

Draft
General Management Plan
Environmental Impact Statement
BADLANDS NATIONAL PARK
North Unit

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 understanding 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. 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 plan has been distributed to other government agencies, tribes, nongovernmental organizations, and interested individuals for review and comment. The public comment period will last for 60 days. Readers are encouraged to send written comments to National Park Service, Attn: Badlands Planning Team, P.O. Box 25287 Denver, CO 80225 or submit comments to <http://parkplanning.nps.gov>. Please note that it is the practice of the National Park Service to make comments, including the names and addresses of respondents, available for public review if requested (also see "Summary").

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 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 such as rehabilitating and expanding the Ben

Reifel Visitor Center 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 facilities would be better 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.

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

SUMMARY

facilitate the zoning of the park, because the location of the road is a key factor in determining a management strategy for the park.

PUBLIC COMMENTS

The National Park Service is seeking public input on this document. The public comment period will last for 60 days. Readers are encouraged to send written comments to the following address:

National Park Service
Attn: Badlands Planning Team
Denver Service Center
P.O. Box 25287
Denver, CO 80225-0287

Comments may also be submitted to the National Park Service Planning, Environment, and Public Comments website at <http://parkplanning.nps.gov>.

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**Purpose of and Need
for the Plan**

PURPOSE OF AND NEED FOR THE PLAN

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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 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 in the early stages and 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 *Draft General Management Plan / Environmental Impact Statement* 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

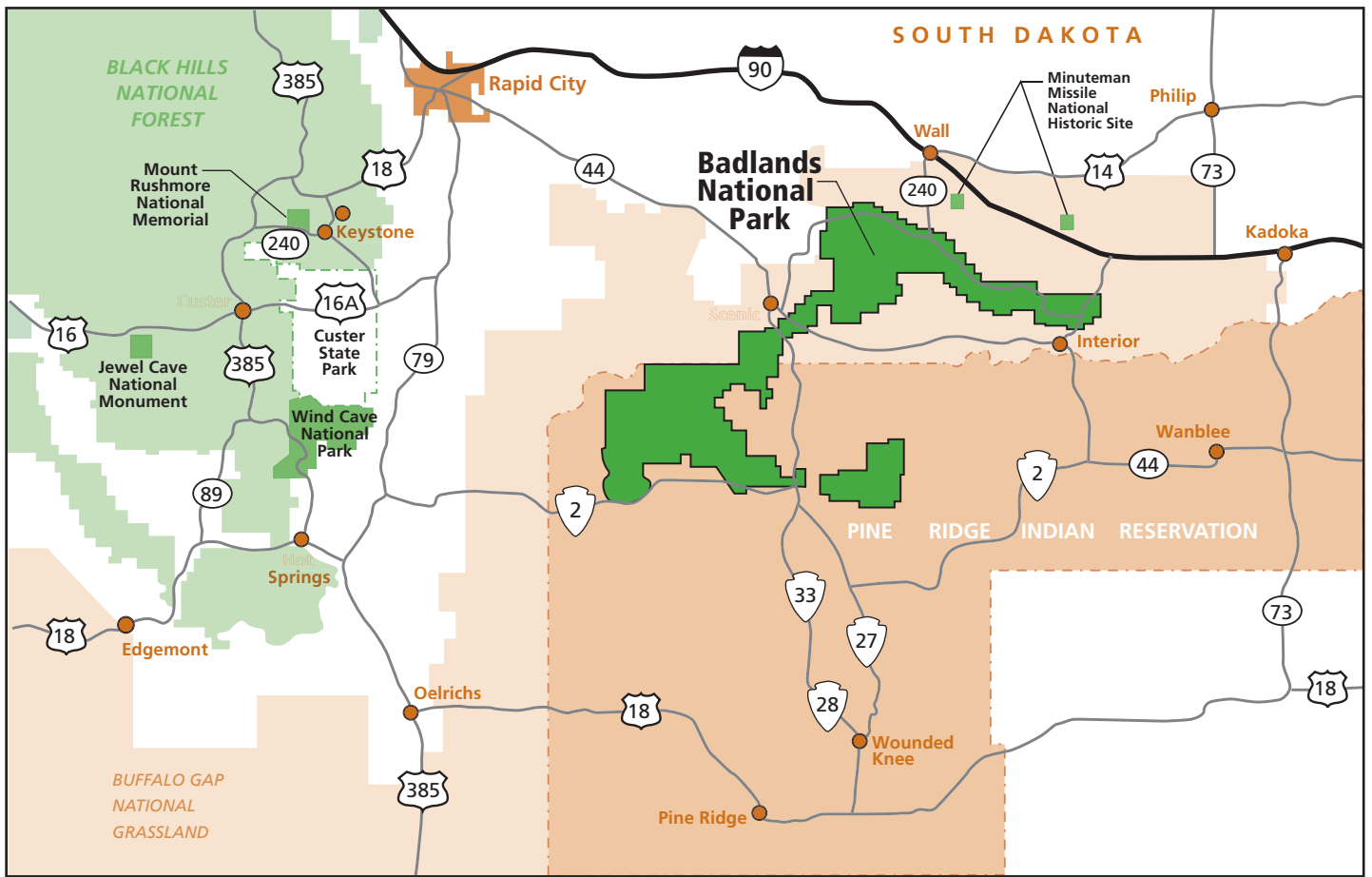
Scoping

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



North



0 10 20 Km

0 10 20 Mi

 Badlands National Park
Boundary Area

Vicinity

Badlands National Park

United States Department of the Interior
National Park Service

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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 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 its neighbors, 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.

Public Review of the Draft Plan

Although the alternative preferred by the National Park Service is identified in this document, the agency will not make a final decision about which alternative to implement until the public has reviewed and commented on the draft plan. The formal comment period begins with the distribution of this draft document. Interested parties have 60 days to review this draft plan and send their comments to the Park Service. Comments may be sent to

National Park Service
Attn: Badland Planning Team
P.O. Box 25287
Denver, CO 80225-0287

Comments may also be submitted to the National Park Service Planning, Environment, and Public Comments website <http://parkplanning.nps.gov>.

