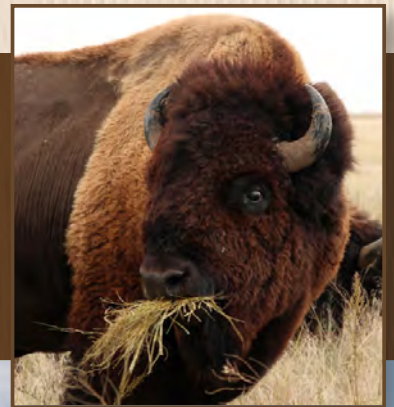




Badlands National Park North Unit

Bison Resource Stewardship Plan / Environmental Assessment

SOUTH DAKOTA | JULY 2016



**North Unit Bison Resource Stewardship Plan /
Environmental Assessment
Badlands National Park
Jackson and Pennington Counties, South Dakota**

EXECUTIVE SUMMARY

Badlands National Monument in South Dakota was recognized as a significant area when the United States Congress authorized its establishment in 1939. 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, which comprises tribal lands that are part of the Pine Ridge Reservation. Unless otherwise stated, in this document the term "park" refers only to the North Unit of Badlands National Park.

Badlands National Park is one of nine National Park Service (NPS) units that currently support bison (*Bison bison*) and is also one of the most recent to participate in bison restoration. Substantial numbers of bison historically inhabited the grasslands within the park. In 1963-1964, 50 bison from Theodore Roosevelt National Park and 2 from Fort Niobrara were introduced to Badlands National Park. An additional 20 bison from Colorado National Monument were introduced to the Badlands National Park herd in 1983. Badlands National Park currently has a management goal of maintaining 500–700 bison in the Sage Creek Unit of the Badlands Wilderness area. The herd is culled opportunistically, and surplus bison have been distributed through agreements to other native tribes through the InterTribal Buffalo Council or the neighboring Oglala Sioux Tribe. None of the alternatives in this plan would alter the terms of these agreements.

The purpose of this plan is to explore options to expand the current geographic bison range to other areas within the North Unit of Badlands National Park. Expanding the geographic bison range in the North Unit would enable the National Park Service to protect the genetic integrity and health of the conservation bison herd in the North Unit, support the health of the mixed-grass prairie ecosystem, and provide appropriate visitor opportunities to view the herd and understand its ecological and cultural importance.

This document describes two alternatives to expand the current bison range within the North Unit and the impacts on the park's resources and visitor use and experiences as a result of implementing each alternative. Alternative 1, the no-action alternative, describes continuation of existing management. Alternative 2, the action alternative, describes expansion of the current bison range into other areas within the North Unit of Badlands National Park. Alternative 2, the action alternative, has been identified as the NPS-preferred management approach.

Comments on this plan / environmental assessment are welcome and will be accepted for 30 days after this document is published and distributed. Comments and responses may be submitted either using the internet or in writing. Commenters are encouraged to use the internet if at all possible. Please submit only one set of comments.

To be sure that you are on our mailing list, please include your name and address on any correspondence.

Internet comments can be submitted at http://parkplanning.nps.gov/Badlands_Bison.

Written comments may be sent to:

National Park Service
Denver Service Center–Planning
Attention: Sarah Conlin
PO Box 25287
Denver, CO 80225-0287

Before including your address, phone number, e-mail address, or other personal identifying information with your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Following public review of this plan and assessment of public comments, either a finding of no significant impact (FONSI) or a notice of intent to prepare an environmental impact statement will be prepared. If a FONSI is prepared, it would document the NPS selection of an alternative for implementation, include any necessary errata sheet(s) for factual changes required in the document and would include responses to substantive comments by agencies, organizations, and the general public. Once the FONSI is signed by the NPS regional director it would be made available to the public. Implementation of the selected action would occur as resources allow.

TABLE OF CONTENTS

<i>Executive Summary</i>	<i>i</i>
<i>Table of Contents.....</i>	<i>iii</i>
Chapter 1: Introduction	3
<i>Overview of the Park.....</i>	<i>3</i>
<i>Purpose and Need for the Plan.....</i>	<i>6</i>
Purpose and Need for the North Unit Bison Resource Stewardship Plan.....	6
Project Scoping.....	6
Bison Conservation Efforts.....	7
<i>Relationship of this Plan to the South Unit of Badlands National Park.....</i>	<i>7</i>
<i>Impact Topics Retained or Considered But Not Retained for Full Analysis in this Plan.....</i>	<i>7</i>
Chapter 2: Alternatives.....	19
<i>Introduction</i>	<i>19</i>
Overview	19
Development of the Alternatives, Including the Preferred Alternative	19
Proposed Action.....	21
<i>Ongoing Management Activities</i>	<i>21</i>
Bison Population Management.....	21
Disease Management	22
Dams and Water Impoundments	22
Ethnographic Use	22
<i>Alternative 1 (No-Action Alternative).....</i>	<i>23</i>
<i>Alternative 2 (NPS-Preferred Alternative)</i>	<i>26</i>
<i>Monitoring Guidelines and Mitigation Measures for the NPS-Preferred Alternative</i>	<i>29</i>
<i>Alternatives Considered But Dismissed From Detailed Evaluation.....</i>	<i>34</i>
<i>NPS-Preferred Alternative.....</i>	<i>34</i>
Chapter 3: Affected Environment.....	37
<i>Introduction</i>	<i>37</i>
<i>Paleontological Resources</i>	<i>37</i>
Background.....	37
Existing Fossil Study Sites.....	38
Threats to Paleontological Resources	38
<i>Vegetation</i>	<i>39</i>
Background.....	39
Vegetation Communities.....	40
Barrens and Sparsely Vegetated Areas.....	41

CONTENTS

Rare Plants	43
Invasive Exotic Plants	43
<i>Archeological Resources</i>	44
<i>Wilderness Character</i>	45
Background.....	45
Natural	47
Untrammeled	47
Undeveloped	48
Solitude or Primitive and Unconfined Recreation	48
<i>Visitor Use and Experience</i>	49
Overview	49
Visitor Use Levels and Characteristics.....	49
Visitor Access and Amenities	51
Interpretation and Education	53
Recreational Opportunities	54
Visitor Safety	56
Chapter 4: Environmental Consequences	59
<i>Introduction</i>	59
Overview	59
General Methods and Assumptions for Analyzing Impacts	59
Climate Change	61
Cumulative Impacts Analysis Method	61
<i>Paleontological Resources</i>	64
Alternative 1 (No-Action Alternative)	64
Alternative 2 (NPS-Preferred Alternative)	66
<i>Vegetation</i>	70
Alternative 1 (No-Action Alternative)	70
Alternative 2 (NPS-Preferred Alternative)	72
<i>Archeological Resources</i>	75
Alternative 1 (No-Action Alternative)	75
Alternative 2 (NPS-Preferred Alternative)	77
<i>Wilderness Character</i>	79
Alternative 1 (No-Action Alternative)	79
Alternative 2 (NPS-Preferred Alternative)	81
<i>Visitor Use and Experience</i>	83
Alternative 1 (No-Action Alternative)	83
Alternative 2 (NPS-Preferred Alternative)	85
Chapter 5: Consultation and Coordination.....	91
<i>Introduction</i>	91
<i>Public Involvement, Including Scoping</i>	91

<i>Consultation and Coordination to Date with Other Agencies, Offices, and the Tribes</i>	92
Section 7 Consultation with the US Fish and Wildlife Service	92
Consultation with the South Dakota Department of Game, Fish, and Parks.....	92
Consultation with American Indian Tribes	93
Section 106 Consultation with the South Dakota State Historic Preservation Office	93
<i>Agencies, Organizations, and Individuals Receiving a Copy of this Document</i>	94
Federal Agencies	94
US Senators and Representatives	94
State Agencies.....	94
State Officials	95
Local and Regional Government Agencies and Officials.....	95
American Indian Tribes Traditionally Associated with Badlands National Park.....	95
Libraries.....	96
Media.....	97
Organizations and Businesses.....	97
Preparers and Consultants and References	101
<i>Preparers and Consultants</i>	101
<i>References</i>	103

MAPS

Regional context of Badlands National Park, Jackson and Pennington Counties, South Dakota	4
Overview of Badlands National Park.....	5
Features of Alternative 1 (No-Action Alternative), North Unit of Badlands National Park.....	25
Features of Alternative 2 (NPS-Preferred Alternative), North Unit of Badlands National Park.....	28
Vegetation (1999) and hydrology, North Unit of Badlands National Park.....	42
Badlands Wilderness, North Unit of Badlands National Park	46

FIGURES

1. Number of recreation visitors by year to Badlands National Park, from 1936 to 2014	50
2. Number of recreation visitors by month to Badlands National Park, from 2010 to 2014	51

TABLES

1. Impact topics retained or considered but not retained for full analysis in this plan as guided by the purposes of this Bison Resource Stewardship Plan and Environmental Assessment for the North Unit of Badlands National Park	8
2. Federally and state listed threatened species, endangered species, and species of concern that have been identified as present in Jackson and Pennington Counties	12
3. Annual visitor counts at NPS-staffed entrances, Badlands National Park.....	53

