east, Black Hills meridian.

Thence west one mile; thence south one mile; thence east one-half mile; thence south one-half mile; thence west one-half mile; thence south two and one-half miles; thence east one and one-fourth miles; thence south one mile; thence east three-fourths mile, to the northeast corner section 7, township 3 south, range 15 east, Black Hills meridian.

Thence south one-fourth mile; thence east one-fourth mile; thence south one-half mile; thence west one-fourth mile; thence south one-fourth mile; thence west one mile; thence south one and three-fourths miles; thence east one mile; thence north three-fourths mile; thence east two miles; thence north one-half mile; thence east three-fourths mile; thence north one-fourth mile; thence east one-half mile; thence north three-fourths mile; thence west one-fourth mile; thence north three-fourths mile; thence west one-fourth mile; thence north one-fourth mile; thence west one-fourth mile; thence north one-fourth mile; thence east one-fourth mile; thence north one-half mile; thence east one mile; thence

south one-fourth mile; thence east one and three-fourths miles; thence north one-half mile; thence west one-half mile; thence north one-half mile, to the northwest corner section 31, township 2 south, range 16 east, Black Hills meridian.

Thence east one-half mile; thence south one-fourth mile; thence east one mile; thence south one-fourth mile; thence east one and three-fourths miles; thence south three-fourths mile; thence east three-fourths mile; thence south three-fourths mile; thence east one-half mile; thence south one-fourth mile; thence east one-fourth mile; thence south one-fourth mile; thence east one-fourth mile; thence south one-fourth mile; thence east one-fourth mile; thence south one-fourth mile; thence east one-half mile; thence south one and one-fourth miles; thence east three-fourths mile; thence north one-half mile; thence east one-fourth mile, to the northeast corner section 19, township 3 south, range 17 east, Black Hills meridian.

Thence north one-half mile; thence east three-fourths mile; thence south two miles; thence east one and one-half miles; thence north one and one-half miles; thence east two miles; thence south one-fourth mile; thence east one-fourth mile; thence south one-fourth mile; thence east one-half mile; thence south one-fourth mile; thence east one-half mile; thence south one-fourth mile; thence east one-half mile, to the northeast corner section 30, township 3 south, range 18 east, Black Hills meridian.

Thence south three-fourths mile; thence east one-fourth mile; thence south one-fourth mile; thence east one-half mile; thence north one-fourth mile; thence east one and one-fourth miles; thence south one-fourth mile; thence east three miles, to the northeast corner of section 36, township 3 south, range 18 east, Black Hills meridian.

Thence north one mile; thence east one mile; thence north one-half mile; thence west one-fourth mile; thence north one-fourth mile; thence west one-fourth mile; thence north one and one-fourth miles; thence west one-half mile to the point of beginning.

Section 441b. Construction of highway by State of South Dakota

The establishment of said park is conditioned upon the State of South Dakota first constructing the following highway in a manner satisfactory to the Secretary of the Interior: A highway commencing at the corporation limits of the town of Interior, thence going in a northwesterly direction to and over Big Foot Pass, and through the region known as The Pinnacles; thence in a westerly direction to Sage Creek, being a total distance of about thirty miles.

Section 441c. Administration, protection, and promotion; franchises for hotel and lodge accommodations

The administration, protection, and promotion of said Badlands National Park shall be exercised under the direction of the Secretary of the Interior by the National Park Service, subject to the provisions of sections 1, 2, 3, and 4 of this title: Provided, That in advance of the fulfillment of the conditions herein the Secretary of the Interior may grant franchises for hotel and for lodge accommodations under the provisions of this section.

Section 441d. Examinations, excavations, and gathering of objects of interest within park

The Secretary of the Interior is authorized to permit examinations, excavations, and gathering of objects of interest within said park by any person or persons whom he may deem properly qualified to conduct such examinations, excavations, or gatherings, subject to such rules and regulations as he may prescribe: Provided, That the examinations, excavations, and gatherings are undertaken only for the benefit of some reputable museum, university, college, or other recognized scientific or educational

institution, with a view to increasing the knowledge of such objects and aiding the general advancement of geological and zoological science.

Section 441e. Effective date of sections 441 to 441d

Sections 441 to 441d of this title shall become effective if and when all of the above conditions shall have been fully complied with to the satisfaction of the President of the United States, who shall then issue a proclamation declaring that the conditions precedent herein required have been complied with, and said proclamation shall formally dedicate and set aside the areas herein described in accordance with the provisions of section 441 of this title.

Section 441e-1. Change in name of Badlands National Monument

The area formerly known as the “Badlands National Monument,” established by Presidential Proclamation of January 25, 1939 (53 Stat. 2521), shall henceforth be known as the “Badlands National Park.”

Section 441f. Adjustment and redefinition of boundaries

In order to establish a more appropriate boundary for the Badlands National Park and to consolidate Federal land ownership therein, the Secretary of the Interior, in his discretion, is authorized to adjust and redefine the exterior boundaries of the national park by appropriate reductions or additions of land: Provided, That the total acreage of the national park, as revised pursuant to sections 441f to 441i of this title, shall not exceed its area of approximately one hundred fifty-four thousand one hundred and nineteen acres as of May 7, 1952.

Section 441g. Orders to effectuate revision of boundaries; publication

The revision of boundaries of the national park, as authorized in section 441f of this title, shall be accomplished by the issuance, by the Secretary of the Interior, of an appropriate order, or orders, such order or orders to be effective upon publication in the *Federal Register*: Provided, That federally owned land under the administrative jurisdiction of any other department or agency of the Federal Government shall be included within the park only with the approval of the head of such department or agency.

Section 441h. Jurisdiction of mining and mineral rights; patents

Administrative jurisdiction over all Federal lands eliminated from the park, by the issuance of an order or orders of the Secretary of the Interior, is transferred to the Secretary of Agriculture for use, administration, and disposition in accordance with the provisions of title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.) and the related provisions of title IV thereof: Provided, That all of such lands formerly set apart and reserved from the public domain shall be subject to the mining and minerals-leasing laws: And provided further, That any disposition of any such lands formerly set apart and reserved from the public domain shall be evidenced by patents issued by the Secretary of the Interior.

Section 441i. Exchanges of land

In order that exchanges of land may be effectuated for the purposes of sections 441f to 441i of this title, the Secretary of the Interior is authorized, in his discretion and in accordance with the provisions of section 255 of title 40, to accept, on behalf of the United States, title to any land or interests in land within the exterior boundaries of the Badlands National Park as revised pursuant to sections 441f to

441i of this title, and, in exchange therefore, with the approval and concurrence of the Secretary of Agriculture, the Secretary of the Interior may patent lands of approximately equal value which were formerly set apart and reserved from the public domain within the Badlands Fall River soil conservation project, SD-LU-1. In effectuating such exchanges, in lieu of conveyances by the Secretary of the Interior, the Secretary of Agriculture may convey lands of approximately equal value within said project which have been acquired heretofore by the United States. All such exchanges shall, in all other respects, be considered as exchanges under the provisions of section 32c, title III, of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1011(c)) and shall otherwise be in accordance with provisions of said Act (7 U.S.C. 1000 et seq.); except that, upon acceptance of title to any lands so acquired by the United States under this section, such lands and any other lands acquired otherwise by the United States within the park boundaries shall be a part of that area. In consummating land exchanges hereunder upon an equitable basis, patents and instruments of conveyance may be issued, and property may be accepted, by the United States, subject to such reservations as may be necessary or in the public interest.

Section 441j. Revision of boundaries

In order to include lands of outstanding scenic and scientific character in the Badlands National Park, the boundaries of the park are revised as generally depicted on the map entitled "Badlands National Monument," numbered NM-BL-7021B, dated August 1967, which is on file and available for public inspection in the offices of the National Park Service, Department of the Interior. The Secretary of the Interior may make minor adjustments in the boundaries, but the total acreage in the park may not exceed the acreage within the boundaries depicted on the map referred to herein. Lands within the boundaries of the park that are acquired by the United States shall be subject to the laws and regulations applicable to the park.

Section 441k. Acquisition of property for park

(a) Consent of State or Oglala Sioux Tribe of South Dakota; transfer from Federal agency

Subject to the provisions of subsection (b) of this section, the Secretary of the Interior may, within the boundaries of the park, acquire lands and interests in lands by donation, purchase with donated or appropriated funds, or exchange, except that any lands or interests in lands owned by the State of South Dakota, a political subdivision thereof, or the Oglala Sioux Tribe of South Dakota may be acquired only with the consent of owner. Notwithstanding any other provision of law, lands and interests in lands located within the park under the administrative jurisdiction of any other Federal agency may be transferred to the administrative jurisdiction of the Secretary without a transfer of funds.

(b) Easements

As to lands located within the boundaries of the park but outside the boundaries of the gunnery range referred to in section 441l of this title, the Secretary of the Interior may acquire only rights-of-way and scenic easements.

Section 441l. Exchange of lands; transfer from Federal agency to administrative jurisdiction of Secretary; terms and conditions of purchase

Inasmuch as (A) most of the lands added to the Badlands National Park by section 441j of this title are inside the boundaries of the Pine Ridge Sioux Indian Reservation, (B) such lands are also within a tract of land forty-three miles long and twelve and one-half miles wide which is in the north-western part of such Indian reservation and has been used by the United States Air Force as a gunnery range since the early part of World War II, (C) the tribal lands within such gunnery range were leased by the Federal

Government and the other lands within such gunnery range were purchased by the Federal Government from the individual owners (mostly Indians), (D) the Department of the Air Force has declared most of such gunnery range lands excess to its needs and such excess lands have been requested by the National Park Service under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq.), (E) the leased tribal lands and the excess lands within the enlarged Badlands National Park are needed for the park, (F) the other excess lands in such gunnery range should be restored to the former Indian owners of such lands, and (G) the tribe is unwilling to sell its tribal lands for inclusion in the national park, but is willing to exchange them or interests therein for the excess gunnery range lands, which, insofar as the lands within the gunnery range formerly held by the tribe are concerned, should be returned to Indian ownership in any event, the Congress hereby finds that such exchange would be in the national interest and authorizes the following actions:

- (a) All Federal lands and interests in lands within the Badlands Air Force gunnery range that are outside the boundaries of the park and that heretofore or hereafter are declared excess to the needs of the Department of the Air Force shall be transferred to the administrative jurisdiction of the Secretary of the Interior without a transfer of funds.
- (b) Any former Indian or non-Indian owner of a tract of such land, whether title was held in trust or fee, may purchase such tract from the Secretary of the Interior under the following terms and conditions:
 - (1) The purchase price to a former Indian owner shall be the total amount paid by the United States to acquire such tract and all interests therein, plus interest thereon from the date of acquisition at a rate determined by the Secretary of the Treasury taking into consideration the average market yield of all outstanding marketable obligations of the United States at the time the tract was acquired by the United States, adjusted to the nearest one-eighth of 1 per centum. The purchase price to a former non-Indian owner shall be present fair market value of the tract as determined by the Secretary of the Interior.
 - (2) Not less than \$100 or 20 per centum of the purchase price, whichever is less, shall be paid at the time of purchase, and the balance shall be payable in not to exceed 20 years with interest at a rate determined by the Secretary of the Treasury taking into account the current average market yield on outstanding marketable obligations of the United States with twenty years remaining to date of maturity, adjusted to the nearest one-eighth of 1 per centum.
 - (3) Title to the tract purchased shall be held in trust for the purchaser if it was held in trust status at the time the tract was acquired by the United States; otherwise, the title to the tract purchased shall be conveyed to the purchaser subject to a mortgage and such other security instruments as the Secretary deems appropriate. If a tract purchased under this subsection is offered for resale during the following ten-year period, the tribe must be given the first right to purchase it.
 - (4) The unpaid balance of the purchase price shall be a lien against the land if the title is held in trust and against all rents, bonuses, and royalties received therefrom. In the event of default in the payment of any installment of the purchase price the Secretary may take such action to enforce the lien as he deems appropriate, including foreclosure and conveyance of the land to the Oglala Sioux Tribe.
 - (5) An application to purchase the tract must be filed with the Secretary of the Interior within one year from the date a notice is published in the *Federal Register* that the tract has been transferred to the jurisdiction of the Secretary.

- (6) No application may be filed by more than five of the former owners of an interest in the tract. If more than one such application is filed for a tract the applicants must agree on not more than five of the former owners who shall make the purchase, and failing such agreement all such applications for the tract shall be rejected by the Secretary.
- (7) “Former owner” means, for the purposes of subsection (b) of this section, each person from whom the United States acquired an interest in the tract, or if such person is deceased, his spouse, or if such spouse is deceased, his children.

Section 441m. Disposition of excess gunnery range lands and reservation lands; purchase; terms and conditions; life estates and use restrictions

(a) Gunnery range lands; reservation lands

All Federal lands and interests in lands within the Badlands Air Force gunnery range that are outside the boundaries of the park, and that have been declared excess to the needs of the Department of the Air Force, and that are not purchased by former owner under section 441l(b) of this title, and all lands that have been acquired by the United States under authority of title II of the National Industrial Recovery Act of June 16, 1933 (48 Stat. 200), and subsequent relief Acts, situated within the Pine Ridge Indian Reservation, administrative jurisdiction over which has heretofore been transferred by the President from the Secretary of Agriculture to the Secretary of the Interior by Executive Order Numbered 7868, dated April 15, 1938, shall be subject to the following provisions of this section.

(b) Purchases

Any former Indian owner of land that is within the Badlands Air Force gunnery range and outside the boundaries of the park and that has not been declared excess to the needs of the Department of the Air Force on August 8, 1968, may, within the period specified in section 441l(b)(5) of this title, elect (i) to purchase an available tract of land described in subsection (a) of this section of substantially the same value, or (ii) to purchase the tract formerly owned by him at such time as such tract is declared excess and transferred to the Secretary of the Interior as provided in section 441l(a) of this title.

(c) Life estates and use restrictions

Any former Indian owner of a tract of land within the boundaries of the park that was acquired by the United States for the Badlands Air Force gunnery range, and that is transferred to the Secretary of the Interior pursuant to section 441k of this title, may, within the period specified in section 441l(b)(5) of this title, elect (i) to acquire from the Secretary of the Interior a life estate in such tract at no cost, subject to restrictions on use that may be prescribed in regulations applicable to the park, or (ii) to purchase an available tract of land described in subsection (a) of this section of substantially the same value.

(d) Purchase restrictions

Purchases under subsection (b) and clause (ii) of subsection (c) of this section shall be made on the terms provided in section 441l(b) of this title.