During the review period, the National Park Service will conduct a series of public meetings to answer questions and receive comments. Each comment will be carefully considered, and responses to substantive comments will be included in the *Final General Management Plan / Environmental Impact Statement*. Depending on the comments received during review by the public and other agencies, some elements of the alternatives may change in the final plan.

DIRECTION FOR THE PLAN

The direction for the alternatives considered in this *Draft 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). This establishing 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, which remain tribal lands, are administered by the National Park Service as the South Unit of Badlands National Park.

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 skyline 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."

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

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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 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 with neighbors 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.
- ♦ 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.

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.

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.
- ♦ 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 or 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 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, and South Dakota state agencies in the

recovery of the black-footed ferret, one of North America's most endangered mammals.

- ♦ 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.
- ♦ 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 monument 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 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

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. Badlands National Park has 64,000 acres of designated wilderness within the North Unit. 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.
- ♦ The wilderness will be monitored to ensure that management actions and visitor impacts on wilderness resources and character do not exceed 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. 32). 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.
- ♦ 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.

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 and is under the same administration. A general management plan is currently being prepared for this national historic site. The two planning efforts are intentionally concurrent; this allows for coordination. In fact, many of the same NPS personnel have served on both planning teams.

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

This new 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 would 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

Prior to starting the GMP, Badlands National Park has prepared plans for the rehabilitation and expansion of the Ben Reifel Visitor Center. This effort will result in additional exhibit space, an improved auditorium, a classroom, and more office space for the staff. The design for this site has been completed and construction is scheduled to be completed in 2005. Redevelopment of the visitor center is consistent with the alternatives developed in this general management 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.

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

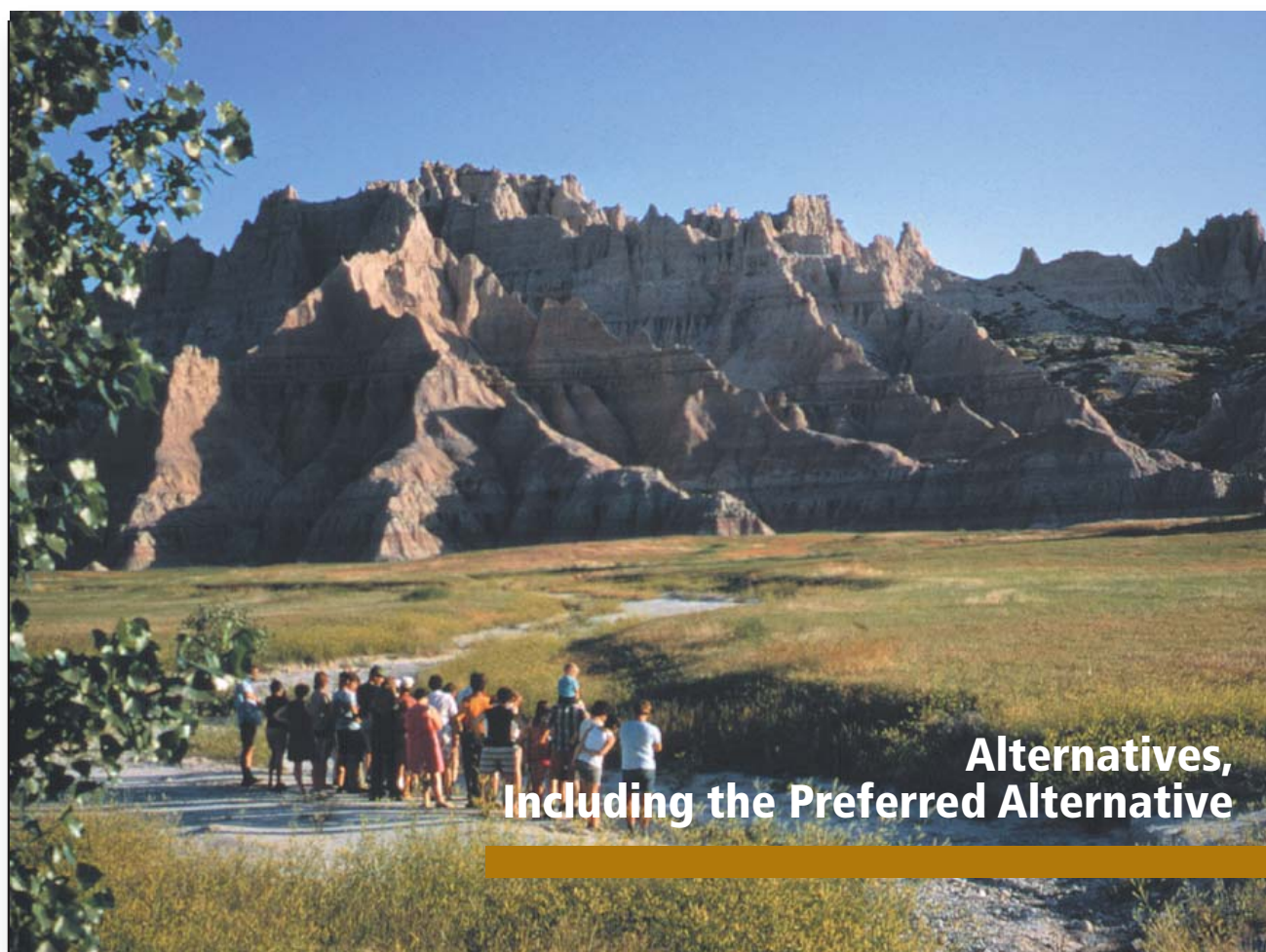
The Wall-Badlands Area Chamber of Commerce prepared a proposal for the creation of Badlands Loop Scenic Byway. The National Park Service supported the designation of that scenic byway, which the state of South Dakota reviewed and approved. The scenic byway starts at Cactus Flats and travels south and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

The Oglala Sioux Parks and Recreation Authority has prepared and submitted a proposal for the creation of the Crazy Horse Scenic Byway. The state of South Dakota 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 *Draft 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. 69) 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 24, 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. 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

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 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.