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Chapter 1: **Introduction**



CHAPTER 1: INTRODUCTION

OVERVIEW OF THE PARK

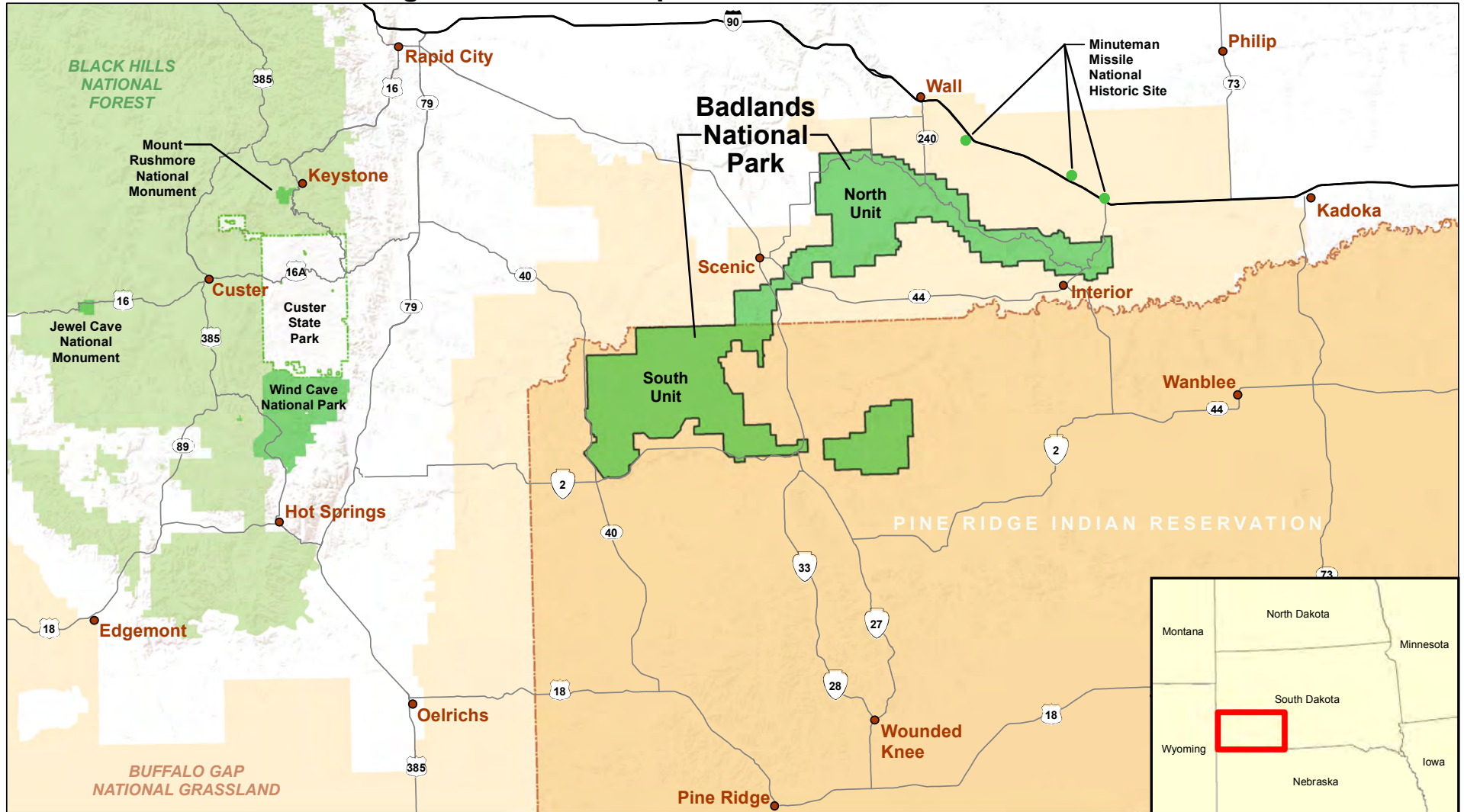
Badlands National Monument in South Dakota was recognized as a significant area when the United States Congress authorized its establishment in 1939. The monument encompassed approximately 110,000 acres of the South Dakota badlands. The monument was expanded by 133,000 acres in 1968, and it was redesignated 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. (See map showing regional context of Badlands National Park and map showing overview of Badlands National Park).

The 1968 expansion created the South Unit of the park, which comprises tribal lands that are part of the Pine Ridge Reservation. Unless otherwise stated, in this document the term “park” refers only to the North Unit of Badlands National Park.

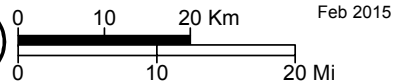
Badlands National Park is one of nine National Park Service (NPS) units that currently support bison (*Bison bison*) and is also one of the most recent to participate in bison restoration. Substantial numbers of bison historically inhabited the grasslands within the park. In 1963-1964, 50 bison from Theodore Roosevelt National Park and 2 from Fort Niobrara were introduced to Badlands National Park (Plumb and Sucec 2006). An additional 20 bison from Colorado National Monument were introduced to the Badlands National Park herd in 1983 (Dratch and Gogan 2010). Badlands National Park currently has a management goal of maintaining 500–700 bison in the Sage Creek Unit of the Badlands Wilderness area (NPS 2008). The herd is culled opportunistically, and surplus bison have been distributed through agreements to other native tribes through the InterTribal Buffalo Council or the neighboring Oglala Sioux Tribe. None of the alternatives in this plan would alter the terms of these agreements.



Badlands National Park Regional Context Map



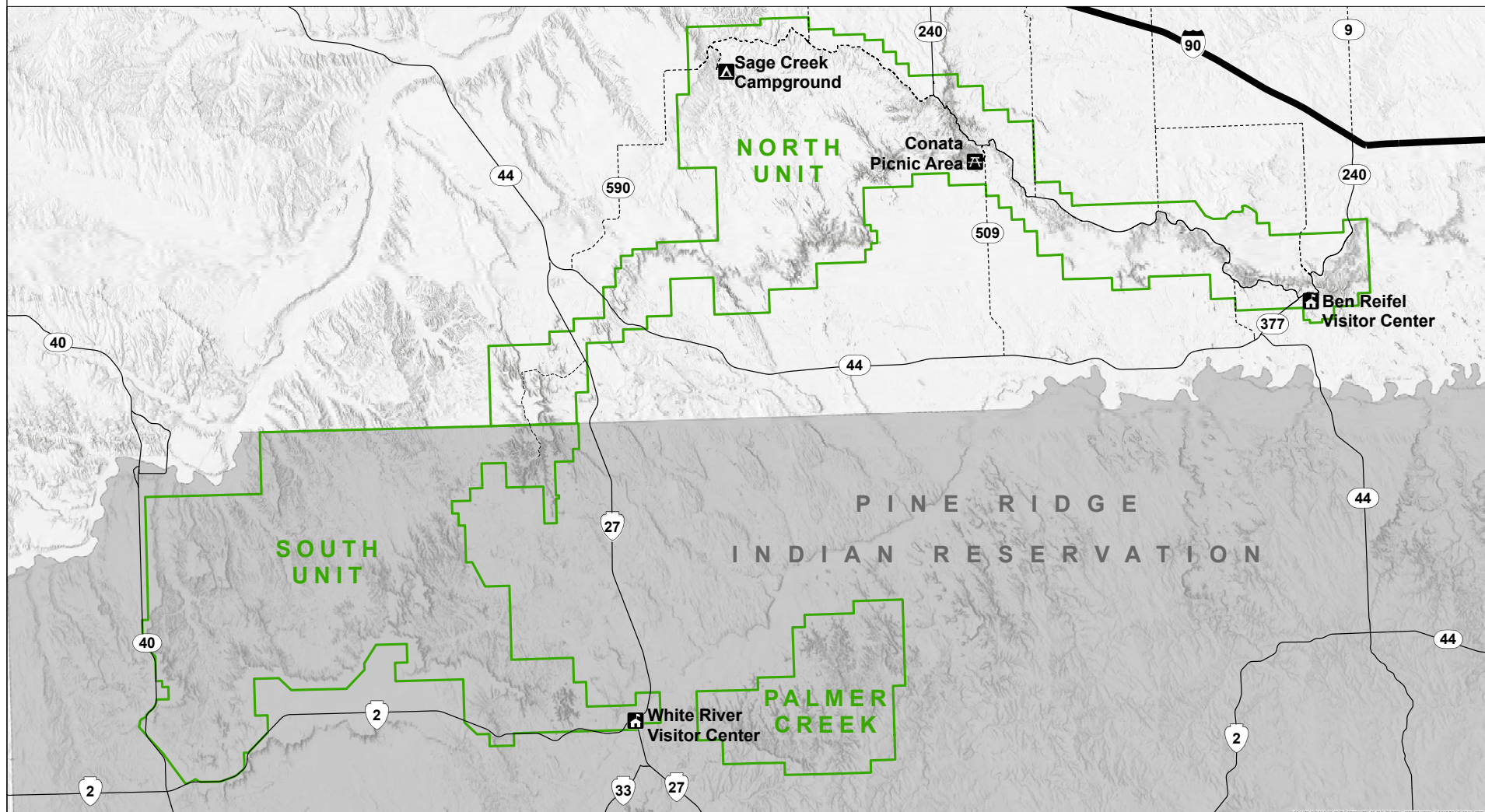
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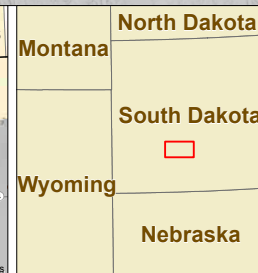
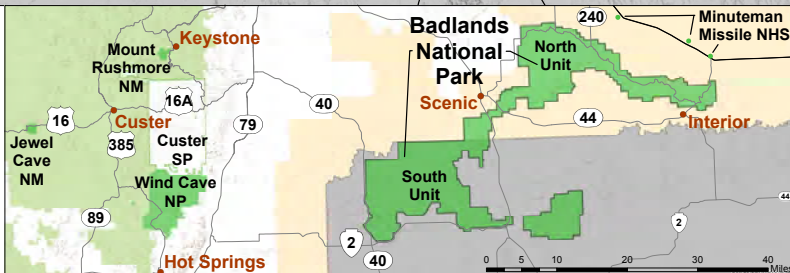
Feb 2015