Section 441n. Lands outside gunnery range; exchange of lands; reservation of mineral rights; grazing and mineral development rights of Indians; execution of instruments; trust title

(a) Exchange of lands; mineral and grazing rights

Title to all Federal lands and interests in land within the boundaries of the Badlands Air Force gunnery range that are outside the boundaries of the park, and that are transferred to the administrative jurisdiction of the Secretary of the Interior as provided in section 441l(a) of this title, including lands hereafter declared to be excess, and that are not selected under sections 441l(b) or 441m of this title, and title to all lands within the boundaries of the park that were acquired by the United States for the Badlands Air Force gunnery range, subject to any life estate conveyed pursuant to section 441m(c) of this title and subject to restrictions on use that may be prescribed in regulations applicable to the park, which regulations may include provisions for the protection of the black-footed ferret, may be conveyed to the Oglala Sioux Tribe in exchange (i) for the right of the United States to use all tribal land within the park for park purposes, including the right to manage fish and wildlife and other resources and to construct visitor use and administrative facilities thereon, and (ii) for title to three thousand one hundred fifteen and sixty-three one-hundredths acres of land owned by the Oglala Sioux Tribe and located in the area of the Badlands Air Force gunnery range which is not excess to the needs of the Department of the Air Force and which is encompassed in civil action numbered 859 W. D. in the United States District Court for the District of South Dakota, if such exchange is approved by the Oglala Sioux Tribal Council. The lands acquired under paragraph (ii) shall become a part of the Badlands Air Force gunnery range retained by the Department of the Air Force. The United States and the Oglala Sioux Tribe shall reserve all mineral rights in the lands so conveyed. The right of the United States to use for park purposes lands that were tribally owned prior to August 8, 1968, shall not impair the right of the Oglala Sioux Tribe to use such lands for grazing purposes and mineral development, including development for oil and gas.

(b) Execution of instruments

The Oglala Sioux Tribal Council may authorize the execution of the necessary instruments to effect the exchange on behalf of the tribe, and the Secretary may execute the necessary instruments on behalf of the United States.

(c) Trust title

After the exchange is effected the title of the Oglala Sioux Tribe to the property acquired by the exchange shall be held in trust subject to the same restrictions and authorities that apply to other lands of the tribe that are held in trust.

Section 441o. Facilities for interpretation of park and history of Sioux Nation; conveyance of reservation lands; submission of terms to Congressional committees

The Oglala Sioux Tribe may convey and the Secretary of the Interior may acquire not to exceed forty acres of tribally owned lands on the Pine Ridge Indian Reservation for the purpose of erecting thereon permanent facilities to be used to interpret the natural phenomena of the park and the history of the Sioux Nation: Provided, That no such conveyance shall be made until sixty days after the terms thereof have been submitted to the Interior and Insular Affairs Committees of the House of Representatives and the Senate.

APPENDIX B: STUDY OF PROPOSED SHUTTLE SYSTEM

**Castle Trail Complex
Demonstration Transportation System Plan
Badlands National Park**

May 2003

Badlands National Park

South Dakota

United States Department of the Interior
National Park Service – Denver Service Center

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1.0 INTRODUCTION

1.1 Badlands National Park

Located south of Interstate 90 in southwestern South Dakota, the 244,000-acre Badlands National Park showcases eroded rocks formations – buttes, pinnacles and spires – along with native, mixed-grass prairie. In addition, the park offers visitors opportunities to hike, bicycle, camp, photograph nature, and observe wildlife. The park annually hosts an average of 1.2 million visitors, seventy-percent of which visit between June and August. The next highest visitation months, or shoulder season months, occur in September, October and May. Figure 1 shows the park and its relation to Interstate 90 and southwestern South Dakota.

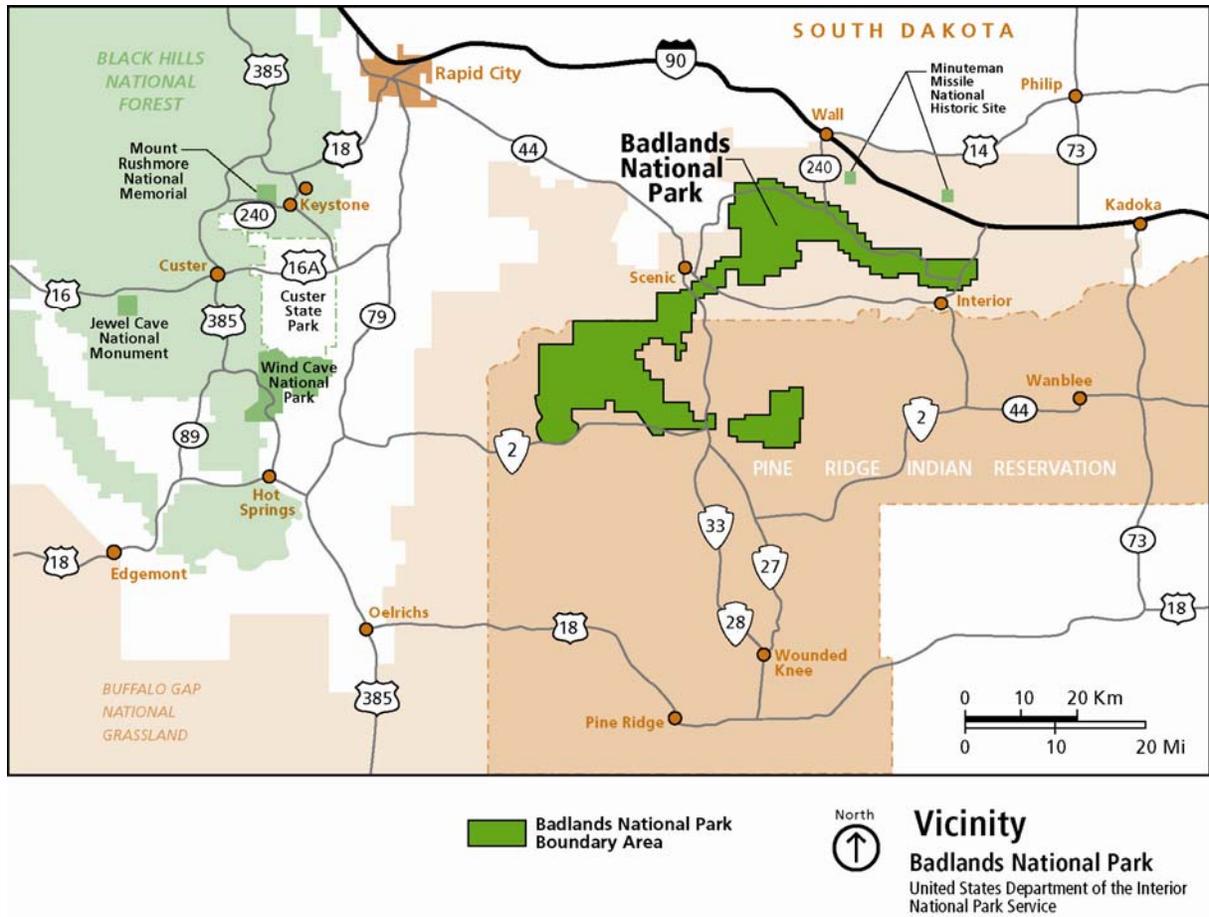
The park is divided into three units – the North Unit, the Stronghold Unit and the Palmer Creek Unit. The latter two are located within the Pine Creek Indian Reservation and are jointly managed under a cooperative agreement with the Oglala Lakota Nation. The North Unit, containing the 64,000-acre Badlands Wilderness Area, experiences the highest visitation. The Ben Reifel Visitor Center is in this unit, as are the Cedar Pass Lodge, the Cedar Pass Campground, the Castle Trail Complex, and the primary park roadway.

Most visitors travel through the park on South Dakota State Highway 240 (SH 240) between the Northeast Entrance (main entrance) off Interstate 90 Exit 131 (Cactus Flats) and the Pinnacles entrance off Interstate 90 Exit 110 (Wall). The 27-mile portion of SH 240 through the park is known as Badlands Loop Road and is the primary park roadway. Figure 2 shows the North Unit and the Loop Road. This paved road accesses the Cedar Pass area developments, trailheads in the Castle Trail Complex and pull off areas for overlooks. The park staff perceives a need for a shuttle servicing the various trailheads in the Castle Trail Complex during the prime visitation months of May through September. Thus, a demonstration transportation system will run for one or two seasons from May to September in order to decide if this is a worthwhile service to provide on a permanent basis.

1.2 Report Purpose

The purpose of this report is to provide recommendations for developing and evaluating a demonstration transportation system plan for a shuttle servicing the Castle Trail Complex in Badlands National Park. The recommendations include visitor use projections, a fleet operations and maintenance plan, a marketing plan to inform visitors about the service, recommendations for sustainable and environmentally sensitive operation, a financial plan, and an evaluation plan to determine if the goals of the demonstration system were met.

Figure 1 Vicinity Map



United States Department of the Interior

Source: National Park Service

National Park Service

DSC 137/20037

Figure 2 Badlands National Park North Unit Map



United States Department of the Interior

Source: National Park Service

National Park Service

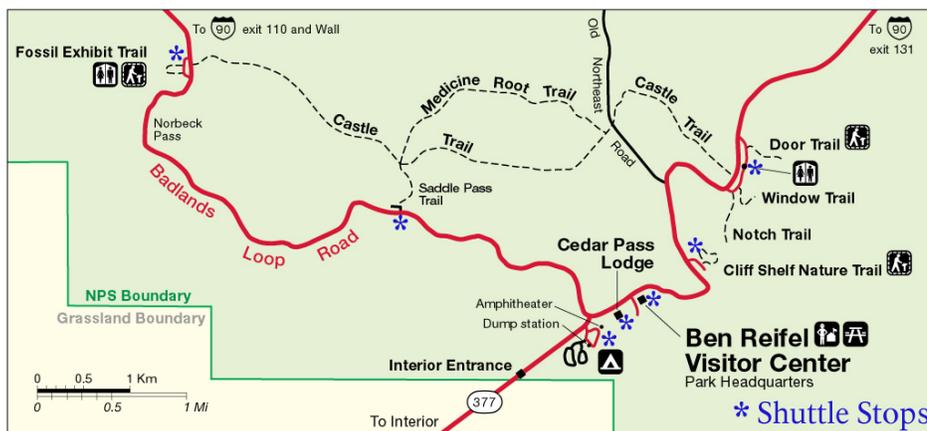
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2.0 CASTLE TRAIL COMPLEX

Figure 3 shows the Castle Trail Complex area. It is in the Cedar Pass area of the North Unit. Cedar Pass is currently the center of visitor information, accommodations and services including the Ben Reifel Visitor Center, park headquarters, Cedar Pass Lodge and Restaurant, and the Cedar Pass Campground. The Castle Trail Complex contains eight hiking trails of various lengths:

- Fossil Exhibit Trail
- Castle Trail
- Medicine Root Trail
- Saddle Pass Trail
- Door Trail
- Window Trail
- Notch Trail
- Cliff Shelf Nature Trail

Figure 3 Castle Trail Complex Area



United States Department of the Interior

Source: National Park Service

National Park Service

DSC 137/20039

With the exception of the Medicine Root Trail, each trail can be accessed via a trailhead adjacent to a parking lot. One parking lot serves the Door, Window, Notch, and Castle Trails. The Fossil Exhibit Trail parking lot also serves the west end of the Castle Trail. The Saddle Pass Trail has its own parking lot. The following trails are out-and-back type trails and can not be accessed by another trail:

- Fossil Exhibit Trail
- Door Trail
- Window Trail
- Notch Trail
- Cliff Shelf Nature Trail

The Medicine Root Trail is a branch of the Castle Trail and can only be accessed by it. The Saddle Pass Trail intersects the Castle Trail. Thus, these trails can be linked together to provide a longer hiking experience.

The park staff has identified a safety issue of visitors getting lost on the trails and ending up at a trailhead far from their origination. Thus, people walk along the Badlands Loop Road to reach the parking lot where they parked their vehicle or call park rangers for assistance. Some of the factors that contribute to the confusion on the trails include poor signage, intense heat and dehydration. The extreme temperatures experienced in the summer months coincide with the peak visitation months.

3.0 DEMONSTRATION TRANSPORTATION SYSTEM GOALS

In addition to increasing safety by picking up lost people, the system can expand opportunities for other Castle Trail Complex users. The goals of the demonstration transportation system (hereafter referred to as shuttle) are to:

- **Improve Service to Castle Trail Complex Users.** The park would like to increase recreational opportunities for bicyclists - a shuttle would provide an option to ride in a vehicle up hill and bicycle back down. Hiking route options increase if it is not necessary for visitors to begin and end their hike at the same trailhead. Visitors staying in the campground would have the option to leave their vehicles at the campsite and still access the visitor's center and the trailheads. Visitors that end up several miles from their initial trailhead would not have to contact park rangers to pick them up.
- **Increase Safety in the Castle Trail Complex.** Some visitors unintentionally end up at a different trailhead from the one at which they parked their vehicle and walk along the Loop Road to return to the correct parking lot. The Loop Road is not designed to accommodate both vehicles and pedestrians and conflicts occur. Some of these visitors are also dehydrated and need quick access to water.
- **Operate System with Minimal Resource Impacts.** The operation and maintenance of the shuttle vehicles needs to be environmentally sensitive. The system may reduce

the number of vehicles using this section of the Loop Road and its parking lots, thereby decreasing wear and tear and maintenance requirements. However, a change of this nature will not be perceptible after only one or two years of shuttle operation.

4.0 VISITOR PROJECTIONS

This section presents five, ten and twenty year shuttle ridership projections. It includes an analysis of regional visitation trends along with the methodology used to forecast the shuttle ridership.

4.1 Regional Visitation Trends

South Dakota Tourism

Table 1 provides annual visitation statistics for a variety of regional tourist attractions. As shown, the most popular attractions in the region are in the National Park System. Popular destinations in the state include Custer State Park, the Lewis and Clark Recreation Area, the Crazy Horse Memorial and Badlands National Park. Badlands National Park attracted about 955,469 visitors during 2002, slightly less than Wind Cave National Park.

Table 1. Visitation to National Parks and Other Attractions, 2000 to 2002

	Location	2000	2001	2002	% Chg '00 - '02
Mount Rushmore National Memorial	South Dakota	2,522,288	2,570,271	2,922,002	16%
Custer State Park	South Dakota	1,693,887	1,666,938	1,820,154	7%
Lewis and Clark Recreation Area	South Dakota	1,028,697	1,071,621	1,070,190	4%
Crazy Horse Memorial	South Dakota	1,000,000+	1,000,000+	1,000,000+	0%
Wind Cave National Park	South Dakota	872,194	874,026	965,416	11%
Badlands National Park	South Dakota	1,105,824	955,469	927,762	-16%
Sturgis Rally	South Dakota	592,000	410,000	450,000	-24%
Devils Tower National Monument	Wyoming	383,468	375,596	404,934	6%

Corn Palace ¹	South Dakota	300,852	267,094	294,922	-2%
Redlin Art Center	South Dakota	234,648	231,304	195,552	-17%
Storybook Land ²	South Dakota	142,992	126,039	120,559	-16%
Jewel Cave National Monument	South Dakota	129,445	125,678	131,565	2%
Fort Sisseton State Park	South Dakota	107,799	111,219	107,862	0%
Mammoth Site	South Dakota	105,706	96,160	107,102	1%
Cultural Heritage Center	South Dakota	20,733	22,984	19,741	-5%

Note: 2002 visitor statistics were not yet available for many attractions.