The relationships between the advantages and costs of each alternative are established.

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 research source 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 or facility development.	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	Emphasis on preserving native species and natural processes while offering a moderately structured visitor experience; 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; possible manipulation of vegetative cover; erosion controlled where visitor safety is involved; paleontological resources actively maintained, monitored, and protected; emphasis on preserving cultural resources, archeological and historic resources possibly allowed to molder.	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.	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. Appropriate commercial services could be permitted.	Management actions focused on preventing resource impacts and providing for visitor safety.	Development limited to trails

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, such as the renovation and expansion of the Ben Reifel Visitor Center, 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.

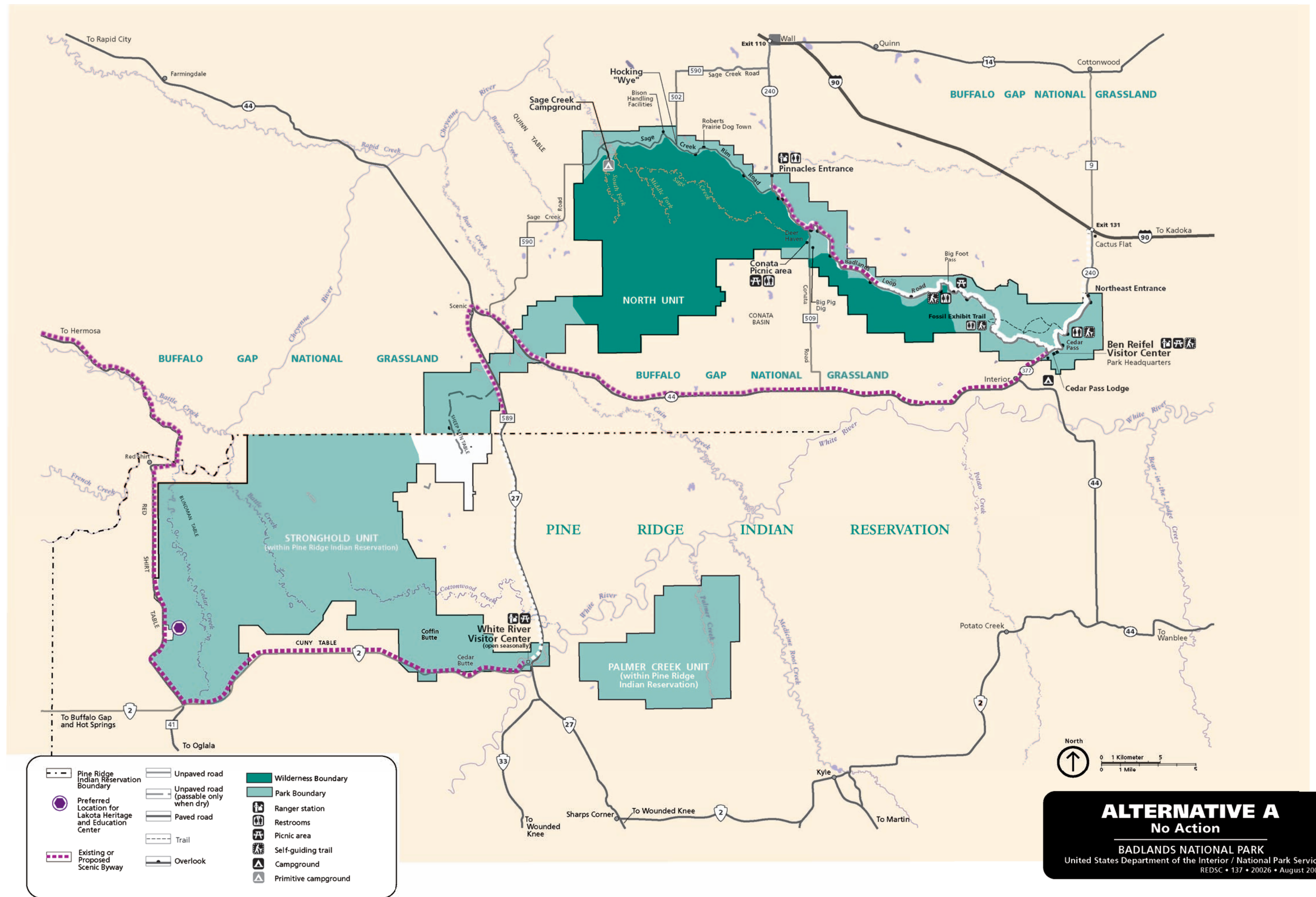
The Ben Reifel Visitor Center at Cedar Pass would continue to offer orientation and information. The existing parking areas and trails along the Loop Road would be retained. Park headquarters would remain at the current location at Cedar Pass, as would other park operations.

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.



ALTERNATIVE A No Action

BADLANDS NATIONAL PARK
United States Department of the Interior / National Park Service
REDSC • 137 • 20026 • August 2005

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

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

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 (2,920 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).

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.