Park Overview



- Paved Road**
- Unpaved Road**
(may be impassable when wet)
- NPS Boundary**
(from Lands Division)
- Pine Ridge Indian Reservation**



0 1.5 3 6 9 12 Miles

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PURPOSE AND NEED FOR THE PLAN

PURPOSE AND NEED FOR THE NORTH UNIT BISON RESOURCE STEWARDSHIP PLAN

The purpose of this plan is to evaluate alternatives to expand the current geographic bison range to other contiguous areas within the North Unit of Badlands National Park. Expanding the geographic bison range in the North Unit would enable the National Park Service to protect the genetic integrity and health of the conservation bison herd in the North Unit, support the health of the mixed-grass prairie ecosystem, and enhance visitor opportunities to view the herd and understand its ecological and cultural importance.

The project is needed to accomplish the following objectives:

- To support the “Home on the Range” goal in the National Park Service’s “A Call to Action” (2014), which focuses on returning the American bison, one of the nation’s iconic species, to the landscape of the United States.
- To support the US Department of the Interior’s Bison Conservation Initiative of 2008, which calls for the expansion of federal bison herds.
- To act in the spirit of NPS policy that calls for the reintroduction of bison (NPS *Management Policies 2006* (§4.1.5) “Natural Resource Management”).

PROJECT SCOPING

The scoping phase plays an important role in helping to focus the priorities that must be addressed in the plan. The following topics represent the pertinent comments and concerns that were identified during the scoping phase in the summer of 2013. See “Chapter 5: Consultation and Coordination” for more information about the scoping phase.

- **Maintain a healthy bison herd and its genetic integrity.** Maintaining a healthy conservation herd requires preserving genetic integrity. The plan will address regular management of the bison herd in order to support its health and its genetic integrity.
- **Provide appropriate bison infrastructure.** The plan will describe the bison infrastructure needed to support an expansion of the bison range and where that infrastructure might be located in the North Unit. Appropriate bison infrastructure could include fencing, exclosures, cattle guards, and portable corrals.
- **Upgrade and maintain bison fence.** The bison fence will need to be regularly maintained to protect against trespass by bison onto private property. The plan will consider a formal protocol for rapid response from NPS staff when / if NPS bison trespass onto neighboring private property.
- **Resource protection.** The North Unit of Badlands National Park protects many nationally and globally significant geologic, paleontological, and archeological resources, as well as designated wilderness, wildlife, and vegetation resources. A goal of the plan will be to minimize any adverse impacts on these resources.

- **Visitor experience and safety.** The plan will identify appropriate visitor experiences related to viewing bison within the North Unit of the park including interpretive and educational opportunities and provision of appropriate vehicle pullouts. Visitor safety needs will also be incorporated into the plan.

BISON CONSERVATION EFFORTS

In 2008, the US Department of Interior developed a bison conservation initiative, which calls for the National Park Service to actively pursue and expand efforts to conserve bison as wildlife while also conserving the genetic biodiversity. The Department of Interior encourages the management of its bison herds based on the best science available and seeks to restore them to their ecological and cultural role on appropriate landscapes (US Department of Interior 2008).

The National Park Service has similarly identified bison conservation as a main goal for their second century of stewardship of NPS units. In its “Call to Action 2014”, a goal, “Home on the Range,” focuses on returning the American bison, one of the nation’s iconic species, to the landscape of the United States (NPS 2014a).

RELATIONSHIP OF THIS PLAN TO THE SOUTH UNIT OF BADLANDS NATIONAL PARK

In 2013, the National Park Service and the Oglala Sioux Tribe began drafting an environmental assessment for bison reintroduction to the South Unit of Badlands National Park, as recommended by the 2012 *South Unit Final General Management Plan / Environmental Impact Statement* (NPS 2012). In 2015, that planning effort was postponed at the request of the tribe. There is no timetable for resumption of the project.

This *North Unit Bison Resource Stewardship Plan / Environmental Assessment* addresses management actions within the North Unit of the park only. None of the information in this plan or any decisions made in the subsequent decision document (Finding of No Significant Impact or Record of Decision) would affect reintroduction of bison to the South Unit.

None of the alternatives considered in this study infringe on private property rights. NPS land management regulations and policies would apply only to lands that the National Park Service owns and manages in the North Unit of Badlands National Park.

IMPACT TOPICS RETAINED OR CONSIDERED BUT NOT RETAINED FOR FULL ANALYSIS IN THIS PLAN

National Park Service planning projects identify issues and evaluate associated impacts. Impact topics are resources of concern that could be affected, either beneficially or adversely, by implementing any of the proposed alternatives. The National Park Service used an interdisciplinary review process to determine which resources could be affected by this project. Table 1 shows impact topics retained and impact topics considered but not retained for full analysis in this plan. A short description of each follows the table, and more information on impact topics retained for detailed analysis is provided in “Chapter 3: Affected Environment.” It should be noted that all of

the park's resources and values are considered important and are managed accordingly, regardless of whether or not they are retained in the impact analysis of this document. The dismissal of an impact topic from detailed analysis only means that the topic is not important to consider in this particular decision process.

TABLE 1. IMPACT TOPICS RETAINED OR CONSIDERED BUT NOT RETAINED FOR FULL ANALYSIS IN THIS PLAN AS GUIDED BY THE PURPOSES OF THIS BISON RESOURCE STEWARDSHIP PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE NORTH UNIT OF BADLANDS NATIONAL PARK

Impact Topics Retained	Impact Topics Considered But Not Retained For Full Analysis
<ul style="list-style-type: none"> ▪ Paleontological resources ▪ Vegetation ▪ Archeological resources ▪ Wilderness character ▪ Visitor use and experience 	<ul style="list-style-type: none"> ▪ Geologic resources and soils ▪ Water resources ▪ Wetlands ▪ Floodplains ▪ Air quality ▪ Wildlife ▪ Special status species ▪ Viewshed / scenery ▪ Carbon footprint ▪ Historic structures ▪ Museum collections ▪ Cultural landscapes ▪ Ethnographic resources ▪ Socioeconomic environment ▪ Environmental justice ▪ American Indian trust resources

Impact Topics Retained for Full Analysis

Paleontological Resources. Paleontological resources are abundant throughout the area. Only a small percentage of the area has been inventoried for paleontological resources. The reintroduction of bison and construction of fencing, vehicle pullouts, and related infrastructure can adversely impact paleontological resources from trampling, increased erosion, ground disturbance, and crushing from park facility/maintenance equipment and activities. Furthermore, the Paleontological Resources Protection Act, a subsection of the Omnibus Public Land Management Act of 2009 (PL 111-011), provides the Department of the Interior with guidance for proper preservation and management of paleontological resources. The spirit of this law helps guide management of these resources in federal project planning and implementation. As a result of the above, this impact topic will be retained for additional analysis.

Vegetation. Bison are an important herbivore in grassland ecosystems; an average-size lactating cow consumes about 30 pounds of forage per day. In addition to plant consumption, bison trampling, wallowing, and other behaviors affect vegetation directly and indirectly. Furthermore, bison can often transport exotic species, which can result in direct and indirect impacts on native vegetation. Last, construction of fencing, vehicle pullouts, and related infrastructure can have adverse impacts on vegetation. Therefore, this impact topic will be retained for additional analysis.