¹Memorial Day to Labor Day only.

²April to October only.

Source: National Park Service, South Dakota Visitors Bureau

Because visitation to many attractions dipped in 2001, presumably as a result of the September 11 terrorist attacks, the analysis calculated the percent change in visitation between 2000 and 2002 for each attraction. Growth in the number of visitors occurred at a few other National Parks, such as Wind Cave National Park (11 percent). Notably, the Badlands has experienced reduced visitation during the last few years (discussed below).²

Table 2 and Figure 4 present South Dakota visitor expenditure. Total expenditures by visitors to the state were \$662.9 million dollars. More than half of tourist dollars are typically spent in the Black Hills, Badlands and Lakes region (57 percent in 2002). As shown in Figure 4, visitor expenditures remained relatively flat for most of the 1990's in real terms, with highest spending between 1998 and 2000. Visitor spending decreased during 2001 and then rebounded in 2002. Expenditure in the Black Hills, Badlands and Lakes Region tends to follow that of the state as a whole, and shows a slight upward trend over time.

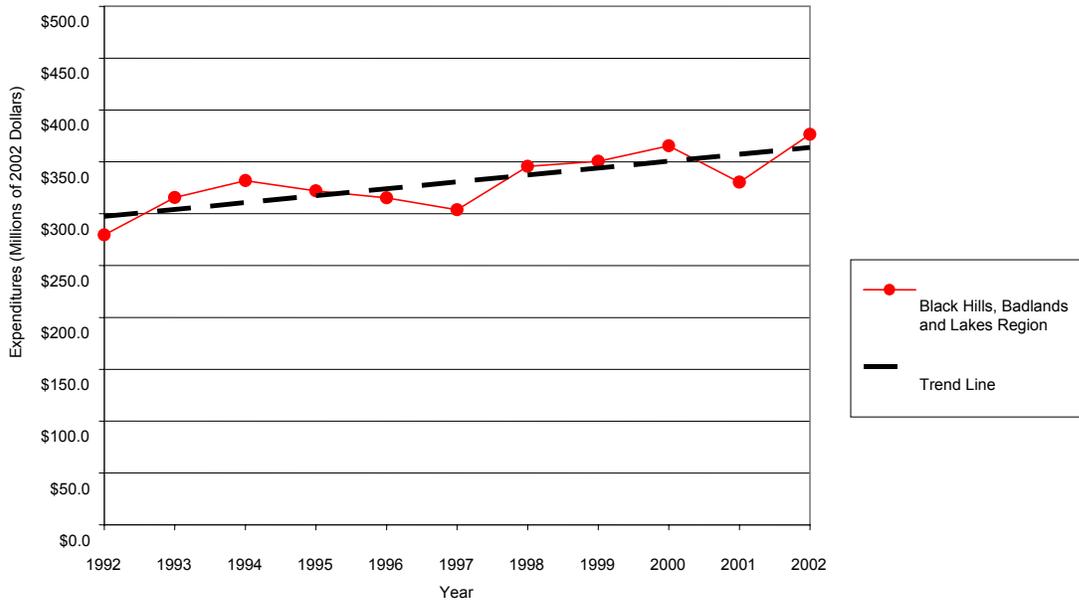
² Visitation statistics for other parks were included for comparative and contextual purposes, but are not the basis for Badlands visitation projections.

Table 2. South Dakota Visitor Expenditures by Region, 1992-2002(Millions of 2002 Dollars)

Year	Glacial Lakes and Prairies	Southeast	Great Lakes	Blackhills, Badlands & Lakes	Total All Regions
1992	\$56.4	\$109.5	\$57.7	\$279.6	\$503.2
1993	\$57.8	\$118.1	\$67.3	\$315.7	\$558.9
1994	\$70.2	\$125.2	\$77.2	\$331.9	\$604.6
1995	\$66.1	\$125.2	\$74.5	\$322.1	\$587.9
1996	\$64.4	\$121.9	\$76.6	\$315.4	\$578.2
1997	\$68.2	\$123.2	\$78.5	\$303.9	\$573.8
1998	\$72.6	\$142.0	\$82.0	\$345.7	\$642.3
1999	\$70.3	\$139.0	\$78.0	\$350.6	\$637.9
2000	\$70.1	\$136.3	\$77.0	\$365.5	\$649.0
2001	\$67.0	\$134.8	\$76.2	\$330.5	\$608.5
2002	\$69.7	\$140.2	\$76.4	\$376.6	\$662.9

Source: South Dakota Governor's Conference on Tourism

Figure 4. Visitor Expenditure Trend for the Black Hills, Badlands & Lakes Region



Source: South Dakota Governor's Conference on Tourism

Historic Visitation to Badlands National Park

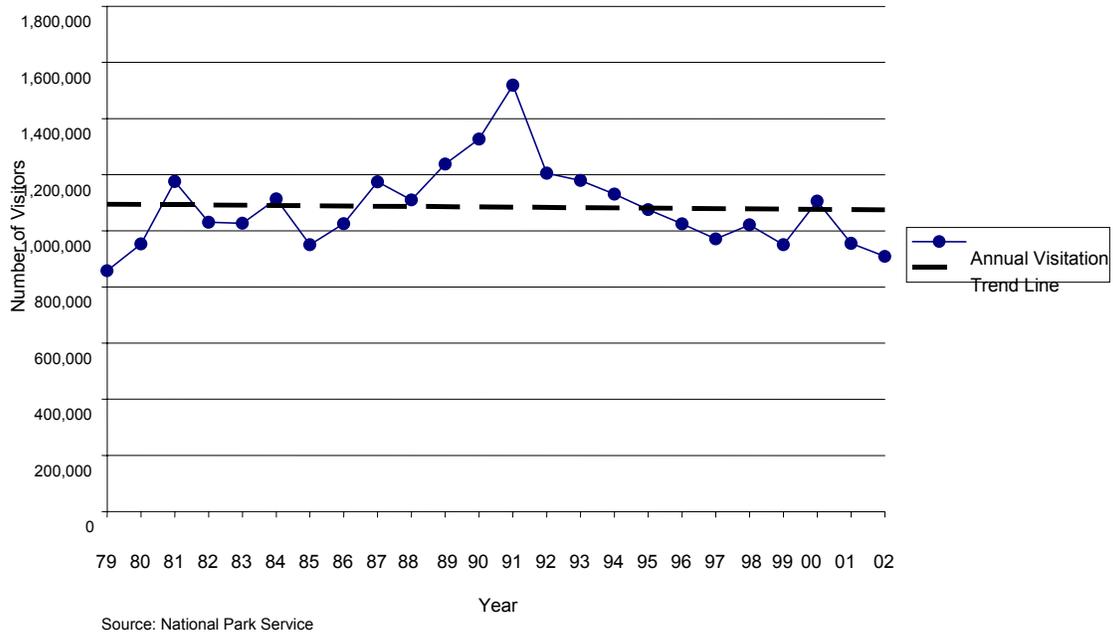
Badlands National Park is located about 70 miles east of Rapid City, and many park visitors consist of vacationers who make a relatively brief visit to the park on their way to other destinations. Table 3 and Figure 5 show that recreational visitation to Badlands National Park averages about 1 million persons annually. While the number of visitors fluctuates from year to year (generally in the range of about 900,000 to 1.2 million persons annually), the overall visitation trend remains relatively flat. Visitation has declined slightly in the past two years, but this is not inconsistent with a relatively stable long-term trend with an average of about 1 million annual visitors.

Table 3. Visitation to Badlands National Park, 1979 – 2001

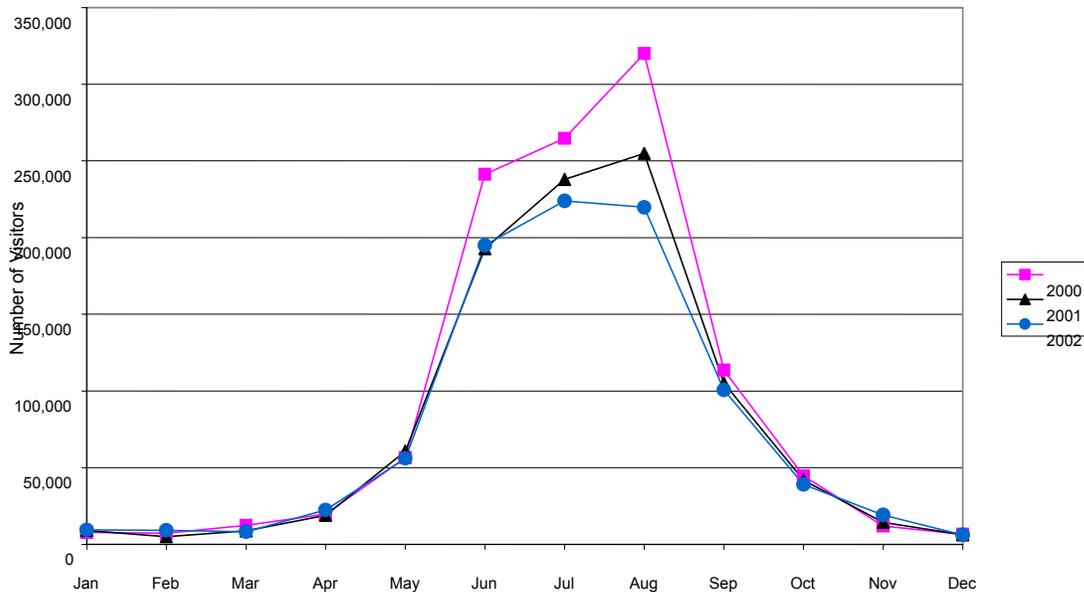
Year	Recreation Visits	Total Visits
1979	858,000	870,000
1980	952,652	964,652
1981	1,175,952	1,187,952
1982	1,030,484	1,042,484
1983	1,026,981	1,038,981
1984	1,113,675	1,125,675
1985	950,242	962,242
1986	1,025,630	1,037,630
1987	1,174,398	1,186,398
1988	1,110,040	1,122,040
1989	1,237,956	1,249,956
1990	1,326,475	1,338,475
1991	1,518,396	1,530,396
1992	1,205,297	1,224,161
1993	1,179,458	1,198,322
1994	1,130,459	1,149,323
1995	1,075,569	1,094,433
1996	1,024,705	1,043,569
1997	970,696	989,560
1998	1,021,049	1,039,913
1999	950,453	969,317
2000	1,105,824	1,124,688
2001	955,469	974,333
2002	908,898	927,762
Average Last 5 years	988,339	1,007,203
Average Last 10 years	1,032,258	1,051,122

Source: National Park Service

Figure 5. Recreational Visitors to Badlands National Park



Visitation to the park is highly seasonal, with the majority of visitors arriving between Memorial Day and Labor Day. Figure 6 shows that seventy-five percent of all visits in 2002 were in the months of June, July and August. Notably, the number of visitors during the low season months (October to May) appears to be relatively stable, with most annual variation occurring during the summer months.

Figure 6. Monthly Visitation to Badlands National Park, 1999-2001

Source: National Park Service

4.2 Badlands Visitor Patterns

This section includes a discussion of visitation patterns and visitor characteristics that provide the context for the projections of usage of the shuttle.³

Visitor Patterns and Characteristics

Following are key factors regarding visitation to Badlands National Park that will influence use of the shuttle:

- Most Badlands visitors enter the Park at the Northeast entrance. Most visitors are traveling from east to west (approximately 80 percent). The most common states from which visitors originate are Minnesota (9 percent), Wisconsin (9 percent), Illinois (8 percent) and Michigan (8 percent). Travelers are less likely to stop on their return trip, when they are more likely to be pressed for time.
- Most visitors come in family groups (61 percent), or with friends (20 percent) (Seven percent come with both, and another seven percent come alone). Many see the sign on the interstate and decide to visit at the spur of the moment.

³Information presented is from the 1999 Badlands General Management Plan, 2000 Visitor Survey, and interviews with Park staff.

- Most visitors (83 percent) stay in the park less than one day. Of those visitors, about 74% spent four hours or less. Campers and lodge visitors typically stay in the park one night.
- Sunday and Monday are the busiest visitor days.
- As Figure 7 shows, the most frequently visited sites by far are the Pinnacles Overlook (67%) and Ben Reifel Visitor Center (65%). Other popular sites include the Journey Overlook Picnic Area (39%), Roberts Prairie Dog Town (37%) and the Cedar Pass Lodge (36%).
- The number of bus tour groups visiting the park has been increasing in recent years. These groups tend to be on very tight schedules, and are very unlikely to make use of the shuttle system.

Hiker Characteristics

Hikers have been identified as the primary consumers of the shuttle. While not much information exists about their current usage of trails, following are key points based on the 2000 Visitor Study, conversations with park staff and other park documents:

- According to the 2000 Visitor Study, 40% of visitors report hiking on a maintained trail during their visit. However, most visitors are not likely to hike long distances.
- Park staff estimate that there are at least 50 to 100 hikers in the park most days during the high season, with less hiking occurring during July and August due to the heat. Visitors are also more likely to visit trails during the morning and late afternoon.
- Figure 8 shows that, of visitors who hike at the park, more than half visit the Fossil Exhibit Trail (54%). Other popular trails include the Door Trail (40%), the Windows Trail (38%) and the Cliff Shelf Trail (28%). The most popular trails are the shortest ones.⁴

⁴Because the survey was completed during August, the month that typically has the highest temperatures, it is probable that survey respondents were less likely to hike than shoulder season visitors.