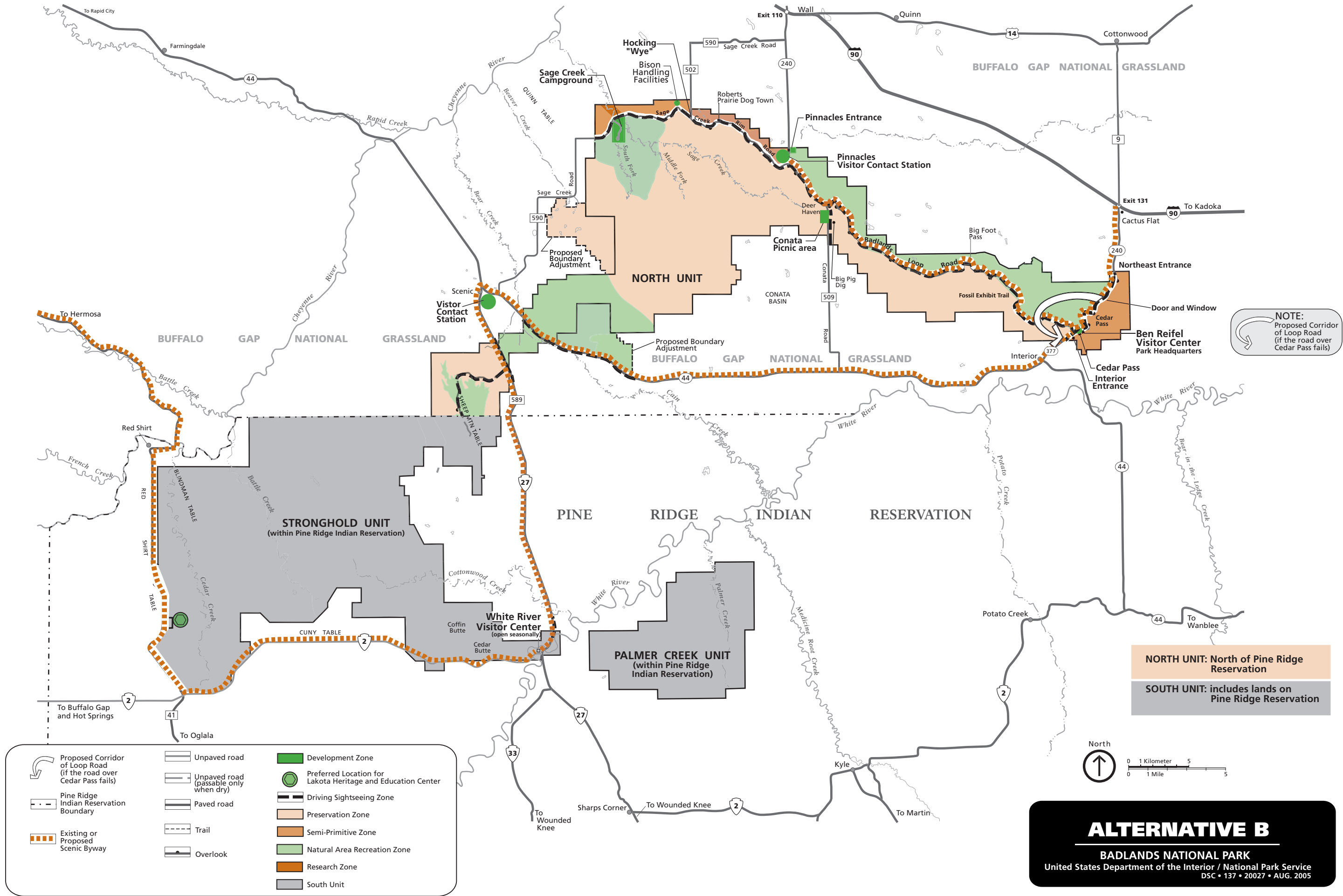
Preservation Zone

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. Board-

walks 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 indicated that the Loop Road was becoming unsafe, another road 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. The Federal Highway Administration has studied this alignment (FHWA 2002) and determined the route is 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.

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

Section 604 of PL 95-625 requires that the National Park Service identify in a general management plan any potential changes to the park boundaries and to give reasons for the changes.

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 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 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 (2,920 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).