Archeological Resources. Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for federal review and protection of cultural resources and

ensures that they are considered during federal project planning and execution. Only 6% of the North Unit has been systematically surveyed for archeological resources, and most of the unit, including vast parts of the area that would be potentially affected by the alternatives, is unsurveyed. Archeological resources located near the surface or within fragile soils could be trampled by bison. Fencing, vehicle pullouts, and associated infrastructure construction may adversely affect archeological resources. As a result of potential bison- and construction-related impacts and unknown locations of archeological resources, this topic will be retained for additional analysis.

Wilderness Character. Congress designated 64,250 acres of the North Unit of Badlands National Park as the Badlands Wilderness in 1976 (PL 94-567). Within the North Unit, the designated wilderness is divided into two geographically separated units, referred to by NPS staff as the Sage Creek Unit and Conata Basin Unit. Currently, the bison range includes the Sage Creek Unit of the wilderness, and alternative 2 proposes expansion of the bison range to include the Conata Basin Unit. Bison management activities and construction of infrastructure for bison management and visitor use, as well as potential changes to visitation and use, may affect wilderness character; therefore, this impact topic will be retained for additional analysis.

Visitor Use and Experience. The North Unit of the park is managed in accordance with the Organic Act of 1916, the general management plan for the North Unit (2006b), and NPS *Management Policies 2006* (NPS 2006a). The management of bison and possible expansion of the bison range and related infrastructure construction may affect visitation patterns and experiences; therefore, this impact topic will be retained for additional analysis.

Impact Topics Considered But Not Retained for Full Analysis

Some resource impact topics that are commonly considered during the planning process were dismissed from detailed analysis either because the management alternative would have no effect or minimal effects on the resource or because the resource is not present in the action areas. The rationale for not retaining these specific topics is stated for each topic.

Geologic Resources and Soils. The geologic features of Badlands National Park are integral to the purpose of the park and its disturbances by bison expedite erosion in certain areas. Unnatural concentrations and year-round residency of bison in the proposed expanded range would introduce some disturbances to native soils and geologic features in areas not occupied by cattle or bison for several decades, particularly in high-use areas such as near water sources and bison movement corridors. These adverse effects are expected to be minimal and would primarily include soil compaction and erosion and destabilization and erosion of Badlands formation material.

Bison disturbances to soils and geologic features (e.g., erosion, compaction) in the existing bison range would continue under the action alternative but could diminish somewhat, relative to current conditions, as the bison migrate into newly opened range and the concentration and/or frequency of bison use in the existing range possibly decreases. The reintroduction of native grazers to the expanded bison range is expected to benefit the mixed-grass prairie ecosystem and its wildfire regime and reduce the number of exotic plants (also see “Vegetation” in the section on “Impact Topics Retained for Detailed Analysis”). By benefiting the mixed-grass prairie ecosystem and its wildfire regime, the reintroduction of native grazers to the expanded bison range could also increase soil stability and decrease the need for prescribed burns on the park’s grasslands, possibly reducing soil erosion in post-fire years and leading to indirect benefits throughout the extent of the expanded range.

The primary geologic hazards in Badlands National Park are landslides and slumps resulting from active erosion. Although the exact migration routes that bison would favor in the expanded range are not known, it is unlikely that their preferred corridors would exacerbate geologic hazards or substantially increase erosion of badlands features. Due the minor beneficial effects anticipated, the minimal increases in erosion in high-use areas of the expanded range, and the negligible effect bison are likely to have on geologic hazards, geologic resources and soils will not be further analyzed in this environmental assessment.

Water Resources. Expansion of the bison range in the North Unit would likely have some effects on water quality and quantity, although the adverse effects would be minimal. Bison consume about 12 gallons of water per day per adult in the summer. Much of the bison range in the no-action alternative is already grazed by bison, and effects on water quantity have proven to be negligible. The bison currently obtain water from ephemeral streams, wetlands, or other water impoundments throughout the existing range. Bison in the proposed expanded range would likely have similar effects. The designating legislation for the Badlands Wilderness authorized the park to maintain 10 water impoundments within the wilderness area; however, this plan does not address any potential stock dam construction or improvement activities. Any potential future stock dam construction or improvement activity would require a separate compliance process, as applicable. Water availability in these areas was identified, and additional investigation determined that the project area can adequately support the reintroduction of bison (see map, “Vegetation (1999) and Hydrology”).

Where bison trails are cut into steep hillsides, the trails may serve as drainage channels that increase surface runoff and reduce baseflow residence time, although to such a minor degree that the watershed would not exhibit a measurable change. Secondary impacts on water quantity resulting mostly from the beneficial impact that bison have on vegetative composition would likely be moderate but predominantly beneficial.

Park staff have noted some localized impacts to water quality in open-water areas that are heavily used by bison, such as increased turbidity from erosion and sedimentation associated with soil trampling and disturbance, creation of additional stream crossings, and nutrient loading from higher concentrations of bison excrement. Potential adverse impacts are likely to be localized and short term in nature. Based on the limited and localized impacts on water quantity and quality, water resources will not be further analyzed in this environmental assessment.

Wetlands. Wetlands are rare in the Badlands landscape because of the area’s topography and limited precipitation and generally are confined and adjacent to streams, seeps, springs, old stock ponds, and ephemeral washes. Some riparian shrublands and riparian or wet meadows also provide wetland conditions. In addition, a limited number of small, isolated groundwater-fed springs and seeps are present in the park and provide open water sources for wildlife and support wetland conditions. Although there may be some minor impacts on wetlands in high use areas from bison accessing water sources, foraging, and trampling vegetation, these are expected to be localized and short term. Given the limited extent of wetlands in the park, and the minimal anticipated impacts from the alternatives, this topic was not retained for further consideration in this environmental assessment.

Floodplains. The North Unit of Badlands National Park has very limited perennial drainages and, thus, few floodplains. Part of the North Unit may contain parts of the regulatory 100-year and 500-year floodplain of the White River, but the components of the proposed action (fencing alterations along the expanded bison range and construction of additional vehicle pullouts and cattle guards) would have negligible effects on the White River floodplain. As a result, this topic was not retained for further analysis in this environmental assessment.

Air Quality. Badlands National Park is a designated Class I air quality area. Class I areas are defined as those national parks that are permitted only a small amount of certain kinds of additional air pollution. The impact of bison fence construction and related infrastructure on air quality would be limited to short-term effects including the temporary introduction of particulates into the environment. As a result, air quality will not be analyzed further in this environmental assessment.

Wildlife. Although expansion of the bison range in the North Unit would likely affect native wildlife and their habitat, the most notable overall effects would be beneficial due to the restoration of a native large grazer in this prairie ecosystem. Expanding bison, a keystone species, to their native range in more eastern parts of the North Unit would help restore natural processes that contribute to the health of the overall mixed-grass prairie ecosystem and to habitat quality and availability for the diverse wildlife species that occupy it. The National Park Service acknowledges, however, that an expansion of the geographic bison range would affect the various other wildlife species in the North Unit of the park differently, depending on the intensity of grazing, physiography, and other localized and species-specific factors. Some wildlife species would likely benefit greatly, whereas a few others might experience relatively limited adverse effects (e.g., due to localized resource competition). It is anticipated that these adverse effects to some wildlife species would be relatively minor and rather localized and would not notably alter species population health. This, combined with the collective value of this bison reintroduction to the ecological system, and the benefits it brings to most native wildlife species in the park, supports the rationale to not retain this topic for further analysis.

Also, the proposed action would likely only result in beneficial effects on the park's bison population. The geographic expansion of the bison range would provide for larger expanses of prairie forage, more opportunities and space for daily and seasonal movement, and an increased potential for NPS wildlife managers to improve the genetic diversity of the herd.

Lastly, the proposed new bison fencing in the North Unit of the park would be constructed to contain the bison while allowing other wildlife to move freely as much as possible. The fence would have at least 16 inches of spacing between the ground and the bottom wire to allow the passage and migration of pronghorn antelope (*Antilocapra americana*) and other wildlife. The average height of the top wire would be 64 inches above the ground. Where possible, the use of Badlands topography as a natural barrier to bison movement will be considered in order to limit the extent of bison fencing necessary. Furthermore, other bison-related facilities, including fencing and vehicle pull-offs, would be strategically placed to avoid wildlife populations and game trails/movement corridors.

As a result of all of the above considerations, wildlife will not be included for further analysis in this environmental assessment.

Special Status Species. Various federal and state and listed species are known to be present in and around the region. The US Fish and Wildlife Service (USFWS) determined the following listed species could be found in Jackson and Pennington counties, which encompass the project area (USFWS letter of consultation, dated June 18, 2015; Table 2). The state of South Dakota

determined the following listed species could be found in Jackson and Pennington counties (see <http://gfp.sd.gov/wildlife/threatenedendangered/>; accessed August 2015 and Table 2).

TABLE 2. FEDERALLY AND STATE LISTED THREATENED SPECIES, ENDANGERED SPECIES, AND SPECIES OF CONCERN THAT HAVE BEEN IDENTIFIED AS PRESENT IN JACKSON AND PENNINGTON COUNTIES.