Figure 7. Sites Visited This Visit

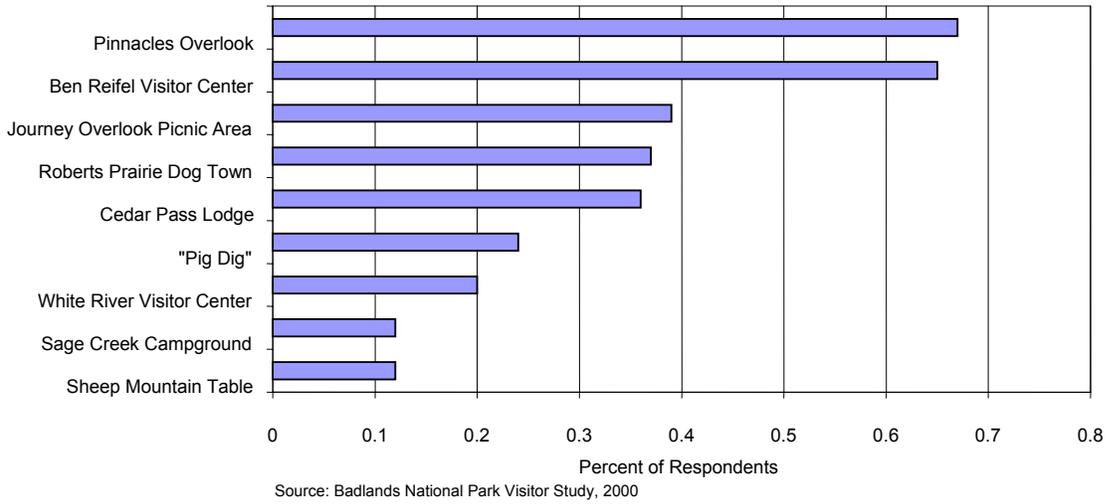
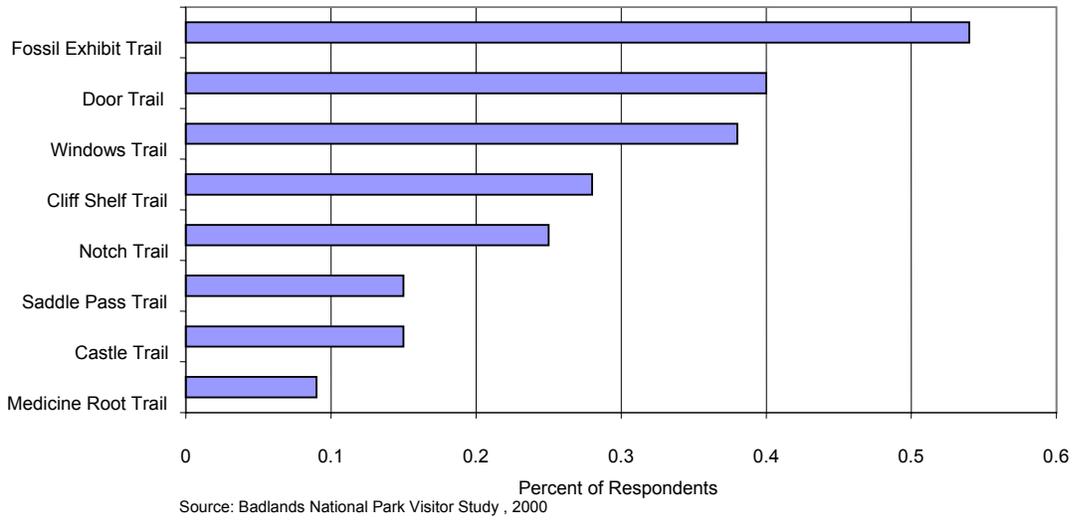


Figure 8. Trails Hiked During Visit to Badlands National Park



4.3 Ridership Projections and Planning Parameters

Based on experience and the discussion above, following are key considerations for ridership projections for the shuttle:

- A high percentage of visitors will not make use of the shuttle system because they do not plan to hike very far and do not plan to stay in the park long.
- Visitors who stay overnight in the park will be more likely to make use of the shuttle.
- Some visitors who do not intend to hike any of the trails will still choose to ride the shuttle as a way to view the park.
- While the highest visitation to the Badlands occurs in July and August, these are also the months with the warmest weather. Because visitors are less likely to hike in extreme heat and serious hikers are more likely to plan their trip during the shoulder seasons, shuttle usage will show less monthly variation than overall park visitation.

Five-, Ten- and Twenty-Year Projections

These projections assume that the shuttle will be marketed according to the Marketing Plan described below, including conspicuous signage and readily available information regarding shuttle stops and times. The projections also assume that the shuttle will be operated in accordance with the following operations plan, and that the shuttles will run according to schedule.

Table 4 presents the projections for the shuttle. Projections for Badlands National Park are included for comparative purposes. The analysis used a simple linear regression model to forecast park visitation, using annual Badlands visitation as the dependent variable and time as the independent variable.⁵ Because visitation to the Badlands shows a great deal of variation from year to year (see Figure 2), the analysis calculated a range of projections, with the regression results as the “medium” projection, and “low” and “high” projections calculated by adjusting the medium projections upward and downward by ten percent. The estimates of shuttle usage are calculated as a percentage of park visitation, assuming that 5% of visitors who stay in the Park five or more hours will use the shuttle.⁶ (According to the Visitor Survey, 27% of visitors stay in the park for five or more hours, but this figure was adjusted upward to 30%, assuming that shoulder season visitors are slightly more likely to stay longer in the park because the weather is not as extreme). For both the Badlands National Park and the shuttle, “low” projections were calculated as 90 percent of the “medium” scenario, and “high” projections were calculated as 110 percent of the “medium” scenario.

⁴The projection was based on visitation from 1979 to 2000 because this period was deemed to be more indicative of a long-term trend, based on conversation with Park staff.

⁵Five percent estimated based on conversations with Park Staff. ERA did not use other NPS shuttle systems as a benchmark because visitor characteristics and shuttle systems vary so greatly between Parks.

Table 4. Shuttle Annual Ridership Projections

Year	Range	Badlands National Park	Castle Trail Complex Shuttle
Year 5	Low	999,630	14,994
	Medium	1,110,699	16,660
	High	1,221,769	18,327
Year 10	Low	1,004,535	15,068
	Medium	1,116,150	16,742
	High	1,227,765	18,416
Year 20	Low	1,014,346	15,215
	Medium	1,127,051	16,906
	High	1,239,756	18,596

Based on experience and the considerations discussed above, the shuttle is estimated to attract 16,660 riders in Year 5, 16,742 riders in Year 10, and 16,906 riders in Year 20 (under the medium scenario). These projections refer to one-way shuttle rides, given that many hikers and bicyclists that use the shuttle will only take the shuttle in one direction (as a means to return to their vehicle).

Design Day Projections

The “design day” shuttle ridership is estimated to assist in planning for the capacity requirements. The design day projections indicate the capacity requirements of high shuttle usage days, but are not intended to represent peak shuttle usage. These projections are intended to aid in designing the shuttle in order to comfortably accommodate peak crowd loads on a normal high day. (It should be noted that the shuttle is expected to carry significantly higher numbers of visitors on occasion, such as when a large group decides to ride the shuttle together).

Table 5 presents the projected design day shuttle usage. The design day estimates are based on projected shuttle usage in Year 5. Based upon the visitor patterns and weather considerations discussed above, a factor of 27% was applied to represent the peak month (June) as a percentage of annual visitation. While August is the peak month for park visitation, hikers are more likely to visit the Park during the shoulder season due to the summer heat. This estimate also takes into account the fact that the shuttle will only run between May and September. This yielded a peak

monthly ridership of about 4,409 (under the medium scenario). The average weekly number of shuttle riders during the peak month is estimated as 1,052.

A factor of 16% is applied to represent the portion of weekly shuttle trips occurring on a weekend.⁷ This results in projected daily shuttle trips of 168 (under the “medium” scenario). Assuming 14% of design day visitors would use the shuttle during the peak hour, these estimates yield a required hourly capacity of 24 shuttle riders.⁸

Table 5. Projected Design Day Visitation

Planning Factors	Projected Shuttle Riders		
	Low	Medium	High
Annual Ridership	15,000	16,700	18,300
Peak Month as % of Year	27%	27%	27%
Estimated Peak Month Ridership	4,050	4,509	4,941
Number of Weeks in Month	4.3	4.3	4.3
Estimated Average Weekly Ridership During Peak Month	945	1,052	1,153
Estimated % of Weekly Ridership Occurring on a Peak Day	16%	16%	16%
Estimated Peak Day Ridership During Peak Month	151	168	184
Estimated % of Ridership Occurring During Peak Hour of	14%	14%	14%
Estimated Peak Ridership During the Design Day	21	24	26

Source: Economics Research Associates

Note: Design Day shuttle usage based on Year 5.

⁶This percentage is based on the assumption that peak day ridership would be slightly higher than 14 percent, which would be the distribution if visitation were distributed evenly throughout the week, given that visitors who spend a longer amount of time in the park are more likely to ride the shuttle.

⁷ ERA estimated peak hourly shuttle trips based on the assumption that peak ridership will occur in the morning or late afternoon, when the heat is less severe (if ridership were distributed evenly throughout the day, 10 percent of daily shuttle riders would ride the shuttle each hour).

5.0 OPERATIONS AND MAINTENANCE PLAN

This section recommends an operations and maintenance plan for the shuttle. The shuttle will be free during the demonstration period, although the evaluation plan tests the willingness to pay for the service. It will accommodate pedestrians and bicyclists.

5.1 System Characteristics

Description: Shuttle route operating between the Door / Window / Notch Trail parking area and the Fossil Exhibit Trail parking area from May to September

Round-Trip Length: Approximately 15 miles

Stops: The shuttle will start at the Door / Window / Notch Trail parking area, travel to the Fossil Exhibit Trail parking area, turn around, and then travel back to the Door / Window / Notch Trail parking area. Intermediate stops include:

- Cliff Shelf Nature Trail parking area
- Ben Reifel Visitor Center
- Cedar Pass Lodge
- Cedar Pass Campground
- Saddle Pass Trail parking area

The shuttle will stop at the intermediate locations twice during each round trip (both going to the Fossil Exhibit area and coming from the Fossil Exhibit area).

The number of parking spaces required at the shuttle stops for the trailheads is estimated based on the visitor use projections, the percent of visitors using each trail and the average vehicle occupancy. No parking is assumed for the campground since each campsite has provisions for parking a vehicle. Furthermore, no additional shuttle parking is assumed to be necessary for the Visitor Center stop since anyone boarding the shuttle here presumably parked to visit the Visitor Center as well as use the shuttle.

It is assumed that the people using a particular trail will park at that trailhead for a period of two hours. The projections forecast a demand of 24 people per hour. As Figure 8 shows, the 2000 Summer Visitor Study captured the percentage of respondents that used each trail. This percentage is applied to the shuttle demand to determine how many people will park at each trailhead. Some of these people may have used more than one trail, so the number of trail users and, hence, vehicles, may be overstated. The visitors for the Castle and Medicine Root Trails are distributed amongst the Door/Window/Notch, Saddle Pass and Fossil Exhibit Trails since they can be accessed from each of these trailheads. The average vehicle occupancy used in this analysis is 2.4, which is based on information in the 2000 Air Emissions Inventory report. Table 6 shows the resulting parking space estimates.

Table 6. Estimated Parking Space Requirements per Shuttle Stop

Shuttle Stop	Visitor Percentage	Visitors Per Hour	Visitor Accumulation	Vehicles
Door/Window/Notch	111	27	54	23
Cliff Shelf Nature	28	7	14	6
Saddle Pass	23	6	12	5
Fossil Exhibit	62	15	30	13

Running Speed: 15 miles per hour in heavy traffic conditions

Average Service Time at Each Stop: 2 minutes

Assumed Cycle Time: 90 minutes (includes travel time, stops and recovery time)

Schedule: 7 am to 8 pm every day from May 1 to September 30

Table 7 shows a sample service schedule for the morning time period.

Service Frequency: Every 45 minutes between 7 am and 10 am, every 90 minutes from 10 am to 5 pm, and every 45 minutes from 5 pm to 8 pm. The 45-minute frequency coincides with the peak activity periods in the park.

Fleet Requirements: 2 vehicles with a capacity of 20-25 passengers per vehicle. Each vehicle also must have the capacity to carry 2 to 3 bicycles and be ADA accessible.

Staffing Requirements: Four seasonal drivers – two drivers per day during the morning and evening periods; one driver per day during the mid-day period; one driver to provide relief for days off.

5.2 Operations and Maintenance

The NPS has two options for operating and maintaining the shuttle system. They are:

- Hire a contractor to provide the shuttle vehicles, operate the shuttle service, and maintain the vehicles. The contractor could be a local transit agency, private shuttle operator or concessionaire.
- Provide the shuttle vehicles and hire a contractor to operate the shuttle service and maintain the vehicles.

Operations of the shuttle system would include providing vehicle operators, data collection (boardings and alightings at each stop), monthly reporting of data, and other staff costs. It would not include marketing costs or provision of vehicle or shuttle stop signage. Maintenance duties would include general upkeep of the vehicles including fueling, cleaning, and preventative maintenance.

Badlands National Park staff currently services, stores and fuels their fleet of 49 gasoline and diesel vehicles at a maintenance facility near the Visitor Center. The capability of the park's vehicle maintenance staff and facility to accommodate two additional vehicles on a permanent basis is unknown. If the shuttles were to be made permanent, then the park would have to make an assessment of its overall capability to accommodate these additional two vehicles based on its experience with the demonstration program. An assessment would address the need for additional maintenance staff and expansion of maintenance facilities at Cedar Pass.

Table 7. Sample Service Schedule

STOP NO.	WESTBOUND - DOOR/WINDOW/NOTCH TO FOSSIL EXHIBIT						EASTBOUND - FOSSIL EXHIBIT TO DOOR/WINDOW/NOTCH						
	DWN	CS	BR	CPL	CPC	SP	FE	SP	CPL	BR	CS	DWN	
DWELL/LAYOVER (min)	10	2	2	2	2	2	10	2	2	2	2	0	
TRAVEL TIME to next	4	3	2	2	7	7	7	7	2	2	3	0	
TOTAL TIME (min)	14	5	4	4	9	9	17	9	4	4	5	0	
subtotal one-way trip						45						45	
BUS A - Cycle 1	7:00A	7:14A	7:19A	7:23A	7:27A	7:36A	7:45A	8:02A	8:11A	8:15A	8:19A	8:24A	8:30A
BUS B - Cycle 1	7:45A	7:59A	8:04A	8:08A	8:12A	8:21A	8:30A	8:47A	8:56A	9:00A	9:04A	9:09A	9:15A
BUS A - Cycle 2	8:30A	8:44A	8:49A	8:53A	8:57A	9:06A	9:15A	9:32A	9:41A	9:45A	9:49A	9:54A	10:00A
BUS B - Cycle 2	9:15A	9:29A	9:34A	9:38A	9:42A	9:51A	10:00A	10:17A	10:26A	10:30A	10:34A	10:39A	10:45A
1	DWN	Door Window Notch Trail Parking Lot											
2	CS	Cliff Shelf Nature Trail Parking Lot											
3	BR	Ben Reifel Visitor Center											
4	CPL	Cedar Pass Lodge											
5	CPC	Cedar Pass Campground											
6	SP	Saddle Pass Trail Parking Lot											
7	FE	Fossil Exhibit Trail											

The major difference between the two options is the cost of acquiring the shuttle vehicles. Under the Option A, the contractor would provide the vehicles for the shuttle service. This could be a favorable option for NPS if funding to purchase the shuttle vehicles is not immediately available. Under Option B, NPS would provide the shuttle vehicles for the contract operator to operate and maintain. This may be the preferred option if there are no local operators that are able to provide vehicles.