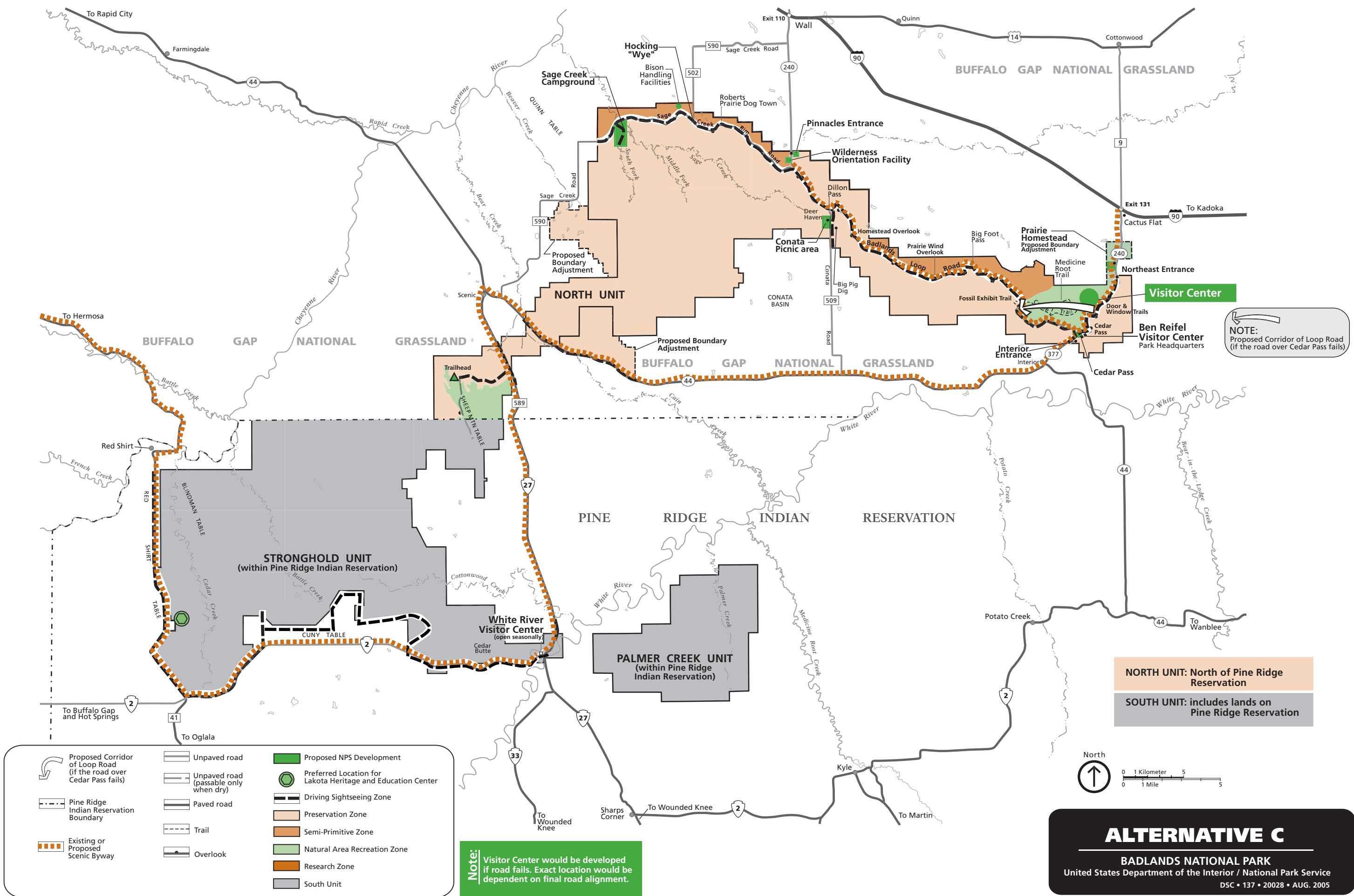
MANAGEMENT OF SPECIFIC AREAS

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 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 the Loop Road was becoming unsafe, another road 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.

The Federal Highway Administration has studied this alignment (FHWA 2002) and has determined the route is 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.

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

Section 604 of PL 95-625 requires that the National Park Service identify in a general management plan any potential changes to the park boundaries and to give reasons for the changes.

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 (2,920 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.

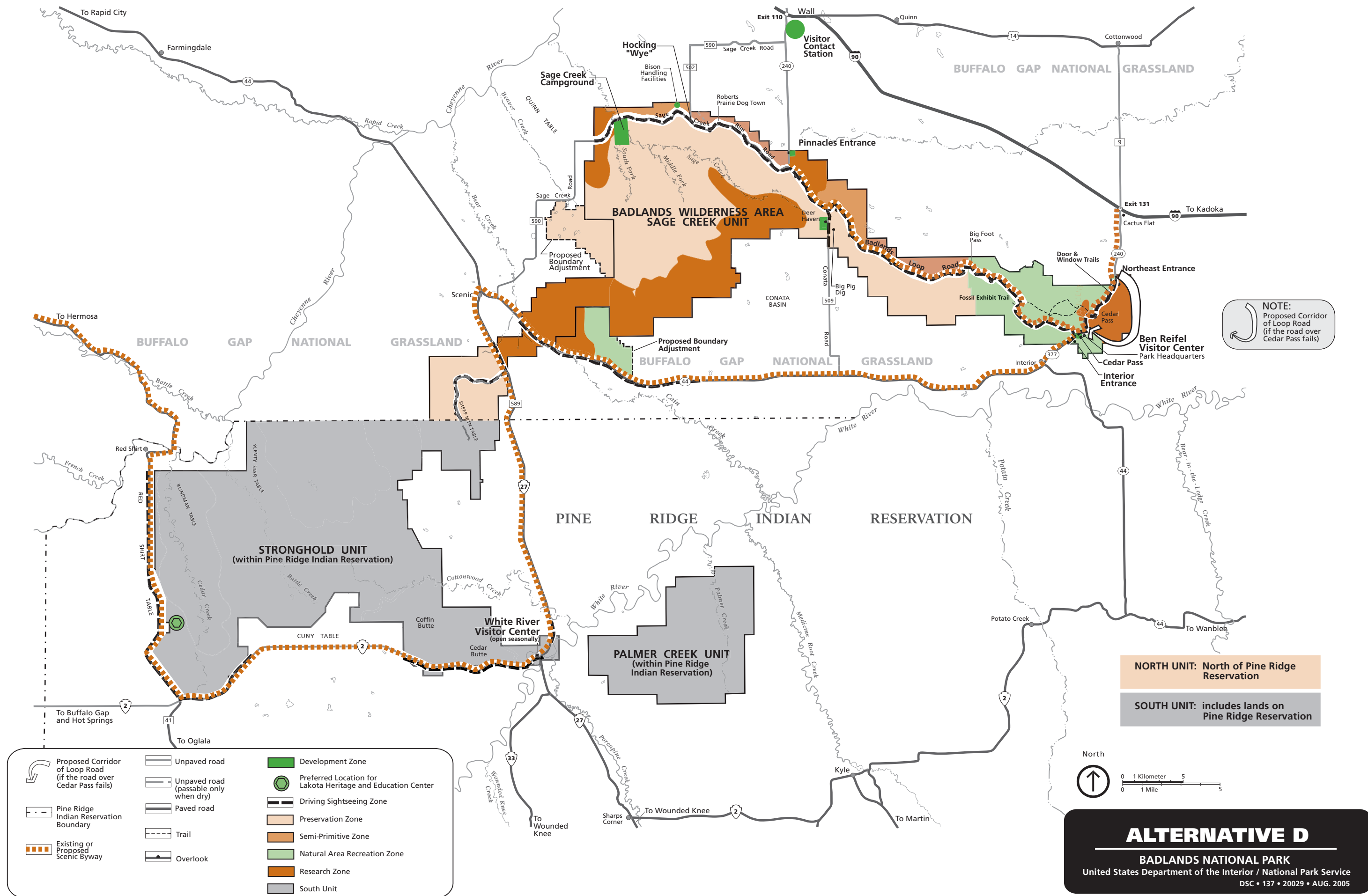
Driving/Sightseeing Zone

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.

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 indicated that the Loop Road was becoming unsafe, another road 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 Forest Service.

The Federal Highway Administration has studied this alignment (FHWA 2002) and has determined the route is feasible from a road construction perspective, but landownership issues would need to be resolved before construction could begin. The most recent planning effort for the Buffalo Gap National Grassland calls for this area to be zoned 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*.

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.

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

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.

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.

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.