Common Name	Scientific Name	State Status	Federal Status
Mammals			
Black-footed ferret	<i>Mustela nigripes</i>	Endangered	Endangered
Northern long-eared bat (Northern myotis)	<i>Myotis septentrionalis</i>	Proposed endangered	Threatened
Swift fox	<i>Vulpes velox</i>	Threatened	
Northern river otter	<i>Lontra canadensis</i>	Threatened	
Birds			
American dipper	<i>Cinclus mexicanus</i>	Threatened	
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	
Least tern	<i>Sterna antillarum</i>	Endangered	Endangered
Osprey	<i>Pandion haliaetus</i>	Threatened	
Peregrine falcon	<i>Falco peregrinus</i>	Endangered	
Red Knot	<i>Calidris canutus rufa</i>		Threatened
Sprague's Pipit	<i>Anthus spragueii</i>	Candidate	Candidate
Whooping crane	<i>Grus Americana</i>	Endangered	Endangered
Fish			
Longnose Sucker	<i>Catostomus catostomus</i>	Threatened	
Northern Redbelly Dace	<i>Chrosomus eos</i>	Threatened	
Sturgeon Chub	<i>Macrhybopsis gelida</i>	Threatened	

In general, the action alternative would not adversely affect these species either because they are not present (or unknown or unlikely to occur within the project area) or because the bison range expansion would actually benefit the species and their respective habitats, primarily due to the ecological effects of reintroducing the native large grazer to the mixed-grass prairie ecosystem. Regardless, for those species that may be present in the project area, the National Park Service has fulfilled compliance requirements under Section 7 of the Endangered Species Act and has submitted determination of effect correspondence to the US Fish and Wildlife Service for its concurrence. See appendix for copies of the compliance documentation. The National Park Service has determined that the proposed action “may affect, not likely to adversely affect” any federally listed species.

Viewshed / Scenery. Adverse impacts on viewshed and scenery resulting from expansion of bison and visitor amenities are expected to be short term, during construction activities for bison fence, cattle guards, and new and expanded vehicle pullouts. No long-term adverse impacts are expected if the proposed action is implemented properly. Bison fencing would be designed to blend into the landscape and generally located away from South Dakota State Highway 240 Badlands Loop Road in an effort to reduce visual impacts. Therefore, this topic not retained for further analysis in this environmental assessment.

Carbon Footprint. For the purpose of this planning effort, “carbon footprint” is defined as the sum of all emissions of carbon dioxide and other greenhouse gases, including methane and ozone, that would result from implementation of the action alternative. Understanding the carbon footprint of the alternatives is important for determining its contribution to climate change.

This impact topic was dismissed from further analysis for several reasons. (1) Few changes would occur in the way visitors reach the project area as a result of the alternatives; (2) the minimal new developments proposed in the project area would not noticeably increase greenhouse gas emissions; and (3) newer sustainable building practices should help limit additional greenhouse gas emissions.

The action alternative is not expected to result in a substantial increase in visitation to the park. There would be an incremental increase in greenhouse gases resulting from short-term construction activities in the project area and some slight increases in visitation. Under the action alternative, however, existing traffic levels should not substantially increase. Also, under the alternatives, the National Park Service would continue to encourage energy efficiency in its operations (such as using low-emission biodiesel fuels to power motor vehicles) to minimize the emission of greenhouse gases. Because of the incremental increases in the amount of greenhouse gas emissions that would result from each alternative, determining a quantitative measurement of their carbon footprint is not practicable.

Historic Structures. No standing buildings or major structures from the pre-NPS era are believed to have survived in the areas included in the management alternatives. Therefore, actions proposed in the alternatives would not have a direct impact on historic structures and this topic was dismissed from further consideration. If structures are encountered during archeological and paleontological surveys, they would be evaluated for a determination of eligibility in the national register and managed under the National Historic Preservation Act of 1966, as amended.

Museum Collections. Museum collections are prehistoric and historic objects, artifacts, works of art, archival material, and natural history specimens. Requirements for proper management of museum objects are defined in Title 36, section 79, of the Code of Federal Regulations (CFR), NPS *Management Policies 2006* (NPS 2006a), and other cultural resources laws identifying the need to evaluate effects on NPS collections. The proposed alternatives would not affect how existing museum collections currently are acquired, accessioned, and cataloged, preserved, or protected. Therefore, this impact topic was not retained for further analysis.

Cultural Landscapes. Cultural landscapes are defined by the National Park Service as geographic areas including both cultural and natural resources and their wildlife or domestic animals therein associated with an historic event, activity, or person, or exhibiting other cultural and aesthetic values. The National Park Service recognizes and protects cultural landscapes under Section 106 of the National Historic Preservation Act of 1966, as amended, and broad servicewide cultural resource management policies. The proposed alternatives would not affect any identified cultural landscape. Therefore, this impact topic was not retained for further analysis.

Ethnographic Resources. The National Park Service defines ethnographic resources as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (Director’s Order 28: *Cultural Resource Management*). Ethnographic resources in Badlands National Park are associated with the cultural practices and beliefs of a living Native American community that is rooted in the region’s history and are important in maintaining the continuing cultural identity of the community.

The land included in the management alternatives is generally acknowledged as part of the historical territory of the Lakota Sioux and includes Big Foot Pass and a campsite that may be associated with Chief Big Foot and the band of Miniconjou that travelled through the area during the winter of 1890. These specific ethnographic resources are closely associated with the Ghost

Dance Movement and the massacre at Wounded Knee and hold special meaning to numerous Native American groups. Paleontological resources found within the Badlands region are also recognized as important through Lakota oral history and beliefs. The potential adverse effects to cultural landscape features associated with the Ghost Dance Movement and paleontological resources (as retained and described in Chapter 4) would not be substantial enough to adversely degrade the ethnographic value of these resources. Protective enclosure fencing (to keep bison out) could be installed around known highly sensitive ethnographic sites where identified in the project area if determined appropriate following consultation with associated tribes.

Bison, which historically would have been present throughout the park, also are acknowledged to hold special importance to many Great Plains tribes. The animals were integral to many traditional lifeways and ceremonies as well as one of the primary sources for subsistence and a major contributor to the Plains ecosystem. Consultation with associated tribes is ongoing and actions related to this project are further outlined in “Chapter 5: Consultation and Coordination.” On May 16, 2016, the park cultural resource specialists met with the Oglala Sioux Tribe’s Tribal Historic Preservation Officer (THPO) regarding various projects taking place in the park, including the North Unit bison resource stewardship plan and environmental assessment. The Oglala Sioux Tribe Tribal Historic Preservation Officer was briefed on the plan and its proposed actions and agreed that the ethnographic resources impact topic did not need to be retained for full analysis in this plan.

Under current bison management practice, park staff collaborate with associated tribes on matters related to education and the continuation of cultural practices related to bison and would continue to maintain these relationships in the proposed action. This includes the forthcoming rule on *Gathering of Certain Plants or Plant Parts by Federally Recognized Indian Tribes for Traditional Purposes* (Federal Register 2015). Certain plants are considered ethnographic resources, but the presence of these plants within the project area is presently unknown. The park will begin a research project to locate and identify plants within the North Unit having ethnographic uses. This project is slated to begin in August 2016. Therefore, the topic of ethnographic resources was dismissed from further analysis.

Socioeconomic Environment. Socioeconomics is the social science of how economic activity affects social processes. In this project, the socioeconomics involves expansion of the existing bison herd and visitor amenities to additional areas of the North Unit. Neither alternative would substantially alter visitor use levels or visitor use patterns in a way that would have more than a minor effect on local businesses or local residents. Under the no-action alternative, visitors would continue to be able to view bison along parts of the unpaved Sage Creek road. Under the action alternative, the bison range would be expanded and likely result in additional viewing opportunities for park visitors. Traffic congestion as a result of bison along the South Dakota State Highway 240 Badlands Loop Road could result in slower and more cautious traveling for park visitors and local residents; however, no significant changes to park visitation, local employment opportunities, income, local tax base, or the general local economy are expected.

Neither alternative would have more than a minor effect on local demographics, services, housing, employment, or the aesthetic quality of adjacent communities. Potential impacts associated with the action alternative include short-term, limited construction projects including bison fence, cattle guards, and new and expanded vehicle pullouts. These projects would result in a localized beneficial impact. Bison fencing would be of sufficient height and strength to contain the bison population and designed to allow other wildlife to move freely (see “Chapter 2: The Alternatives”). Based on past history with bison escapes and retrieval, neighboring private property rights, values, productivity, and aesthetics are not expected to change. The park bison herd has been certified

brucellosis free for many years and regular monitoring of the herd would continue to ensure a healthy and disease-free herd. Therefore, the expansion of the bison range is not expected to have an impact on neighboring cattle operations. As described in section, “Ongoing Management Activities”, park staff would continue to manage the bison population in order to maintain a balanced ecosystem. Under both alternatives, culled bison would continue to be distributed to other agencies and governments through agreements, including an agreement with the InterTribal Buffalo Council. Therefore, this impact topic was not retained for further analysis.