Table 8 shows the vehicle and operating cost estimates for Options A and B. The operating cost estimates were calculated by multiplying the number of vehicle revenue hours by the estimated cost per revenue hour. The operating cost estimates shown are most likely higher than the cost of comparable contracted service in the Badlands Area and, therefore, are conservative estimates.

Table 8. Estimated Vehicle and Operating Costs for the Castle Trail Shuttle System

	Option A – Contractor provides vehicles	Option B – NPS provides vehicles
Vehicle cost - two 25-pass. buses with wheelchair lift (a) and bicycle rack (b)	\$0	\$171,600 (Diesel) \$231,600 (CNG)
Operator cost per revenue vehicle hour (c)	\$55	\$45 - \$50
Annual vehicle revenue hours (d)	2,907 hours	2,907 hours
Estimated annual operating cost	\$159,885	\$130,815 – \$145,350
Estimated vehicle + annual operating cost	\$159,885	\$302,415 – \$376,950

- (a) Cost for a 25-passenger bus is about \$75,000 to \$105,000 depending on whether it is powered by diesel or an alternative fuel, such as Compressed Natural Gas (CNG). Cost for wheelchair lift is approximately \$10,000. Cost estimates obtained from Airline Coach Services, Burlingame, CA.
- (b) Bicycle rack for 2 to 3 bicycles estimated at \$800. Cost for an 8- to 12-bicycle trailer would be \$6000. Cost estimates obtained from Sportworks in Woodinville, WA.
- (c) Cost per vehicle revenue hour for Option A was averaged from the hourly costs to operate the Golden Gate Park Shuttle in San Francisco, CA (Airline Coach Services) and the Caltrain Shuttle Program in San Francisco/ San Mateo/ Santa Clara Counties, CA (San Mateo County Transit District). Cost per vehicle revenue hour for Option B was obtained from Zion National Park Shuttle in Springdale, UT (Parks Transportation, Inc.)

Number of vehicle revenue hours assumes 2 shuttle vehicles, 153 days of revenue service per year, and 13 revenue hours per day for the first shuttle and 6 hours per day for the second

As shown in Table 8, the total start-up costs of implementing the Castle Trail shuttle system would be 90 to 135 percent greater with Option B due to vehicle procurement costs. However, the annual operating costs for Option B are lower, since the vehicle purchases would be a one-time expense.

At Zion National Park in Utah, a private contractor, Parks Transportation, Inc (PTI), operates and maintains the shuttle system in the Park (Option B). NPS provides the vehicles (35 in fleet) and built a maintenance facility for the shuttle vehicles. PTI has a five-year contract, with five one-year options to continue afterward. The Zion Canyon shuttle route is similar to the proposed Castle Trail shuttle in that it operates seasonally (April through October), has a route of similar distance (16.4 miles round trip), and is also free of charge. It is different from the Castle Trail system because it serves an area that is restricted to private vehicles during its operation (resulting in high ridership), has twice as many stops (15 total), and runs at frequencies of 6 to 30 minutes throughout the day. The cost to operate the Zion shuttle is about \$44 per revenue vehicle hour. The contractor has a limited number of staff working during the off-season, and NPS compensates PTI about \$52,000 per month to cover staff expenses and to maintain the vehicles.⁹

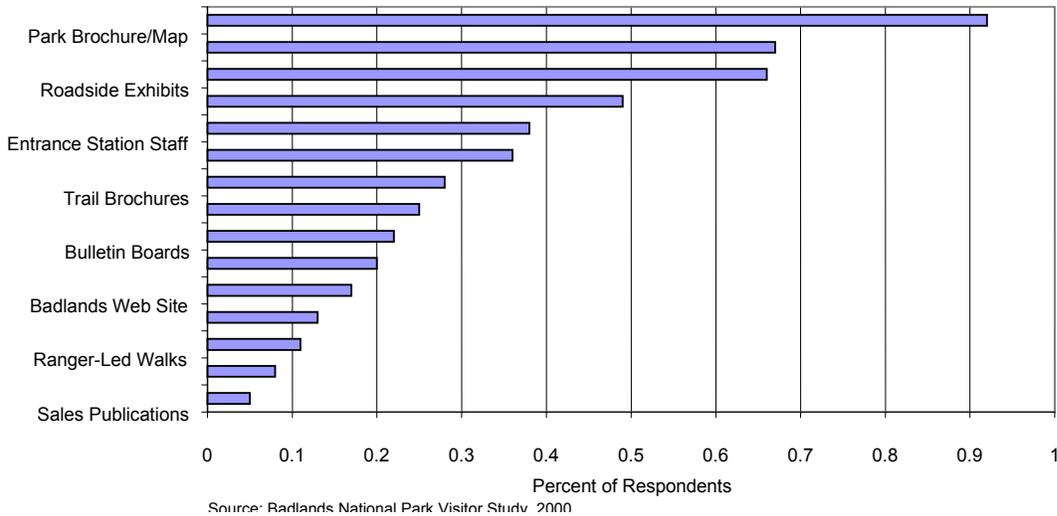
6.0 MARKETING PLAN

6.1 Factors Considered to Formulate Plan

In addition to the visitation patterns and visitor characteristics discussed above, following are additional factors considered in formulating the marketing plan for the shuttle:

- The majority of Badlands National Park visitors are visiting for the first time (about 65%), therefore are unlikely to know about the shuttle system prior to entering the Park. The most common sources of information consulted by visitors prior to visiting the Badlands are travel guides and tour books (48%) and friends or relatives (42%).
- According to the visitor survey, 18 percent of Badlands visitors consult the Badlands National Park web site prior to their visit, and 55 percent reported that they would prefer to use the Internet as a main source of information about the park in advance of their next visit.
- While in the park, the most common source of information used by visitors is the Badlands National Park Brochure (92%). As Figure 9 shows, visitors are also very likely to obtain information at the Visitor Center, roadside exhibits and from park staff.
- Most visitors speak English. According to the visitor survey, 93% of visitors are domestic and 7% are international. The most common sources of international visitors are Canada (4%), England (22%) and Germany (18%).

⁹ Correspondence with Kirk Scott, General Manager, Parks Transportation, Inc., February 2003.

Figure 9. Information Services Used This Visit

6.2 Specific Marketing Plan Recommendations

The marketing plan for the shuttle relies on a combination of conspicuous signage and easy to obtain information about the shuttle system. Below are specific recommendations for marketing the shuttle:

- Shuttle stops should be marked with conspicuous (colorful, large, and easy to read) signage. These signs will make visitors aware that the shuttle system exists, and make it easy for visitors to locate the shuttle stops.
- A Travelers Information System could be used in conjunction with signs on the Interstate to alert visitors to the presence of a shuttle system via car radio.
- Detailed information about the shuttle system should be available at the following locations:
 - In the park brochure (including on the park map) and in the park newspaper;
 - On bulletin boards at trailheads and overlooks
 - At all Park visitor centers, especially the Ben Reifel Visitor Center
 - At the Entrance Station
 - At the Cedar Pass Lodge and Gift Shop (if possible, information about the shuttle should be placed in each room)
 - In various locations in the campground area
 - From park staff
 - At other national parks including the Minuteman Missile National Historic Site
 - At regional tourist information centers and other area attractions such as Wall Drug, the National Grasslands Visitor Center, the Black Hills Visitor Information Center in Rapid City, and the Air and Space Museum

- On the Badlands National Park web site, by means of a prominent link.
- Marketing materials should include a detailed schedule of shuttle stops and pick-up times. Visitors will be more likely to use the shuttle if they feel confident about when the shuttle will pick them up and drop them off. The availability of a schedule will be especially important given that the majority of visitors only plan to spend a limited amount of time (less than one day) in the park.
- Shuttle stops should also include a posted schedule of stops and times. Ideally, stops should be placed in areas that receive shade.
- Marketing materials should feature examples of how the shuttle might be used by visitors (e.g., to reach and return from trailheads, to facilitate more appealing hikes, to view the Park without the hassle of driving, etc.) and highlight the fact that it is a free service for all visitors.
- The shuttle itself should be attractive and easily identified (e.g., “Badlands Free Shuttle System”).

7.0 EVALUATION PLAN

A thorough evaluation of the demonstration system measures its goal achievement and level of service, or performance. It will determine if the system is useful and its impacts on resources. The evaluation results serve as input to the decision to continue operation once the demonstration period ends. It is also valuable for understanding trends and assessing impacts of service and policy changes, and for monitoring performance of the contract operator. The evaluation effort includes monitoring several indicators of goal achievement and system performance. As previously mentioned, the goals of the demonstration transportation system are to improve service to Castle Trail Complex users, increase safety in the Castle Trail Complex and to operate the system with minimal resource impacts.

7.1 System Performance Indicators

The following are indicators of system performance:

- **Reliability:** The system is reliable if it maintains the designated headway, or takes the same amount of time to complete each round trip and adheres to the arrival and departure time at each stop. This assists visitors with planning when to be at the stop location. Another measure of reliability is if the shuttle stops at all the designated locations on each round trip.
- **Service Effectiveness:** The system should have enough capacity to accommodate the demand for passengers and bicyclists. Passenger trips per revenue mile and passenger trips per revenue hour are other measures of effectiveness.
- **Service Efficiency:** If there is a fare charged, the system efficiency is determined by comparing operating costs to revenue hours or revenue miles. The measure of revenue hours includes the cost of hiring the contract operator and any administrative, marketing and other costs that would be required to operate the shuttle program. If more routes were added in the future, the systemwide cost would include the operating costs for all routes. Another measure of system efficiency is to compare the operating costs rate of increase to the increase of CPI for the Badlands Area.

- **Cost Effectiveness:** The cost effectiveness of operating the shuttle is evaluated by assessing the operating cost per passenger mile, the operating cost per passenger trip and the fare box recovery ratio (in the future if fares are collected).

7.2 Methods to Monitor Performance Measures

The following describes a way to monitor each indicator and the monitoring process:

Number of Users. This factor is an indicator of capacity and usefulness. The shuttle driver records the number of boarding passengers and bicycles at each stop by hour and day of week. This data serves to determine:

- Total number of riders on weekdays and weekends – compares supply to demand; service frequency may need to be modified daily or from the weekdays to weekends
 - Appropriateness of operating hours – hours may be able to be adjusted based on demand
 - Utilization of bicycle conveyance system - comparison of supply versus demand; the rack system may need to be expanded to a trailer system
 - Usefulness of and need for each stop location – some locations may never be used and can be dropped from the route
- **Route Time.** This is an indicator of reliability. The shuttle driver should record the time at which the shuttle leaves the Door / Window / Notch Trails parking lot, leaves the Fossil Exhibit Trail parking lot, and arrives again at the Door / Window / Notch Trails parking lot. Comparing the actual roundtrip time to the planned round trip time determines if the shuttle stays on schedule. This information also assists with the calculation of percent of departures missed and percent of trips missed. This information serves as input to the vehicle revenue hours indicator.
 - **Route Miles.** This provides input for passenger trips per mile and revenue hours indicators. The shuttle driver should record the mileage traveled each day of operation. Ideally, this will not vary from day to day.
 - **Visitor Experience.** This factor indicates user satisfaction with the system performance and if the goals are being met. The shuttle driver hands each boarding group a survey form and pencil and collects them as the group alights. The survey also provides information on visitor use patterns and suggestions for improvements and changes. The survey should be quick and easy to complete. The following recommends questions and an answer format:
 - Where did you get on / off the shuttle? Provide a list of each stop location.
 - How long did you wait for the shuttle? Provide a list of time ranges.

- Was the wait satisfactory? Yes or no./
 - Were you able to board the first shuttle that came along? Yes or no.
 - Were the stops in convenient locations? Yes or no.
 - What other locations would you use? Fill in the blank.
 - Did you hike on the trails? Yes or no.
 - If you biked, was the bicycle rack easy to use? Yes or no.
 - Would you use this shuttle again? Yes or no.
 - Would you pay for this service? Yes or no.
 - If you would pay, how much would you be willing to pay? Provide cost ranges.
 - How did you find out about the shuttle system? Provide list in website, visitor's center, family/friends, park brochure, previous visit, saw it in a parking lot
 - Was the vehicle clean? Yes or no.
 - Was the driver able to answer your questions about the Castle Trail area? Yes or no.
 - Was the driver courteous? Yes or no.
 - Do you have any comments or suggestions? Fill in the blank.
-
- **Accident Records.** This factor is an indicator if the goal of improving safety is met. Comparing previous years' records for accidents to the year the shuttle is in operation determines if the goal of improving safety is met. There may be a noticeable reduction in accidents between pedestrians or bicyclists and motor vehicles on this section of the Loop Road.
 -
 - **Resource Impacts.** Air quality models calculate the Park's overall vehicular emissions to be minor and to not cause an attainment problem. Hence, the additional emissions from the shuttle likely will not significantly increase the Park's overall emissions nor cause an attainment problem. Therefore, monitoring of the emissions from the shuttle vehicle is not required.

The number of users, route time, route miles, and visitor experience indicators should be monitored daily throughout the five-month operational length of the demonstration system. This amount of data should provide a clear indication of use patterns, system performance and goal achievement. The accident records should be reviewed and compared to previous years after the demonstration period is over. Operating costs should be compiled after the demonstration period is over and comparisons made to the other indicators to determine efficiency and effectiveness.

The contract between NPS and PTI to provide the Zion shuttle service includes some good examples of performance measures that could also be used for the Castle Trail shuttle. These include:

- **On-time performance:** Maintain 93% OTP (over a one-month period) within 0 minutes early and 5 minutes late of scheduled times at a minimum of three time points along the route. Penalties for not meeting the 93% standard include a 1% deduction from the month's invoice for OTP of less than 93%, and a 5% deduction from the month's invoice for OTP of less than 87%. A deduction of \$100 per incidence is taken

from the month's invoice for recorded schedule deviations of more than 1 minute early.