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 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 for the widest range of use through the application of zoning that limits or restricts visitor use. 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 that do 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><u>Concept and General Strategies</u></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><u>Proposed Boundary Adjustments</u></i>			
No boundary adjustments in the no action alternative	A total of 5,400 acres along SD Highway 44 recommended for addition to park, a mix of private and Forest Service land; if acquired, would be managed in development and natural area / recreation zones.	A total of 5,400 acres along SD 44 recommended for addition to park, a mix of private and Forest Service land; if acquired, existing ranch facilities used for a ranger station and administrative support and placed in development zone; rest of acquired parcel in preservation zone, focus on restoring natural processes.	A total of 5,400 acres along SD 44 recommended for addition to park, a mix of private and Forest Service land; if acquired, managed in development and natural area / recreation zones, with a wilderness orientation facility and a primitive campground added.
		About 240 acres along SD 240 south of Cactus Flats recommended for addition to park; includes Prairie Homestead, which would be in development zone; existing visitor facility removed and visitors led through area on an interpretive trail; rest of acquisition in natural area / recreation zone.	
	About 4,500 acres of private land along west side of North Unit next to wilderness recommended for addition to park; land is adjacent to prairie dog habitat where black footed ferrets were introduced; if acquired, land would allow access for management activities in wilderness.	About 4,500 acres of private land along west side of North Unit next to the wilderness recommended for addition to park; if acquired managed same as in alternative B.	About 4,500 acres of private land along west side of North Unit next to wilderness recommended for addition to park; if acquired managed same as in alternatives B and C.

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
<u>Management of Specific Areas</u>			
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, still offering orientation; Sage Creek and Cedar Pass campgrounds redeveloped; parking, trails, headquarters unchanged; new museum storage at Cedar Pass.	See management of various zones below.	See management of various zones below. Implement a demonstration shuttle system on the Loop Road from Door and Window to fossil exhibit.	See management of various zones below.
THE LOOP ROAD			
Maintenance of the Loop Road in present alignment continued; if road became unsafe it would be closed and visitors directed to other routes.	If the road failed, new route developed along a corridor going west from NE entrance down Badlands Wall toward Interior (within park boundaries); if done, more studies, NEPA documentation, and public input needed.	If the road failed, new route developed along a corridor going west from NE entrance, <i>not</i> down Badlands Wall but instead across prairie above wall; if done, more studies, NEPA documentation, and public input needed.	If the road failed, new route developed along a corridor going west from NE entrance down Badlands Wall (across private and Forest Service lands), ending near Interior entrance; if done, need to resolve landownership issues, and more studies, NEPA documentation, and public input needed.
<u>Management Prescriptions „ General</u>			
No management prescriptions in this alternative.	Percentage of park in each prescription: Semiprimitive 5% Preservation 53% Natural Area Recreation 27% Driving / Sightseeing 14% Development 0.9% Research 0.1%	Percentage of park in each prescription: Semiprimitive 6% Preservation 73% Natural Area Recreation 6% Driving / Sightseeing 14% Development 1% Research 0%	Percentage of park in each prescription: Semiprimitive 5% Preservation 45% Natural Area Recreation 9% Driving / Sightseeing 16% Development 1% Research 23%
SEMPIRIMITIVE ZONE			
No management prescriptions in this alternative.	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.	Area north of the Loop Road and Sage Creek Rim Road also in this zone, available for hiking and pack stock use.	Area north of the Loop Road and bison area north of Sage Creek Rim Road in this 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
PRESERVATION ZONE			
No management prescriptions in this alternative.	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.	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.	Most of wilderness area in park in this zone; visitors could explore and find solitude; wilderness values retained.
NATURAL AREA / RECREATION ZONE			
No management prescriptions in this alternative.	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.	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.	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.
DRIVING / SIGHTSEEING ZONE			
No management prescriptions in this alternative.	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.	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.	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.

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: € 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

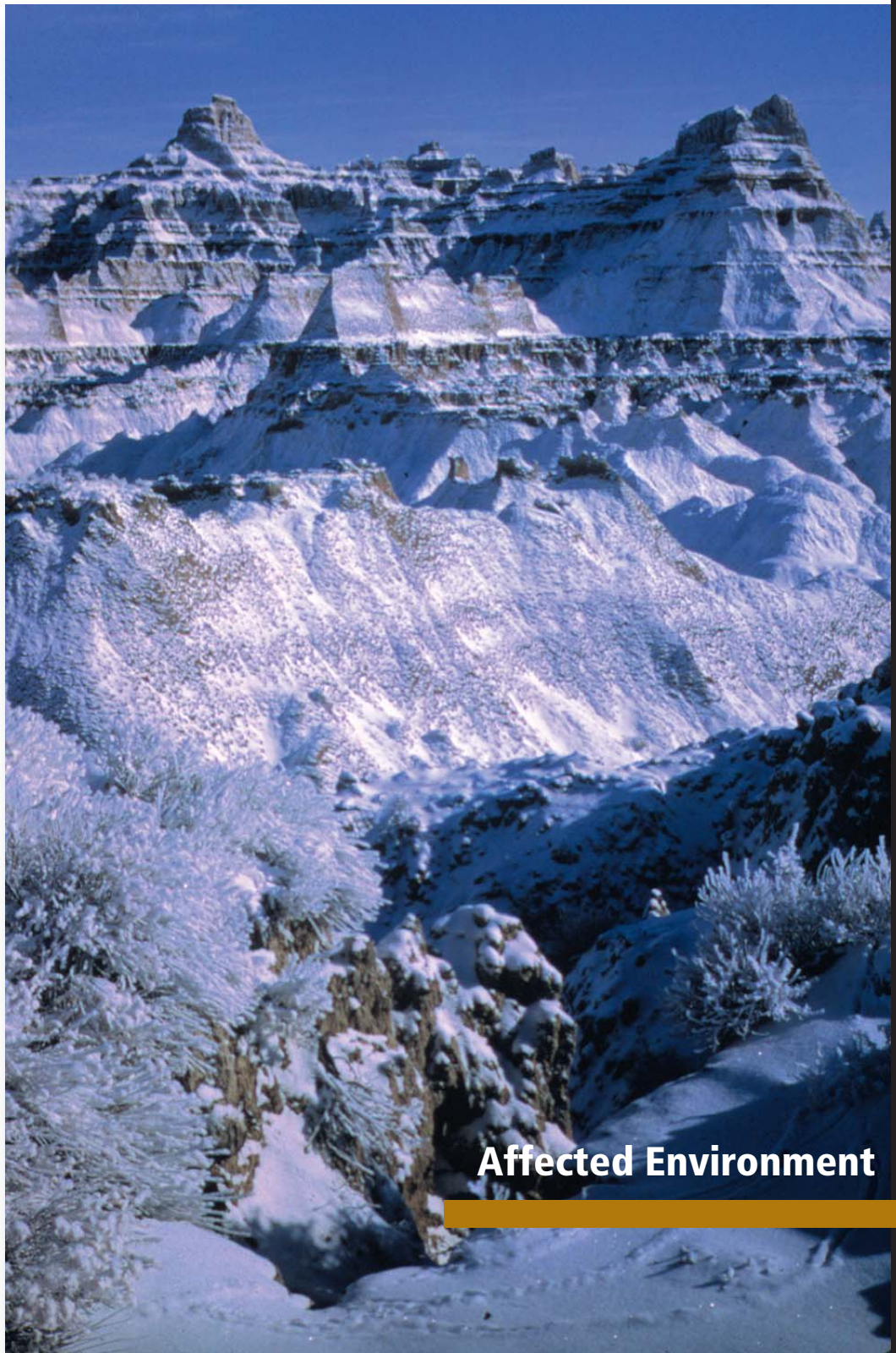
TABLE 8: COMPARISON OF ENVIRONMENTAL CONSEQUENCES