Environmental Justice. Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minority and low-income communities. On August 17, 1994, the Secretary of the Interior established Department of the Interior policy. This memorandum directs all bureau and office heads to consider the impacts of their actions and inactions 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.

To fulfill Executive Order 12898 in the context of the National Environmental Policy Act of 1969 (NEPA), the planning team identified that there are minority populations and low-income populations in the vicinity of the North Unit of the park. The planning team then assessed the alternatives presented in this plan and determined that neither alternative would result in substantial direct or indirect adverse effects on any minority or low-income population or community as defined in the US Environmental Protection Agency’s “Final Guidance for Incorporating Environmental Justice Concern in EPA’s NEPA Compliance Analyses” (1998).

The following information contributed to this conclusion:

- The actions proposed 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 any minority or low-income population or community.
- The impacts on the natural and physical environment resulting from any actions proposed in the alternatives would not disproportionately adversely affect any minority or low-income population or community or be specific to such populations or communities.
- The actions proposed in the alternatives would not result in any identified effects that would be specific to any minority or low-income community.
- Park staff have consulted and worked with the affected traditionally associated peoples in cooperative efforts to manage the recreational potential of the park and its resources effectively and would continue to do so. No adverse effects were identified that would disproportionately affect the traditionally associated peoples.

Therefore, the topic of environmental justice was not retained for further analysis.

American Indian Trust Resources. Secretarial Order 3175, “Departmental Responsibilities for Indian Trust Resources,” requires that any anticipated impacts on Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. Departmental responsibilities are identified in 512 DM section 2. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the

United States to protect tribal and allotted lands, assets, resources, and treaty rights; 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 of Indian trust resources was not retained for further analysis.

2

Chapter 2: **Alternatives**



CHAPTER 2: ALTERNATIVES

INTRODUCTION

OVERVIEW

This North Unit bison resource stewardship plan / environmental assessment presents two alternatives for the future management of the North Unit of Badlands National Park. The two alternatives are alternative 1, to continue current management (the no-action alternative), and alternative 2, the action alternative (NPS-preferred alternative).

This chapter describes the process used by the National Park Service to develop the alternatives. The impacts of implementing each alternative are discussed in “Chapter 4: Environmental Consequences.”

DEVELOPMENT OF THE ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

The planning team relied on the park’s previous planning documents for guidance in developing the alternatives. These include the *Badlands National Park North Unit General Management Plan / Environmental Impact Statement* (NPS 2006b), *Badlands National Park Long Range Interpretive Plan* (1999a), and *Badlands National Park Resource Management Plan* (1999b). Combined, these documents provide clear direction about what kind of place the park should be—its overall character in terms of emphasis on particular resource conditions and visitor experiences.

Public input received during scoping was important in the development of the alternatives. The public scoping process helped the planning team understand the public’s values and preferences regarding visitor experiences in the park including their concerns, issues, and suggestions related to bison management. The main ideas reflected in the comments were related to maintaining a healthy conservation herd of bison, providing appropriate bison infrastructure, preventing disease, protecting resources, and identifying appropriate visitor experiences and visitor safety needs related to viewing bison.

The action alternative also must address the purpose and need for the plan as described in Chapter 1. The purpose and need was developed through careful analysis of conversations from public scoping, review of the park’s previous planning documents, and input from a wide variety of NPS staff.

Once the purpose and need for the project was articulated and further defined by the outcomes of the public scoping, the planning team developed a range of strategies to address bison management in the North Unit of the park. Many of these strategies are considered best practices for managing bison and managing visitor use related to viewing bison and, as such, were included as strategies

common to all alternatives (see section on “Ongoing Management Activities” in this chapter). Ongoing management activities would continue to be implemented regardless of which alternative is identified as the agency’s preferred management approach.

While developing each alternative, it became clear that some proposed alternative concepts or strategies did not need to be further analyzed. Certain alternatives can sometimes be considered but eliminated from further study for a variety of reasons. According to NPS Director’s Order 12 *DO-12 Handbook*, reasons to eliminate alternatives include:

- Technical or economic infeasibility.
- Inability to meet project objectives or resolve need.
- Duplication with other, less environmentally damaging or less expensive alternatives.
- Conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy such that a major change in the plan or policy would be needed to implement the alternative.
- Too great an environmental impact.

The NPS planning team discussed and dismissed a number of ideas from consideration (see section on “Alternatives Considered but Dismissed from Detailed Evaluation” in this chapter“).

The National Park Service is considering one action alternative. During alternative development, it was determined that the purpose and need for the plan could be met with a single action alternative (alternative 2) and that other alternatives were neither feasible nor necessary.

Once the action alternative (alternative 2) was developed, it was compared to the no-action alternative (alternative 1), which is the continuation of the park’s current management actions and direction into the future; that is, continuing with the present course of action until that action is changed. The no-action alternative is included as a baseline against which to compare the effects of the action alternative. The no-action and one action alternatives are described in detail in this chapter.

The preliminary alternatives (no-action and action alternatives) were shared with the public in the fall of 2015. Feedback was analyzed and considered as the planning team refined the alternatives. The main ideas reflected in the public comments were similar to those identified during public scoping. The comments were related to maintaining a healthy conservation herd of bison, providing appropriate bison infrastructure, preventing disease, protecting the resources of the park, and identifying appropriate visitor experiences and safety needs related to viewing bison.

In all alternatives, 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.

PROPOSED ACTION

A proposed action is “the bureau activity under consideration” (46.30). “A proposed action is one option (alternative) for addressing purpose and need” (NPS 2015a). The proposed action is to expand the existing bison range to conserve the herd’s genetic integrity while enhancing the mixed-grass prairie ecosystem, and to increase visitor opportunities to view the bison herd and understand the ecological and cultural importance of bison in the Great Plains of North America.

ONGOING MANAGEMENT ACTIVITIES

Some current management strategies would remain in place if the bison range were expanded. These strategies emphasize certain management practices needed to meet the purpose and need for the plan and address identified issues.

BISON POPULATION MANAGEMENT

The bison population would continue to be managed according to a range of parameters. These include resources available to support the bison such as water and forage; condition of resources that could be impacted by bison; and cost and time required by park staff to perform bison management activities as well as visitor interpretation, education, and safety; and visitor experience and opportunities to view and learn about bison. In the past, the use of these parameters typically has resulted in a herd of approximately 500–1,500 animals. Monitoring would inform park managers regarding appropriate bison population and strategies to ensure both resource and visitor protection. Please see the section, “Monitoring Guidelines and Mitigation Measures for the NPS-Preferred Alternative,” in this chapter.

Prior to any expansion of the bison range (as in the recently acquired inholding proposed as part of the no-action alternative or the larger scale range expansion proposed as part of the action alternative), park staff would assess the size of the bison herd. According to the above parameters and if the herd were sufficiently large, park staff would perform a roundup to cull the herd before allowing the bison to move into any new rangelands. This process would allow park managers to better understand how the bison use and impact the new rangeland and its resources. (Please note that, in this case, cull means to distribute to other agencies / governments through appropriate agreements, including an agreement with the InterTribal Buffalo Council.). In future, as managers assess how the bison use and impact the new rangeland and its resources, they would determine when to perform a roundup and how many animals to cull.

During the initial roundup, park staff would cull the herd based on science and a systematic random sample. Factors determining the number and individuals to cull include the overall number of bison, age distribution, and ratio of males to females. Additionally, park staff would continue to use best practices and best available information to inform bison genetic conservation.

DISEASE MANAGEMENT

The State of South Dakota is a Certified (Brucellosis) Free State and an Accredited (TB) Free State, according to the South Dakota Animal Industry Board in 2004. During annual bison roundups park staff would continue to draw blood for DNA analysis and archiving and in support of testing for brucellosis and other infectious diseases as required by the South Dakota Animal Industry Board and State Veterinarian. Brucellosis has never been found in the North Unit bison herd. Bovine tuberculosis has never been found in the park or surrounding area; however, the park occasionally tests for this and other infectious diseases when shipping animals to other states as recommend by the receiving state's State Vet / Animal Industry Board. If the potential for disease is detected or determined, management would react accordingly on an as-needed basis and within agency and park policies. Additional testing may be conducted if the situation warrants.

If an animal is injured or appears unhealthy, resource management staff would follow up with additional data collection / necropsies and, for disease purposes, consult with NPS Biological Resources Division wildlife veterinarians. The circumstances would be reviewed with the veterinary staff and a determination made regarding further actions to be taken. These could include continued monitoring and/or euthanizing the animal.