- **Missed trips:** 99% of trips scheduled per month must be completed. The penalty for completing less than 99% of scheduled trips is a deduction equal to 3% of the month's invoices. Any missed trip that is the last scheduled trip of the day is counted as 3 missed trips.
- **Preventative maintenance:** 100% of preventative maintenance inspections are to be completed at every 500 mile interval. A deduction of \$500 is taken from the month's invoice for each infraction.
- **Equipment maintenance:** Contractor is required to maintain government provided maintenance equipment. 100% of preventative maintenance of equipment must be completed within manufacturer's recommended timeframe. A deduction of \$500 is taken from the month's invoice for each infraction. Contractor is responsible for any repairs that would have been covered by warranty for the duration of the warranty time period.
- **Driver training:** Contractor must comply with contract requirements. A deduction of \$100 a day will be taken for every day that a driver does not meet the requirements.
- **Submission of monthly reports:** Contractor is required to submit monthly reports with the submittal of monthly invoices. Invoices will not be paid if monthly reports are not provided.
- **Wheelchair lifts:** Wheelchair lifts will operate at all times when in transit service. A deduction of \$100 will be taken from the month's invoice for each incidence where a wheelchair lift does not operate and the individual and his/her party is not accommodated by the contractor within 10 minutes.
- **Cleanliness:** Buses must meet contract standards and requirements for cleanliness. A deduction of \$100 a day will be taken from the month's invoice if contractor does not comply with this standard.
- **Heating System:** Bus heating systems must be able to work at all times when bus is in revenue service. A deduction of \$100 a day will be taken from the month's invoice if contractor does not comply with this standard.
- **Accidents:** the Contractor shall not experience more than 1.25 preventable passenger and vehicular accidents (using the National Safety Council definition) per 100,000 miles traveled. A deduction of \$1000 per accident will be taken from the month's invoice if contractor does not comply with this standard.

8.0 ENVIRONMENTALLY SENSITIVE DESIGN AND OPERATING GUIDANCE

8.1 Shuttle Bus Environmental Issues

Shuttle bus environmental issues are related to air emissions and vehicle maintenance facilities and practices. Shuttle buses with a carrying capacity of 15 to 20 can be either heavy-duty gasoline or diesel vehicles (HDGVs or HDDVs).

8.2 Current Vehicle Emissions

Heavy-duty vehicles in the current Badlands NP fleet are almost exclusively diesel vehicles. A recent study of air emissions at the park quantified the air emissions generated by these HDDVs and the park’s light-duty gasoline vehicles and trucks.¹⁰

Emission factors produced by the U.S. Environmental Protection Agency (EPA) *MOBILE6.2*¹¹ model were used in conjunction with vehicle miles traveled (VMT) data in order to estimate mobile source emissions for volatile organic compounds (VOC) (both exhaust and evaporative), nitrogen oxides (NO_x), and carbon monoxide (CO). Similarly, emission factors produced by the EPA *PART5* model were used in conjunction with VMT data to estimate particulate matter (PM₁₀) emissions. A summary of current park vehicle emissions operating on conventional gasoline and diesel fuels is provided in Table 9. As the data in Table 9 indicate, the current heavy-duty diesel vehicle fleet accounts for less than 10 percent of the total park VMT and contributes a similar fraction to the park’s total vehicle emissions.

Table 9. Badlands National Park Vehicle Emissions

Vehicle Type	VMT	Emissions (lbs/year)			
		PM ₁₀	VOC	CO	NO _x
Light-Duty Gasoline Vehicles	394,762	753	681	13,900	710
Light-Duty Gasoline Trucks	102,200	196	223	4,463	281
Heavy Duty Diesel Vehicles	36,710	92	40	528	1,350
Total	533,672	1,041	945	18,891	2,341

¹⁰ EA Engineering, Science, and Technology. 2003. *2000 Air Emission Inventory, Badlands National Park, South Dakota*. February.

¹¹ USEPA. 2002. *User’s Guide to MOBILE6.1 and MOBILE6.2 Mobile Source Emission Factor Model*. EPA420-R-02-010. Office of Air and Radiation. March.

8.3 New Shuttle Bus Emissions

Emissions associated with the proposed shuttle system were calculated for both heavy-duty gasoline buses and heavy-duty diesel buses based on the estimated annual VMT for the shuttle buses. Table 10 shows the results.

Table 10. Proposed Castle Trail Shuttle Bus Emissions

Vehicle Type	VMT	Emissions (lbs/year)			
		PM ₁₀	VOC	CO	NO _x
Heavy-Duty Gasoline Bus	29,835	61	59	1,649	247
Heavy-Duty Diesel Bus	29,835	75	33	429	1,097

As the data indicate, emissions from a shuttle bus system would increase emissions from the park's heavy-duty vehicle fleet by about 80 percent, but is still a small percentage of the park's total vehicle emissions. For example, the addition of diesel shuttle buses would increase vehicle NO_x emissions in the park by approximately 3 percent, while all other pollutants would be less than 1 percent, and these increases would be too small to be detected by air monitoring stations in the region. In addition to gasoline- and diesel-powered buses, biodiesel fuel may be a viable alternative for the proposed shuttle bus, as well as for the park's current heavy-duty diesel vehicles.

8.4 Biodiesel Fuel

Biodiesel is a domestically produced, renewable fuel that can be used in unmodified diesel engines with current refueling infrastructure. Performance, storage requirements, and maintenance are similar for biodiesel blends and petroleum diesel fuels. Biodiesel is made by chemically reacting alcohol with vegetable oils, fats, or greases. It is often used in blends, such as B20, which is a 20 percent blend with diesel fuel. Biodiesel blends are sensitive to cold weather and may require special anti-freezing precautions. Biodiesel also acts as a detergent additive and may loosen and dissolve sediments in storage tanks that may need to be cleaned.

A number of National Park Service western units have implemented biodiesel fuel programs. For example, Yellowstone NP has utilized B20 in three employee commuter buses that have operated for approximately 100 miles per day for the last several years. The park has also successfully utilized a 100 percent rapeseed ethyl ester fuel in a pickup truck that has accumulated over 130,000 miles. In 2002, Yellowstone, Grand Teton, and Grand Canyon NPs implemented biodiesel fuel programs for all park-operated diesel vehicles.

Due to the increasing interest in the use of biodiesel fuel, the Environmental Protection Agency (EPA) recently conducted an analysis of available biodiesel emission data.¹²

¹² U.S. Environmental Protection Agency. 2002. *A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions*. Draft Technical Report. EPA420-P-02-001. October.

Table 11 summarizes the estimated changes in regulated emissions relative to those from current diesel fueled heavy-duty highway engines for a 20 percent soybean-based biodiesel fuel.

As noted in Table 11, all emissions decreased by a measurable degree, except NO_x, which is a principal component in the formation of ozone or smog. However, ozone is a principal concern primarily on the East Coast and southern California, while particulate matter and organics contribute to the impairment of visibility in the western states. Table 12 provides a comparison of emissions from park vehicles operating on diesel fuel and biodiesel.

Table 11. Emission Impact of 20 Percent Biodiesel Relative to Diesel Fuel

Pollutant	Percent Change
Particulate Matter (PM ₁₀)	-10.1
Carbon Monoxide (CO)	-11.0
Nitrogen Oxides (NO _x)	+2.0
Hydrocarbons (HC)	-21.1

Table 12. Badlands National Park Vehicle Emissions

Vehicle Type	VMT	Emissions (lbs/year)			
		PM ₁₀	VOC	CO	NO _x
Diesel Fuel					
Current Heavy-Duty Diesel Vehicles	36,710	92	40	528	1,350
Proposed Diesel Shuttle Bus	29,835	75	33	429	1,097
Total	66,545	167	73	957	2,447
Biodiesel Fuel					
Current Heavy-Duty Vehicles	36,710	82	36	416	1,377
Proposed Biodiesel Shuttle Bus	29,835	67	26	382	1,119
Total	66,545	149	62	798	2,496

8.5 Vehicle Maintenance Pollution Prevention

The addition of two shuttle buses to the park’s heavy-duty fleet will not impose significant burdens on the park’s vehicle maintenance operations that may have environmental impacts. It does, however, provide an opportunity to review a number of vehicle maintenance operations that can benefit from pollution prevention measures. These include:

- air conditioning refrigerant recycling/reclamation
- used oil recycling/reuse
- used oil filter management
- waste antifreeze/coolant recycling
- waste battery management
- spent degreaser/solvent management
- sorbents and wipes management
- wastewater management (e.g., oil/water separators)

The National Park Service has created a source of information for NPS employees to use in furthering “greening” activities at the park level. A web site titled “Green Toolbox” has been created to further the adoption of pollution prevention measures and institute resource conservation practices in park maintenance and other operations. There are many additional sources of related information at the federal level (e.g., EPA and GSA) and state level (e.g., South Dakota Department of Environment and Natural Resources, Water Resources Assistance Program, Pollution Prevention Program).

9.0 FINANCIAL PLAN

This section presents a financial plan for operating the shuttle system. Based on the annual operating costs presented in Table 8 and the estimated annual ridership of 16,660 passengers in Year 5, the cost to operate the shuttle would range from \$7.85 to \$9.60 per passenger as shown in Table 13.

Table 13. Estimated Cost per Passenger to Operate the Castle Trail Shuttle System

	Option A – Contractor provides vehicles	Option B – NPS provides vehicles
Estimated operating cost	\$159,885	\$130,815 – \$145,350
Cost per passenger for 16,660 annual passengers (a)	\$9.60	\$7.85 - \$8.72

(a) Annual ridership for Year 5 of Shuttle, Economics Research Associates, February 2003.

Because the shuttle service would be provided to passengers free of charge, no fare revenue would be collected to offset these operating expenses. Passenger surveys or some other sensitivity analysis could be conducted to determine passengers’ willingness to pay for the shuttle service in the future. Given the estimated operating cost of approximately \$8 to \$10 per passenger, it would be unlikely that passengers would be willing to pay a fare that would cover the full operating costs of the shuttle. These per passenger costs would decrease if more passengers were attracted to use the shuttle. Given that the estimated annual ridership is equivalent to an average of less than 10 passengers per shuttle trip, there is substantial vehicle capacity (up to 25 passengers per vehicle) that could accommodate more persons.

Financing the shuttle could be achieved by increasing the Badlands Park entrance fee and by requesting the use of other NPS funding sources. At Zion National Park, the entrance fee was increased from \$10 to \$20 to help subsidize the cost of the shuttle program. The additional \$10 from the entrance fee goes to a general transportation fund (623 Account) of which a portion is used to cover about 60 percent of the shuttle operating costs. The remainder of the shuttle costs is supplemented from the revenue that is generated from the sales of the National Parks Pass. Zion National Park staff was authorized by NPS headquarters to use a portion of this revenue to fund the remaining 40 percent of shuttle costs.¹³

¹³ Correspondence with Pat Fesler, Budgets Department, Zion National Park, March 2003.

10.0 LIST OF PREPARERS

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**APPENDIX C: SCIENTIFIC NAMES OF PLANTS AND ANIMALS DISCUSSED
IN THIS PLAN**

Common Name	Scientific Name
ANIMALS	
Atlantis fritillary butterfly	<i>Speyeria atlantis</i>
badger	<i>Taxidea taxus</i>
bison	<i>Bison bison</i>
black-footed ferret	<i>Mustela nigripes</i>
black-tailed prairie dog	<i>Cynomys ludovicianus</i>
bobcat	<i>Felis rufus</i>
boreal chorus frog	<i>Pseudacris triseriata</i>
bullsnake	<i>Pituophis melanoleuc</i>
cabbage white butterfly	<i>Pieris rapae</i>
checkered white butterfly	<i>Pontia protodice</i>
clouded sulphur butterfly	<i>Colias philodice</i>
common wood nymph butterfly	<i>Cercyonis pegala</i>
common checkskipper butterfly	<i>Pyrgus communis</i>
coyote	<i>Canis latrans</i>
deer mouse	<i>Peromyscus maniculatus</i>
Delaware skipper butterfly	<i>Anatrytone logan</i>
eastern cottontail rabbit	<i>Sylvilagus floridus</i>
eastern tiger swallowtail butterfly	<i>Pterourus glaucus</i>
elm bark beetle	<i>Scolytus multistriatus</i>
elm leaf beetle	<i>Pyrrhalta luteola</i>
Great Plains toad	<i>Cognatus bufonidae</i>
hackberry emperor butterfly	<i>Asterocampa celtis</i>
least chipmunk	<i>Eutamias minimus</i>
melissa blue butterfly	<i>Lycaeides melissa</i>
mountain lion	<i>Felis concolor</i>
mourning cloak butterfly	<i>Nymphalis antiopa</i>
mule deer	<i>Odocoileus hemionus</i>
muskrat	<i>Ondontra zibehicus</i>
painted lady butterfly	<i>Vanessa cardui</i>
pearl crescent butterfly	<i>Phyciodes tharos tharos</i>
prairie rattlesnake	<i>Crotalus viridis</i>
pronghorn antelope	<i>Antilocapra americana</i>
rattlesnake	<i>Crotalus spp.</i>
red admiral butterfly	<i>Vanessa atalanta</i>
red fox	<i>Vulpes vulpes</i>
regal fritillary butterfly	<i>Speyeria idalia</i>
Rocky Mountain bighorn sheep	<i>Ovis canadensis canadensis</i>
striped hairstreak butterfly	<i>Satyrium liparops</i>
sturgeon chub	<i>Macrhybopsis gelida</i>
swift fox	<i>Vulpes velox</i>
variegated fritillary butterfly	<i>Euptoieta claudia</i>
viceroi butterfly	<i>Basilarchia archippus</i>
western plains garter snake	<i>Thamnophis radix</i>
Wiedemer's admiral butterfly	<i>Basilarchia weidemeyerii</i>

Common Name	Scientific Name
ANIMALS (continued)	
white-tailed deer	<i>Odocoileus virginianus</i>
Woodhouse's toad	<i>Bufo woodhousii</i>
<u>Birds</u>	
American robin	<i>Turdus migratorius</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
barn owl	<i>Tyto alba</i>
barn swallow	<i>Hirundo rustica</i>
cliff swallow	<i>Hirundo pyrrhonota</i>
ferruginous hawk	<i>Buteo regalis</i>
golden eagle	<i>Aquila chrysaetos</i>
grasshopper sparrow	<i>Ammodramus savannarumi</i>
horned lark	<i>Eremophila alpestris</i>
killdeer	<i>Charadrius vociferus</i>
lark bunting	<i>Calamospiza melanocorys</i>
loggerhead shrike	<i>Lanius ludovicianus</i>
long-eared owl	<i>Asio otus</i>
mourning dove	<i>Zenaida macroura</i>
northern harrier	<i>Circus cyaneus</i>
peregrine falcon	<i>Falco peregrinus</i>
prairie falcon	<i>Falco mexicanus</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
snowy owl	<i>Nyctea scandiaca</i>
Swainson's hawk	<i>Buteo swainsoni</i>
western meadowlark	<i>Sturnella neglecta</i>
whooping crane	<i>Grus Americana</i>
wild turkey	<i>Meleagris gallopavo</i>
PLANTS	
<u>Grasses and Forbs</u>	
alfalfa	<i>Medicago sativa</i>
Barr's milkvetch	<i>Astragalus barrii</i>
blue grama	<i>Bouteloua gracilis</i>
buffalo grass	<i>Buchloe dactyloides</i>
Canada thistle	<i>Cirsium arvense</i>
crested wheatgrass	<i>Agropyron cristatum</i>
Dakota buckwheat	<i>Eriogonum visherii</i>
Dalmatian toadflax	<i>Linaria dalmatica</i>
downy brome	<i>Bromus tectorum</i>
Easter daisy	<i>Townsendia exscapa</i>
field bindweed	<i>Convolvulus arvensis</i>
giant ragweed	<i>Ambrosia trifida</i>
green needlegrass	<i>Stipa viridula</i>
hairy virgin's bower	<i>Clematis hirsutissima</i>
halogeton	<i>Halogeton glomeratus</i>
hoary cress	<i>Cardaria draba</i>