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
<u>Effects on Natural Resources</u>			
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.
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.

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
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, the new Loop Road segment, and to visitor 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.
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.
<i>Effects on Cultural Resources</i>			
HISTORIC BUILDINGS AND OTHER STRUCTURES			
No historic structures are known to exist in the park, so no effects on historic structures.	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 effects as in alternative B.	Same as alternative A.

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
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><i>Effects on Visitation and the Visitor Experience</i></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 and those coming to South Unit; 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.
RANGE AND ENJOYMENT OF VISITOR ACTIVITY			
<i>Vehicle Use</i> „ No change in driving opportunities.	<i>Vehicle Use</i> „ 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 Cunny Tables would open more recreational opportunities; reducing areas open to ORVs would cause a minor to moderate adverse effect on visitors seeking that experience; overall, moderate to major beneficial effects on driving/sightseeing.	<i>Vehicle Use</i> „ 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.	<i>Vehicle Use</i> „ 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; less ORV driving available in South Unit.
<i>Hiking and Pack Stock Use</i> „ 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.	<i>Hiking and Pack Stock Use</i> „ Hiking opportunities increased by adding trailheads and designating trails; pack stock opportunities improved by adding trailer parking areas in South Unit.	<i>Hiking and Pack Stock Use</i> „ 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.	<i>Hiking and Pack Stock Use</i> „ Fewer hiking and pack stock opportunities available than in other alternatives because of restrictions in larger research zone.

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>Camping</i> „ Cedar Pass and Sage Creek campgrounds unchanged; rehabilitation would continue.	<i>Camping</i> „ Camping opportunities improved by adding a small campground in boundary expansion area along SD 44 and a group campground at bison handling facility.	<i>Camping</i> „ Changing Sage Creek campground to a day use area would eliminate opportunity for quiet primitive camping, a long-term minor to moderate adverse effect.	<i>Camping</i> „ Camping opportunities same as in alternative A.
<i>Picnicking</i> „ Limited picnic areas would continue to cause long-term negligible adverse impacts.	<i>Picnicking</i> „ New picnic area at Cedar Pass.	<i>Picnicking</i> „ Same as alternative B.	<i>Picnicking</i> „ 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.
<u>Effects on the Socioeconomic Environment</u>			
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.	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 269.

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, especially in the South Unit. 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

Very little data on water quality in Badlands is available. Water quality is believed to vary seasonally and from stream to stream, although the causes of

these fluctuations are unknown (Black & Vetch 1998). Building the developments included in the alternatives would be likely to increase erosion, even with mitigative measures. 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 would be 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; 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

Wetlands are rare in the Badlands because of the area's topography and low precipitation. Most wetlands are along or adjacent to rivers, 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. 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

Planning for a new storage and curation facility is underway; this will expand the available space for collection storage. This facility will be built regardless of which alternative is selected. Therefore, the topic of collections will not be discussed.

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. 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 (Hammitt 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 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. However, sylvatic plague has never been documented in prairie dogs in South Dakota. 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 non-essential 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.

Less than 5% of the park has been surveyed for cultural resources, so information on all categories of cultural resources in the park is limited. Consequently, insufficient information is available for making specific statements about the probable impacts on cultural resources in particular areas. The park's "Resource Management Plan" (NPS 1999c) presents baseline resource status and provides the context for the following discussion of the park's cultural resources.

HISTORIC STRUCTURES

The park's list of classified structures is a computerized, evaluated inventory of all historic and prehistoric structures with historical, architectural, or engineering significance in which the National Park Service has a legal interest or plans to acquire legal interest. Included are structures that individually meet the criteria of the National Register of Historic Places or are contributing resources of sites and districts that meet national register evaluation criteria. Included on this list are other structures that are managed as cultural resources (table 9).

TABLE 9: LIST OF CLASSIFIED STRUCTURES
BADLANDS NATIONAL PARK

Structure Name	LCS Number
Yellow Mounds Overlook	51080
Rainbow Overlook	51081
Clastic Dikes Overlook	51082
Burns Basin Overlook	51083
Grasslands Overlook	51084

The Prairie Homestead, outside of the park boundaries 0.5 mile north of the Northeast entrance, was listed in the National Register of Historic Places 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 first part. The sod house, made from available material, was built in 1909 by Edgar I. Brown, who homesteaded near the Dakota Badlands and lived there until 1949. The Crew family rehabilitated the house in the 1960s, furnishing it with items typical of the period.

ETHNOGRAPHIC RESOURCES

Ethnographic resources (such as a site, structure, landscape, or natural resource feature assigned traditional legendary, subsistence religious or other significance and 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 in, the National Register of Historic Places.