DAMS AND WATER IMPOUNDMENTS

No new dams or water impoundments would be added as a result of the alternatives. In addition, water supplies within the bison range would not be artificially supplemented. In times of low water availability, existing impoundments and water tanks within the bison holding facility would be filled with water and gates would be opened so that bison could access the impoundments. Any needed repair or maintenance of dams or springs would be considered on a case by case basis by the park's interdisciplinary NEPA team, and appropriate compliance documentation would be prepared. For example, appropriate compliance documents would be prepared for any needed repair or maintenance to dams eligible for listing on the National Register of Historic Places. In addition, management actions related to water impoundments within wilderness would be determined through a minimum tool requirements analysis and other necessary compliance (depending on extent of repair / improvement, historic value of impoundment, and/or presence of sensitive resource).

ETHNOGRAPHIC USE

Appropriate access for ethnographic use would be allowed, as defined in *NPS Management Policies 2006* (NPS 2006a)

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

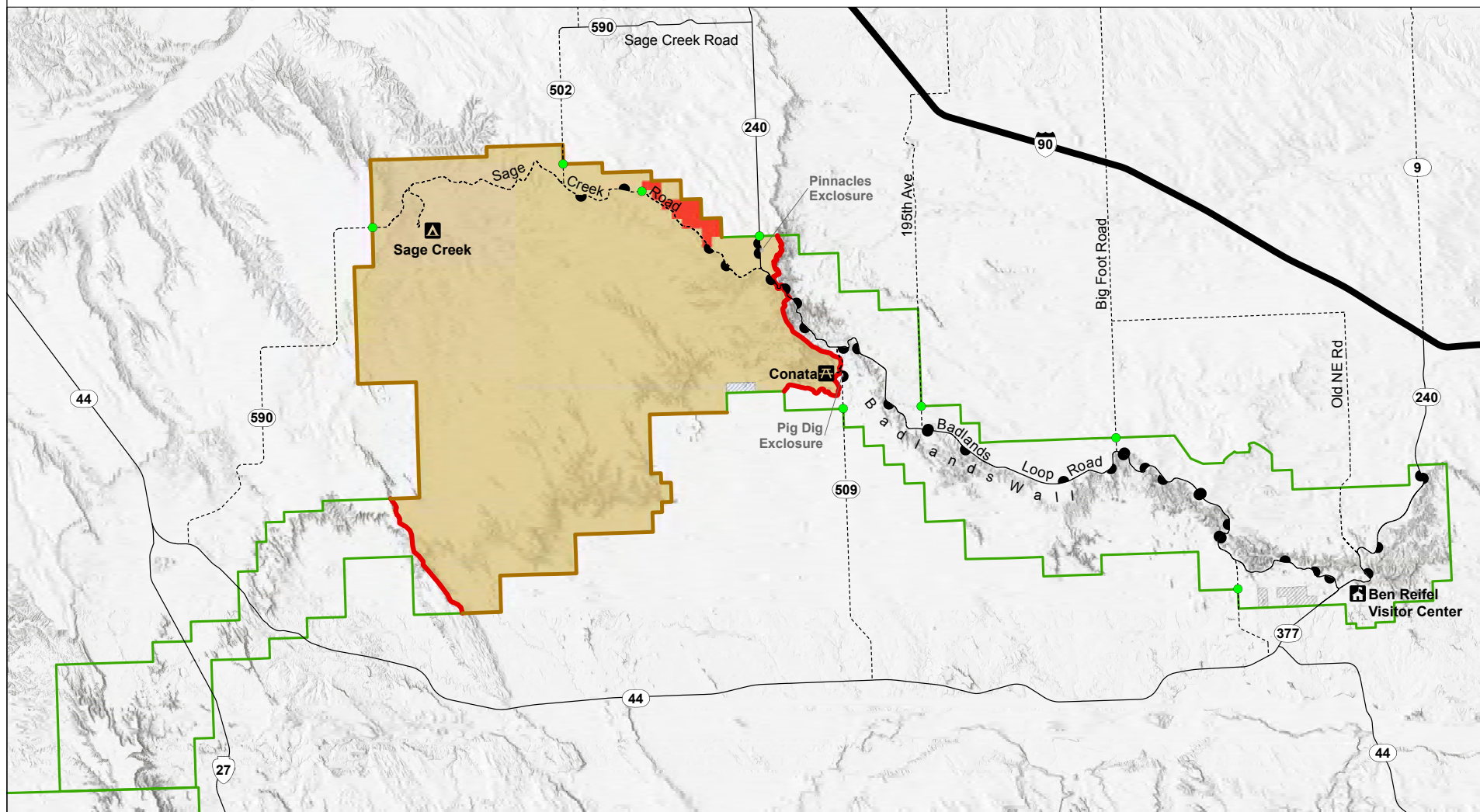
The no-action alternative is the continuation of current management actions and direction into the future; that is, continuing with the present course of action until that action is changed. The no-action alternative, as required by NEPA, also serves as a baseline with which to compare the effects of action alternatives with those of the status quo.

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)	
Geographic Extent of Bison Range	<ul style="list-style-type: none"> ▪ The bison range would continue to include the Sage Creek Unit of the designated wilderness within the North Unit of Badlands National Park, as well as the area north of the Sage Creek Rim Road from the western boundary of the park where the Sage Creek Rim Road crosses the park boundary to a few miles west of the Pinnacles Entrance Station at the Pinnacles Overlook cattle guard. ▪ The current bison range is approximately 57,640 acres. See map, "Alternative 1 (No-Action Alternative)."
Visitor Use and Experience	<ul style="list-style-type: none"> ▪ The majority of visitors would continue to not see bison during their visit to the North Unit of the park. Bison are only visible to visitors driving the 12 miles of unpaved Sage Creek Rim Road past the Pinnacles Overlook or the short connector road to the Sage Creek Campground, camping at the Sage Creek Campground or in dispersed camping within the current bison range, or hiking or riding horses into the backcountry of the Sage Creek Unit of the designated wilderness. ▪ A number of interpretive and education opportunities related to bison would continue to be offered to visitors, including curriculum-based bison programming (both in the classroom and for distance learners); regular ranger programs related to wildlife, including programming focused on bison; and information about bison as part of the park's junior ranger program. ▪ Roving rangers would continue to interpret bison to visitors at various locations within the park, as appropriate. ▪ A bulletin board at the visitor center would continue to show current / approximate locations of the bison herd. ▪ Commercial tours would continue to stay mostly on the paved South Dakota State Highway 240 Badlands Loop Road and, therefore, opportunities to view bison would continue to be limited. ▪ Some limited educational programs for youth groups related to bison could continue (i.e., studying aging behavior and studying comparisons between cattle and bison grazing). ▪ The park would continue current research efforts related to bison.
Visitor Safety	<ul style="list-style-type: none"> ▪ Safety messages related to bison would continue to be posted at strategic locations throughout the park and on various park media (at Sage Creek Campground and the visitor center and in the park brochure and on the park website).
Bison-Related Facilities	<ul style="list-style-type: none"> ▪ The bison range is currently contained through approximately 36 miles of bison fencing, as well as by badlands features and 8 cattle guards at strategic locations. ▪ Some small-scale additions and improvements to the bison fence would be performed to secure a recently acquired inholding using the park standard for boundary bison fence; cross-fencing for cattle would be removed. ▪ A small enclosure would be constructed to protect some sensitive park resources (e.g., paleontological and archeological resources); sensitive resources could be documented and removed from within the bison range when necessary. ▪ The bison fence would continue to be a mixture of different fencing types ranging from 5 feet to 8 feet high and varying from 3-strand and 5-strand barbed wire to woven wire with barbed wire on top. ▪ The existing bison holding facility would remain in its current location. ▪ During periods of high precipitation, water impoundments and streams in the Sage Creek

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)	
	Unit of the designated wilderness and north of Sage Creek Rim Road would continue to provide water to bison and other wildlife. During both wet and dry conditions, several perennial water sources in the current bison range would also provide water (see map, "Vegetation (1999) and Hydrology").
Bison Roundup	<ul style="list-style-type: none"> ▪ The park would continue to plan a yearly roundup. Sometimes roundups are infeasible due to inclement weather or other issues, and the subsequent year's roundup would need to take into account the skipped roundup from the previous year. ▪ The roundup would continue to take about two weeks and involve a large number of park employees and volunteers. ▪ Park staff would continue to use horses to perform the roundup in the Sage Creek Unit of the Badlands Wilderness. Outside the wilderness, park staff would continue to use vehicles to herd the animals to the bison holding facility. After the roundup, park staff would continue to monitor the bison herd population.
Trespass Bison Procedures	<ul style="list-style-type: none"> ▪ Park staff would continue to strive to rapidly respond to trespass bison. Park staff would continue to contact the landowner, remove the bison, repair the fence, and then follow up with the landowner after these procedures have been completed. ▪ The park superintendent reserves the right to use whatever means deemed appropriate for removal of problem bison.