Appendix C: Scientific Names of Plants and Animals Discussed in This Plan

Common Name	Scientific Name
<u>Grasses and Forbs</u> (continued)	
Hopi tea	<i>Thelesperma megapotamicum</i>
houndstongue	<i>Cynoglossum officinale</i>
Japanese brome	<i>Bromus japonicus</i>
Kentucky bluegrass	<i>Poa pratensis</i>
largeflower Townsend daisy	<i>Townsendia grandiflora</i>
leafy spurge	<i>Euphorbia esula</i>
little bluestem	<i>Andropogon scoparius</i>
needle and thread	<i>Stipa comata</i>
prairie coneflower	<i>Ratibida columnifera</i>
prairie cordgrass	<i>Spartina pectinata</i>
prairie dropseed	<i>Sporobolus heterolepis</i>
puncture vine	<i>Tribulus terrestris</i>
Russian knapweed	<i>Centaurea repens</i>
Sidesaddle (or Secund) bladderpod	<i>Lesquerella arenosa</i> var. <i>argillosa</i>
side-oats grama	<i>Bouteloua curtipendula</i>
silver-mounded candleflower	<i>Cryptantha cana</i>
smooth brome	<i>Bromus inermis</i>
sow thistle (perennial)	<i>Sonchus arvensis</i>
spotted knapweed	<i>Centaurea maculosa</i>
switchgrass	<i>Panicum virgatum</i>
threadleaf sedge	<i>Carex filifolia</i>
western wheatgrass	<i>Agropyron smithii</i>
white milkwort	<i>Polygala alba</i>
yellow sweetclover	<i>Melilotus officianalis</i>
<u>Trees and Shrubs</u>	
American elm	<i>Ulmus americana</i>
American plum	<i>Prunus americana</i>
broom snakeweed	<i>Gutierrezia sarothrae</i>
green ash	<i>Fraxinus pennsylvanica</i>
Parry's rabbitbrush	<i>Chrysothamnus parryi</i>
peachleaf willow	<i>Salix amygdaloides</i>
plains cottonwood	<i>Populus deltoides</i>
ponderosa pine	<i>Pinus ponderosa</i>
Rocky Mountain juniper	<i>Juniperus scopulorum</i>
sand sagebrush	<i>Artemisia filifolia</i>
silver sagebrush	<i>Artemisia cana</i>
silverscale saltbush	<i>Atriplex argentea</i>
tamarisk	<i>Tamarix parviflora</i>
three-leaved sumac	<i>Rhus trilobata</i>
western snowberry	<i>Symphoricarpos occidentalis</i>
Yucca	<i>Yucca glauca</i>

APPENDIX D: CORRESPONDENCE FROM U.S. FISH AND WILDLIFE SERVICE ABOUT THREATENED AND ENDANGERED SPECIES

 <p>PHONE MESSAGE United States Department of the Interior / National Park Service / Denver Service Center 12795 West Alameda Parkway / P.O. Box 25287 / DSC-PM / Denver, CO</p>			
Project:	Badlands GMP		Date: November 18, 2003
NPS PMIS No:		Time:	
Call To:	Joy Gober		Phone Number: (605) 224-8693, x27
Subject:	Threatened & endangered species in the vicinity of the North Unit of Badlands National Park		
Discussion:	The USFWS South Dakota web site (http://southdakotafieldoffice.fws.gov/endsppbycounty.htm) lists 3 threatened and endangered species in Jackson County (whooping crane, bald eagle, and black-footed ferret) and 4 threatened & endangered species in Pennington County (whooping crane, bald eagle, least tern, and black-footed ferret). (The black-footed ferret is a proposed/experimental population in both counties.) Ms. Gober confirmed that this list is still accurate.		
Follow-Up Tasks:			
Copies To:	TIC	With Attachment	By Mail
	PIFS	Without Attachment	By NPS mail System
	Project Files	By fax	By electronic mail
By:			
Project Manager:		Telephone No:	

APPENDIX E: ANALYSIS OF BOUNDARY ADJUSTMENT AND LAND PROTECTION CRITERIA

The National Park and Recreation Act of 1978 (16U.S.C. § 1a-7) directs the National Park Service to consider, as part of a planning process, what modifications of external boundaries might be necessary to carry out park purposes. Subsequent to this act, Congress also passed Public Law 101-628, the Arizona Desert Wilderness Act. Section 1216 of this act, codified at 16 U.S.C. §1a – 12, directs the secretary of the interior to develop criteria to evaluate any proposed changes to the existing boundaries of individual park units. 16 U.S.C. §1a-13 calls for among other things the National Park Service to consult with affected agencies and others regarding a proposed boundary change, and to provide a cost estimate of acquisition cost, if any, related to the boundary adjustment. The legislation also requires that a statement on the relative priority of acquisition of each parcel be provided.

These legislative provisions are implemented through NPS *Management Policies*, which state that the National Park Service will conduct studies of potential boundary adjustments and may make boundary revisions as follows:

- To protect significant resources and values, or enhance opportunities for public enjoyment related to the purposes of the park
- To address operational and management issues, such as the need for access or the need for the boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads, or
- Otherwise protect park resources critical to fulfilling park purposes

Two additional criteria must be met if the acquisition would be made using appropriated funds, and not merely a technical boundary revision; the criteria set forth by Congress at 16 U.S.C. 4601-9(c)(2) must be met. NPS *Management Policies* (2001), section 3.5, states the following criteria:

- The added lands will be feasible to administer, considering their size, configuration, ownership, and hazardous substances, costs, the views of and impacts on local communities and surrounding jurisdictions, and other factors such as presence of exotic species
- Other alternatives for management and resource protection have been considered and are not adequate

During the course of the planning process, three areas have been identified as potential additions to Badlands National Park. These additions are the Dougan Property, Kudnra /USFS property, and Prairie Homestead. The following is a review of the criteria for boundary adjustments as applied to Badlands National Park. This review is included as supporting documentation for the alternatives, which includes a recommendation for boundary changes in the North Unit of the park.

This plan does not address the legislative requirement to provide a cost estimate for the boundary adjustment nor does it include the relative priority for acquisition. However, the legislative proposal for the boundary adjustment and accompanying support materials would include both of these requirements.

DOUGAN PROPERTY

Description of the Property

The property is approximately 4,500 acres adjacent to Badlands National Park in Pennington County, South Dakota. The property is along the western boundary of the North Unit of the park and is immediately adjacent to the park's designated wilderness. The property is currently owned by Danny Dougan, a local rancher. These lands were originally included in the monument boundary but were removed by Congress in 1952 and 1957 (Mattison and Grom, 1970). The boundary adjustments were made by Congress because these were private lands and at that time the owners of this land were not willing sellers. Congress was also reducing the cost of land acquisition for the monument. The current owner of the land is interested in seeing his lands added to the park.

Criteria: To protect significant resources and values, or opportunities for public enjoyment related to the purposes of the park.

One of the purposes of Badlands National Park is to preserve the flora, fauna, and natural processes of the mixed grass prairie ecosystem. The Dougan property includes significant tracts of mixed grass prairie, which provides habitat to wildlife species of special concern in the Badlands. The conversion of the Great Plains for agriculture has severely limited habitat for many of these species that the park currently supports. For some of these species, such as the black-footed ferret, the park lacks adequate land to support and perpetuate the species.

Prairie. Most of Dougan property remains in a western wheatgrass native prairie community. Preserving an additional 4,000 acres of native prairie plant communities would be a significant outcome of NPS acquisition and management of the property.

Most rare plant species in the Badlands are found in uncommon or unique habitats associated with the Badlands erosional features and outcroppings. While there have been no surveys of the property, it is likely that the Badlands features on the property support rare plant species populations.

Black-footed Ferrets and Black-tailed Prairie Dogs. This property supports nine small prairie dog colonies totaling 116 acres. Two of these towns are within ½-mile of the largest prairie dog colony within the park, referred to as the Kocher Flats complex, which was a reintroduction site for the endangered black-footed ferret in 1997, 1998, and 1999. Wildborn black-footed ferrets in the park have been documented every year since releases began. With expansion of the ferret population on Kocher Flats, individual ferrets dispersed into smaller adjacent prairie dog colonies. Ferrets have been documented utilizing available prairie dog habitat on the Dougan property since 1999, with a minimum of two wild-born litters produced there since that time. However, the current owner advised the park that lethal control of prairie dogs was necessary for cattle range management. The landowner allowed the Park Service to capture the ferrets and translocate them back into the park. Due to the topography of the area the Dougan property

represents the only area for significant expansion of the Kocher Flats prairie dog complex and expansion of ferret habitat.

Prairie dog colonies provide den sites, escape cover, and prey for a variety of grassland wildlife species. Studies on the importance of prairie dog colonies to the grassland ecosystem, combined with range-wide eradication programs and loss of habitat, led to a recent petition to the U.S. Fish and Wildlife Service for listing the black-tailed prairie dog as threatened. The current status of this petition is that black-tailed prairie dogs are “warranted but precluded” from federal listing. Several western states, including South Dakota, are giving prairie dogs new management attention. Based on vegetation, soil, and slope characteristics, the Dougan property has the potential to support more prairie dog acreage than is currently present (because of control efforts). If the current prairie dog colonies (116 acres) on the Dougan property (4,500 acres) were allowed to expand to a minimum of 10% landscape coverage, it would support approximately 450 acres of prairie dogs. Density estimates of prairie dog colonies within Badlands National Park in 2002 were a mean of 19.4 prairie dogs/acre. These 450 acres of colonies on the Dougan property would thus support about 8,700 prairie dogs. The potential of prairie dog colonies to support black-footed ferrets at a given site is evaluated by the size of the colony, the proximity of the colony to other large colonies, and the density of prairie dogs on the colony. With the above scenario of 450 acres of prairie dogs on the Dougan property, there would be available habitat for five to six ferrets or one to two ferret family groups.

This potential ferret habitat would obviously increase with an increase in the acres of prairie dogs. It is realistic to expect that prairie dogs could expand to occupy 500 to 2,000 acres of the Dougan property. Under that scenario, and with similar densities as found within the park, up to 38,000 prairie dogs could populate the property, which could then support 20 to 24 ferrets or four to six ferret family groups dispersing out from Kocher Flats. Thus, addition of the property to the park would have significant positive impacts to the black-footed ferret population in the Conata Basin/Badlands Recovery Area.

Swift Fox. In the fall of 2003 the park began a swift fox restoration effort by releasing 30 wild fox from Colorado. All the fox were released in the park, along the northern boundary. Since release of the fox, telemetry has located fox outside the western side of the park, near the Dougan property. The property is good swift fox habitat and could be important to fox recovery in the Badlands area. With future releases planned, the National Park Service would release fox on the property if acquired.

Bison. Bison have been in Badlands National Park since 1963, when the reintroduced population numbered 53 animals. The present population is approximately 900 animals representing approximately 1/2 of the ecological carrying capacity of approximately 60,000 acres of the Badlands Wilderness Area and approximately 10,000 acres of nonwilderness prairie that constitutes the park’s bison range. One of the critical limiting factors to the park’s carrying capacity is the availability of water in the Sage Creek portion of the wilderness area. The Dougan property contains at least 15 additional water sources (stock ponds) beyond the western edge of the wilderness. These water sources would be easy to access and maintain because they are outside the wilderness and near improved roads. Considering the addition of range and water resources, the park’s bison herd could conservatively increase to 1,000 to 1,500 with the purchase of this property.

Paleontological Resources. Badlands National Park was established because of its unique geologic landforms and impressive fossils. A report accompanying the park’s enabling legislation

describes the purpose of the monument as “to preserve the scenic and scientific values of a portion of the White River Badlands and to make them accessible for public enjoyment and inspiration.” Also described were “vast beds of vertebrate fossil remains...which appear in great variety. The whole area is a vast storehouse of the biological past...”

Based on the geologic map created in 1976, the Brule Formation of the White River Group occurs throughout much of the Dougan property. It outcrops in a series of long sinuous banded ridges that form a boundary around the edge of the property.

Contained within the Brule Formation are 30 million-year-old fossil mammals, birds, and reptiles. For over 150 years, scientists throughout the world have come to western South Dakota to study these magnificent fossils. Both the rocks and fossils preserved within the White River Badlands provide important information about ancient climate and mammal evolution from 30 million years ago. It is likely that such fossils exist in much of the Dougan property.

Because of the great significance of the fossils and geology, protection of the Dougan property directly adjacent to the park would be a great contribution to the scientific community. Additional fossil-rich areas would be made available to researchers studying paleontology and geology in the park.

Wilderness. Another purpose of Badlands National Park is to preserve the Badlands wilderness area and associated wilderness values. The Dougan property is adjacent to the western edge of the Badlands wilderness area. Currently the wilderness area is only accessible from Sage Creek campground on the north and Highway 44 on the south. This property also would provide additional access for visitors, which would enhance opportunities for the public to enjoy this part of the park. Due to the expansive vistas within the Badlands wilderness, any development on the Dougan property would be visible from much of the wilderness and would thus detract from those wilderness values related to untrammeled viewsheds. Acquisition by the Park Service would protect these viewsheds.

Criteria: To address operational and management issues, such as the need for access or the need for the boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads.

Access. The property provides critical access to the western portion of the Sage Creek Unit of the Badlands wilderness area. The current landowner has allowed NPS staff to access the wilderness through the property. If the property were sold it is possible that the National Park Service would no longer have access through it. This access has been critical to black-footed ferret reintroduction and monitoring in the Kocher Prairie Dog Town complex. NPS ownership of the property would ensure continued access to this complex.

The current landowner also has allowed NPS staff to access the park through the property to control weeds. Several Canada thistle infestations targeted for treatment are most easily accessed from this property. Loss of access would extend travel times for the responding crews, reducing the park’s effectiveness in treating these populations.

Fire Management. The Dougan property allows some of the only access for wildland fire suppression and prescribed burning along the western boundary of the park. The current owner has been most accommodating in the past, granting access for managing prescribed burns on the western edge of the Badlands wilderness area. Access has also been critical for conducting

prescribed fires in that portion of the wilderness. Access allows NPS crews into the wilderness boundary for holding fires within the park.

The NPS Fire Effects Monitoring team has also been granted access across the property to monitor post-burn vegetation plots. The water sources on Dougan's property would provide dip sites for helicopter buckets if a fire needed to be controlled in the wilderness area. Continued access across this property is very important to the success of the park fire management program.