The park contains evidence of continuing Lakota traditional spiritual uses such as the presence of prayer banners, especially in the South Unit. 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. It is expected that an ethnographic study of the Oglala Sioux currently being prepared will help to determine aboriginal use of the park.

Several areas in the Sheep Mountain locality have been identified by the Oglala Sioux Tribe as areas of spiritual importance. Tribal members have been guaranteed unrestricted access to these areas in perpetuity, and the National Park Service will not add developments in the areas without the tribe's written consent.

Local tribes have used lands within the park boundaries since before the coming of the Europeans and the creation of Badlands National Monument. Current ethnographic information provided by the tribe has indicated that several areas have special spiritual significance for the Oglala Sioux.

A report is being prepared 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. It is expected that the study will identify the American Indian groups that have both traditional and contemporary links to the park's natural and cultural resources. The study also is expected to identify 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

A Historic Resources Study is currently being prepared that will assess the eligibility of the Cedar Pass Developed area surrounding and adjacent to the Visitors Center for inclusion in the National Register of Historic Places. As was detailed on page 79, although all potential cultural landscapes face degradation from the Badlands' characteristic endemic erosion, they would not be affected by the actions of any of the alternatives.

MUSEUM COLLECTIONS

The fact that the park's museum collections would not be affected by any of the alternatives is explained on page 80. Development of a new curation facility will be carried out regardless of which alternative is selected.

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–2 millions visitors in the next decade (Oglala Sioux Parks and Rec. 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

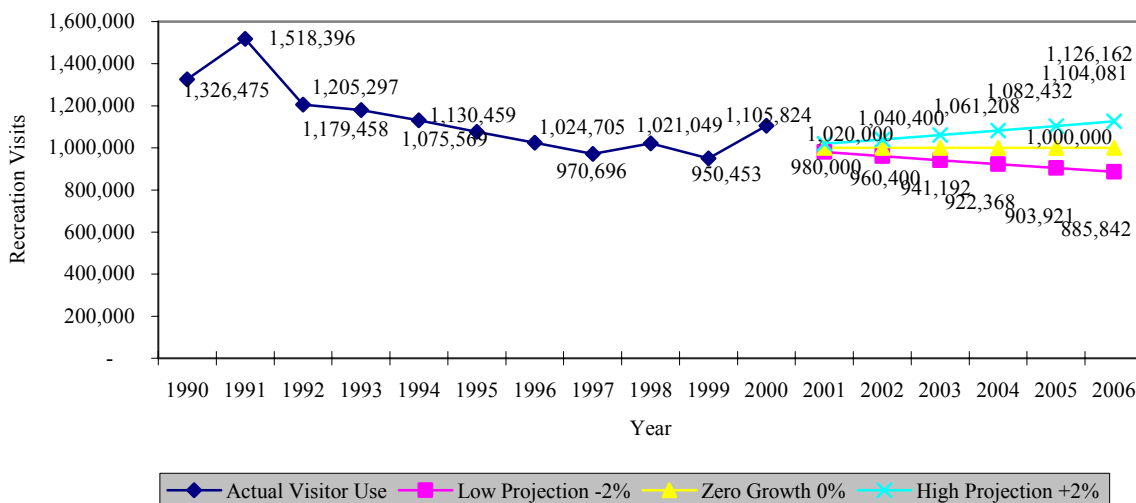
The highest visitation to Badlands National Park is in June, July, and August (70% of the annual visitation), followed by the “shoulder season” months of September, October, and May. Visitation in the shoulder season has increased recently partly because more retired people are visiting the park.

Visitation to the park for the decade of the 1990s is presented in figure 1 (NPS 2001e). A downward trend in visitation, averaging -2% per year, is apparent. However, approximately 1 million people per year visited the park in the past five years. Using 1 million recreation visits as a start-

ing point, a 2% decline each year would result in visitation of approximately 885,000 recreation visits in five years (by 2005). Over this same period, a 2% increase in visits would result in about 1,126,000 recreation visits 2005. Projecting future visitation is an inexact art. A steady downward trend is not likely over a long

period. Likewise, a long-term upward trend may not be sustainable by the park's resources or infrastructure. Visitation in the range of 1,000,000 recreation visits plus or minus 20% is considered a reasonable forecast, given the historic data presented here.

Figure 1. Badlands National Park Actual and Projected Visitor Use



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 Journey Overlook 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 26.

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 north-western 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. 24 and 32.)

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 26, 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. Many visitors make relatively short stops at the complex to obtain information and take care of personal needs. The Ben Reifel Visitor Center, the park's primary orientation and educational facility and a focal point for the public, was completed in 1959. It contains an exhibit and sales area and staff offices. The park plans in 2004 to remodel and expand the visitor center, adding adequate space for exhibits, a classroom, a library, an auditorium, and more staff offices.

An informal exhibit in the Ben Reifel Visitor Center called the "Touch Room" is very popular, but it is too small for current visitation, and the infrastructure is outdated. The permanent exhibits have not changed in the past 40 years, and the information provided does not reflect our current knowledge about the park's resources. There is limited space for changing exhibits, and there is considerable congestion in summer, especially when more than one tour bus arrives.

Tour buses use the parking lot for picnics because there are no other picnic facilities for groups of this size. There is no room for group programs or special education programs. The building has poor heating, cooling, and air circulation. Parts of the building, which was built on unstable clay soil, have shifted, creating cracks in the walls, sidewalks, and ceilings. Lines frequently form outside the restroom.

The entrance patio of the Ben Reifel Visitor Center has been partly enclosed to accommodate audiovisual equipment, and plastic chairs and benches serve as a

makeshift theater seating 48. The movie "Buried Fossils, Living Prairie" is shown continually in summer. The area is not climate controlled. Summer temperatures can reach 90°F, and it can be cold in spring and autumn or when there is rain.

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 in the amphitheater, which seats 200.

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 park, but no designated trails are available in the South 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), 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%
	2,370,000	12.7%	118,595,000	7.2%	6,818,000	6.9%
Total	\$18,604,000	100.0%	\$1,653,293,000	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.

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.

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 17).

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.