Wilderness Management. The property provides critical access to the western portion of the Sage Creek Unit of the Badlands wilderness area. The current landowner has allowed NPS staff to access the wilderness through the property. Loss of access would increase travel times for NPS staff working on wilderness management issues.

Criteria: The added lands will be feasible to administer, considering their size, configuration, ownership, and hazardous substances, costs, the views of and impacts on local communities and surrounding jurisdictions, and other factors such as presence of exotic species.

The recommended boundary addition would be feasible for the Park Service to manage and would not substantially add to the NPS workload to manage these lands. The added lands would create a block of land contiguous with the existing park boundary.

These lands are currently private lands and NPS acquisition would reduce local tax revenue for Pennington County. Payment in lieu of taxes would mitigate this impact. Acquisition of these lands has been discussed in public meetings, and local communities have not raised concerns about the loss of tax revenue or other impacts.

There are no known hazardous substance issues associated with the parcel, and appropriate hazardous material surveys would be conducted prior to acquisition.

Criteria: Other alternatives for management and resource protection have been considered and are not adequate.

The alternative to federal acquisition is the continuation of private ownership. The current landowner has been very cooperative in working with the National Park Service by providing access for management activities. The current land use has been primarily grazing, which has allowed the lands to remain relatively intact. However, this arrangement and cooperation could be lost if these lands are sold to another owner.

These properties are located in an area that has had limited interest by land conservation organizations. The Buffalo Gap National Grasslands has been acquiring lands in the area, but these have been through land exchanges that have focused on consolidating the lands the U.S. Forest Service manages. The current property owner is not interested in exchanging these lands for other lands currently being managed by the U.S. Forest Service. No other state or federal agencies have expressed an interest in protecting the resources on this property.

THE KUDNRA/ USFS PROPERTIES

Description of the Property

The proposed boundary change would seek congressional approval for an addition of approximately 5,400 acres to Badlands National Park in Pennington County, South Dakota. The property has access off Highway 44. Approximately 3,400 acres of these lands are currently owned by Kudnra family, local ranchers that manage the lands for cattle range. This private land includes a 160-acre inholding within the current authorized boundary of the park. The remaining approximately 2,000 acres are federal lands administered by the U.S. Forest Service. Both the private landowners and the Forest Service are agreeable to these lands being added to the park.

Criteria: To protect significant resources and values, or enhance opportunities for public enjoyment related to the purposes of the park

One of the purposes of Badlands National Park is to preserve the flora, fauna, and natural processes of the mixed grass prairie ecosystem. This property contains significant resources that make acquisition highly desirable for the National Park Service for furthering the purpose of Badlands National Park.

Prairie. Most of the Kudnra property remains in a native western wheatgrass prairie community, which is the dominant plant community in the region. Preserving an additional 3,400 acres of native prairie is a very desirable benefit of protecting the property. Also, most rare plant species in the Badlands are found in uncommon or unique habitats associated with badlands erosional features and outcroppings. While there have been no surveys of the Kudnra property, it is likely that its location at the base of the Badlands means that some of the area's rare plant species would be found there.

Black-footed Ferrets and Black-tailed Prairie Dogs. The land sits at the base of the Badlands Wall and on the western edge of the Conata Basin. The Conata Basin is the primary habitat for the only wild, self-sustaining, black-footed ferret population in existence. At this time the private landowner controls prairie dog populations, but if put in federal ownership, prairie dog town complexes could expand from U.S. Forest Service land in the basin, thus expanding available black-footed ferret habitat.

Prairie dog colonies provide den sites, escape cover, and prey for a variety of grassland wildlife species. Studies on the importance of prairie dog colonies to the grassland ecosystem, combined with range-wide eradication programs and loss of habitat, led to a recent petition to the U.S. Fish and Wildlife Service for listing the black-tailed prairie dog as threatened. The current status of this petition is that black-tailed prairie dogs are "warranted but precluded" from federal listing. Several western states, including South Dakota, are giving prairie dogs new management attention. Based on vegetation, soil, and slope characteristics, the Kudnra property has the potential to support more prairie dogs acreage than is currently present (because of control efforts) and aiding in statewide prairie dog management.

Swift Fox. In the fall of 2003 the park began a swift fox restoration effort by releasing 30 wild fox from Colorado. All of the fox were released in the park along the northern boundary. However, since release telemetry has located several of the foxes utilizing the Conata Basin. The property is good swift fox habitat and could aid in fox recovery in the Badlands area. NPS ownership would

ensure it remains good habitat (particularly by increasing prairie dog populations) and, with additional releases planned, the park would release fox on the property if acquired.

Bison. Bison have been in Badlands National Park since 1963, when the reintroduced population numbered 53 animals. The present population size is approximately 900 animals representing approximately 1/3 to 1/2 of the ecological carrying capacity of approximately 60,000 acres of the Badlands wilderness area and approximately 10,000 acres of nonwilderness prairie that constitutes the park's bison range. One of the critical limiting factors to the park's carrying capacity is the availability of water in the Sage Creek portion of the wilderness area. Addition of the Kudnra/USFS property would provide additional acreage and water sources for bison, allowing an increase to the herd by as many as 100 animals. Also, the property would allow for bison to roam up to Highway 44, which would provide visitors an important wildlife viewing experience from Highway 44.

Paleontological Resources. Badlands National Park was established because of its unique geologic landforms and impressive fossils. A report accompanying the park's enabling legislation describes the purpose of the monument as "to preserve the scenic and scientific values of a portion of the White River Badlands and to make them accessible for public enjoyment and inspiration." Also described were "vast beds of vertebrate fossil remains...which appear in great variety. The whole area is a vast storehouse of the biological past..."

These lands are very rich in fossils. This is the area where a unique paleontological find occurred — fossil Oreodont twin embryos that are now on display at the South Dakota School of Mines and Technology Museum of Geology. Because of the great significance of the fossils and geology in the area, protection of the property directly adjacent to the park would be a great contribution to the scientific community. Additional fossil-rich areas would be made available to researchers studying paleontology and geology in the park. Inclusion of the private lands in the park also places greater legal protection on these significant resources.

Wilderness. Another purpose of Badlands National Park is to preserve the Badlands wilderness area and associated wilderness values. This property is adjacent to the southwestern edge of the Badlands wilderness area. This property would provide additional access for visitors, which would enhance opportunities for the public to enjoy this part of the park. Due to the expansive vistas within the Badlands wilderness, any development on property would be visible from the wilderness and would thus detract from those wilderness values related to untrammelled viewsheds. Acquisition by the NPS would protect these viewsheds.

Public Enjoyment. These lands would offer opportunities for visitors seeking solitude to explore remote scenic lands and view natural resources. .

Criteria: To address operational and management issues, such as the need for access or the need for the boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads.

Acquisition of this property would address operational and management issues relating to access. Acquisition of the property would move the boundary south to an existing road, Highway 44, which would guarantee access for resource management, resource protection.

Access. The property would provide the park with a southern public and administrative access to the Sage Creek Unit of the Badlands wilderness area from Highway 44.

With the southern access allowed by purchase of this property, research (particularly paleontological research) would greatly benefit from closer access to research sites.

Fire Management. Access would also aid in conducting prescribed fires in that portion of the wilderness. It would allow fire engines to drive to the wilderness boundary and enable hose lays and ATV access for holding the fire within the park.

Wilderness Management. The property provides critical access to the southern portion of the Badlands wilderness area. Acquiring these lands would reduce travel times to for NPS staff working on wilderness management issues.

Criteria: The added lands will be feasible to administer, considering their size, configuration, ownership, and hazardous substances, costs, the views of and impacts on local communities and surrounding jurisdictions, and other factors such as presence of exotic species.

The recommended boundary change would very feasible to manage. The addition would create a block of land contiguous with the existing park boundary. NPS staff could easily access the property from existing roads. The management of these additional lands would not substantially add to the NPS workload.

These lands are currently private lands and federal acquisition would reduce local tax revenue for Pennington County. Payment in lieu of taxes would mitigate this impact. Acquisition of these lands has been discussed in public meetings and local communities have not raised concerns about the loss of tax revenue or other impacts.

There are no known hazardous substance issues associated with the parcel, and appropriate hazardous material surveys would be conducted prior to acquisition.

Criteria: Other alternatives for management and resource protection have been considered and are not adequate.

The alternative to federal acquisition Kudnra property is the continuation of private ownership. The current landowner has been very cooperative in working with the National Park Service by providing access for management activities. The current land use has been primarily grazing which has allowed the lands to remain relatively intact. However, **this arrangement** and cooperation could be lost if these lands are sold to another owner.

The landowner is unwilling to sell the 160-acre inholding by itself. Therefore, the acquisition of the entire ranch offers the only reasonable opportunity to extinguish one of the few remaining tracts of private land subject to nonconforming uses within the authorized boundaries of the park.

These properties are located in an area that has had limited interest by land conservation organizations. The Buffalo Gap National Grasslands has been acquiring lands in the area, but these have been through land exchanges that have focused on consolidating the lands the U.S. Forest Service manages. The current property owner is not interested in exchanging these lands for other lands currently being managed by the U.S. Forest Service. No other state or federal agencies expressed an interest in protecting resource on the property.

The acquisition of the 2,000 acres currently administered by the USFS would be for operational efficiency, since these lands would be surrounded by park lands, and the USFS is attempting to consolidate lands. Discussions with the USFS have been positive concerning transferring management of these lands, if the private lands are acquired by the National Park Service.

THE PRAIRIE HOMESTEAD PROPERTY

Description of the Property

The property consists of 240 acres located at the northeast entrance to Badlands National Park in Jackson County, South Dakota, on Highway 240. The property is currently owned by the Crew family. The owner is willing to see the property added to the park.

The property includes the Ed and Alice Brown homestead comprising of 160 acres. The site consists of the original sod house, constructed in 1909, several outbuildings, and a modern, approximately 900-square-foot building, which includes an office, retail outlet, and museum. The Crew family has been operating the historic site as museum for over 40 years.

An associated 80-acre parcel also owned by the Crew family is proposed to be included in order to create a contiguous management unit that ties into the existing north boundary of the national park. A helicopter flight-seeing service, immediately adjacent to the northeast entrance station, is based on this tract. A fenced enclosure around the landing pad, a small (approximately 250 square feet) office/reception building, fuel storage tank, and storage shed are on this parcel.

Criteria: To protect significant resources and values, or enhance opportunities for public enjoyment related to the purposes of the park.

One of the purposes of Badlands National Park is to interpret the contemporary history of use and settlement of lands within the park. The sod house and associated furnishings and structures possess a high degree of integrity and direct connection to a pioneer family. The “soddy” is dug into the hillside, with a framed front and stacked sod partial walls and roof. Storage shed, chicken coop, root cellars and outhouse complete the district. The Homestead was placed on the National Register of Historic Places in 1974 as a state significant district. (For additional details on the significance of the homestead, see the Cultural Resources section of the “Affected Environment.”)

Recent discussions with Steve Rogers of the State Historic Preservation Office (SHPO) have revealed that the homestead is a rare resource in the state of South Dakota as well as in the surrounding states. The SHPO considers the district to be very significant with good integrity.

The Badlands area of western South Dakota was settled relatively late in the homesteading era. The occasional year of plentiful rain and mild winters lured an ethnically diverse immigrant population to the region under the auspices of the Homestead Act – which allowed the granting of 160 acres to those who settled and met the criteria for improving the land. The 1929 Act authorizing Badlands National Monument contained a provision that the monument could be established at such time as a “satisfactory” amount of land had been transferred to the government without cost to the federal treasury. This was accomplished in 1939 by Presidential Proclamation. The land base that became Badlands National Monument derived from public lands acquired through the submarginal lands program of the Resettlement Administration

brought about in response to the drought and depression of the 1930s. In 1936 Badlands National Monument boundary expansion was authorized as Title II of an amendment to the Taylor Grazing Act. Federal repurchasing of many homesteads during those dust bowl days eventually brought about the acquisition of sufficient private lands from homesteaders giving up on farming and leaving the area for more hospitable lands.

Badlands National Park currently lacks homestead-era structures with which to illustrate this significant part of the recent history of the region. The human history of the area, specifically the homesteading and agricultural use of the area, has been identified and recommended as an interpretive theme in park planning documents as early as 1947 and remains in the most recent plan completed in 1999. Homesteading in the Badlands, with the attendant harsh weather and rugged landform, molded the character of many families still tied to the area. This is the best preserved remaining homestead era sod home in South Dakota, is already a recognized interpretive site, and is within ¼-mile of the park along its primary entrance road.

Acquisition of the adjacent 80-acre parcel would require the relocation of the helicopter tour operation, thus reducing a noise source, traffic congestion, and the potential safety concerns associated with helicopter departures and landings next to the busiest entrance station in the park.

Another purpose of Badlands National Park is to protect the unique landforms and scenery of the White River Badlands for the benefit, education and inspiration of the public. The federal acquisition of the Crew Property will protect the viewshed of the White River Badlands. The Loop road (Highway 240), the main access to the park passes through these lands and offers impressive views of the Badlands as you approach the northeast entrance station. Acquisition of these lands would be protect them from development and maintain an unobstructed views of the Badlands for the majority of visitors as they enter the park.

Criteria: The added lands will be feasible to administer, considering their size, configuration, ownership, and hazardous substances, costs, the views of and impacts on local communities and surrounding jurisdictions, and other factors such as presence of exotic species.

The recommended boundary change would be a feasible administrative unit, creating a contiguous block of land along a portion of Highway 240, the primary entrance to Badlands National Park from Interstate 90. The acquisition of the lands would not substantially increase the workload for the park staff. The maintenance of the Prairie Homestead would result in increase in operating cost to maintain the structures and staff the facility. These costs have been included in the cost of the alternatives presented on page 58.

These lands are currently private lands and federal acquisition would reduce local tax revenue for Jackson County. Payment in lieu of taxes would mitigate this impact. Acquisition of these lands has been discussed in public meetings, and local communities have not raised concerns about the loss of tax revenue or other impacts.

The property contains a potential hazardous material site, the fuel storage tanks associated with the commercial helicopter tour operation. Any contamination of soil is likely to be minor due to the storage tank's small size. This would be investigated further and remediated (if necessary) prior to acquisition.

Criteria: Other alternatives for management and resource protection have been considered and are not adequate.

The Crew family recognizes that they would not always be able to maintain and administer the site to ensure it is afforded adequate protection in the future. Mr. Crew, with the support of the senior senator from South Dakota, approached the National Park Service in 2001 and requested that the site be incorporated into the boundary of Badlands National Park.

The alternative to federal acquisition is the continuation of private ownership. There are no other federal or state agencies, museums, institutions, or foundations with an interest to preserve and interpret this historical property.

The acquisition has the support of the congressional delegation and the local community. The State Historic Preservation Office believes the National Park Service is the best steward for this property if the present owners relinquish ownership.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.