Alternative 1 (No-action Alternative)



- | | | | |
|--|-----------------------------------------------------------------|--|------------------------------------------------------|
| | Paved Road | | Existing Pullout/Overlook |
| | Unpaved Road
(may be impassable when wet) | | Existing Cattle Guard |
| | Badlands National Park Boundary
(from Lands Division) | | Current Bison Range |
| | Private Inholding | | Existing Bison Fencing |
| | Acquired Inholding
(included in bison range) | | Natural Topographic Barrier to Bison Movement |

North Dakota

South Dakota

Nebraska



Produced by:
Midwest Region Geospatial Support Center

Coordinate System:
NAD 1983 UTM Zone 13N

The NPS makes no warranty, express or implied,
related to the accuracy or content of this map.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

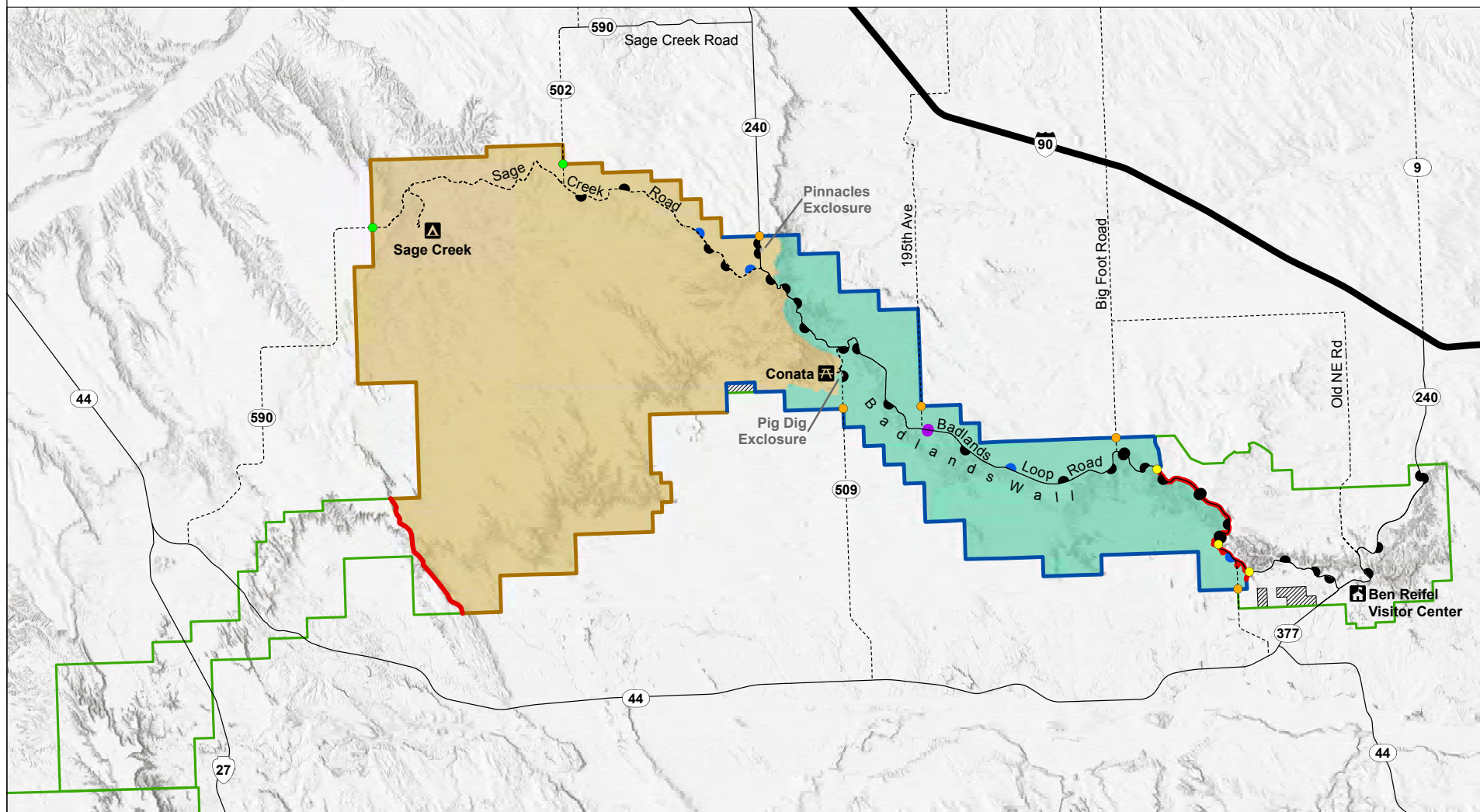
The National Park Service is considering a single action alternative at this time. During alternative development, it was determined that the purpose and need for the plan could be met with a single alternative and that other alternatives were not feasible or necessary.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)	
Geographic Extent of Bison Range	<ul style="list-style-type: none"> The bison range would expand to approximately 80,193 acres (22,553 acres more than current range). See map, "Alternative 2 (NPS-Preferred Alternative)," to review the areas included in the expansion.
Visitor Use and Experience	<ul style="list-style-type: none"> Visitors would have more opportunities to hike, camp, or ride horses in areas where bison are present such as along the majority of the northern and southern extent of South Dakota State Highway 240 Badlands Loop Road and at a distance from the Cedar Pass developed visitor area. The bison range currently extends to the Sage Creek Campground and this would continue under this alternative. Safety information would continue to be posted on the bulletin board of this campground. Visitors may be able to see bison from most of the park's existing overlooks and vehicle pullouts along Sage Creek Rim Road or Badlands Loop Road. Five strategically located vehicle pullouts would be constructed and two existing vehicle pullouts would be improved to provide more opportunities for visitors to view bison along park roads from a safe distance. These new and expanded pullouts would result in an additional 17,760 square feet of paved or gravel parallel parking spaces along the side of the road and be able to accommodate up to an additional 111 parked vehicles. Vehicle pullouts would be strategically placed to avoid wildlife populations and game trails / movement corridors. Although the proposed locations of these pullouts are identified on the map, "Alternative 2 (NPS-Preferred Alternative)," it is possible that the locations of some of the pullouts might be changed slightly to allow for better viewing of the bison herd. If any of those location modifications exceed the impacts of the locations identified in this document, additional compliance analysis may be needed. Park staff would provide enhanced opportunities to educate park visitors on the ecological and cultural values of bison. This effort could include personal and nonpersonal interpretive media at key bison viewing areas, strategically located vehicle pullouts, web-based information and/or social media, and other education / interpretation programming in the park. Additional details of new interpretation and education opportunities would be developed upon implementation of the plan, allowing the National Park Service to determine where the bison congregate within the expanded range. Park staff would continue current research efforts and explore enhanced opportunities for research related to bison. Possible areas of study include increased monitoring related to movement of bison in the North Unit of the park and analysis of population trends. Park staff would explore partnership opportunities with other agencies, educational institutions, and nonprofit groups.
Visitor Safety	<ul style="list-style-type: none"> Visitor safety would continue to be of utmost importance, with a focus on visitor education. Park staff would develop regulations regarding a safe distance to stay from bison and other wildlife. NPS staff at entrance stations would inform visitors of the safe distance regulations, and educational signs would be posted throughout the park in strategic locations. Safe distance regulations would be enforced by law enforcement staff. Park staff would receive training on behavioral cues that indicate a bison is agitated or feeling threatened. Law enforcement staff would be trained on how to respond appropriately to bison-visitor incidents.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)	
Bison-Related Facilities	<ul style="list-style-type: none"> ▪ The fence around the North Unit of the park would be upgraded to a consistent height of approximately 64 inches and constructed to contain the bison while allowing other wildlife to move freely. It would have at least 16 inches of spacing between the ground and the bottom wire to allow the passage and migration of pronghorn antelope and other wildlife. In areas where the fence crosses draws or ravines, additional modifications could be made to ensure it would hold during periods of heavy precipitation. Fencing may not be needed in areas where the badlands would act as a natural barrier to bison movement. ▪ An additional 38.3 miles of bison fence would be constructed. The majority of the new bison fence mileage would be upgrading the existing boundary fence along the exterior boundary of the North Unit (36.8 miles) to meet bison fencing standards. The remaining 1.5 miles of bison fencing would be constructed as several small sections of fence in the interior of the park: <ul style="list-style-type: none"> – To the east of Big Foot Road, excluding bison access to the Big Buffalo Basin area of the park. – Intermittent fencing as needed along the Badlands Loop Road between Big Foot Road and South Dakota State Highway 240, where topographic features do not provide sufficient boundary to bison trying to enter the Big Buffalo Basin area of the park. – To the east of Old Interior Road near the southern boundary of the North Unit, connecting to topographic features south of the Badlands Loop Road in order to restrict bison movement into the eastern portions of the North Unit. – Enclosures to protect some sensitive park resources (e.g., paleontological and archeological resources); sensitive resources could be documented and removed from within the bison range when necessary. – Around inholdings within the park. ▪ A corridor along the interior of the boundary fence would be developed for access by off-highway vehicles, horseback, or foot to perform periodic inspection and maintenance of the fenceline. Inspection and maintenance would be both preventive and proactive. For the corridor within designated wilderness, the park would perform a minimum requirements analysis to determine the minimum tool necessary to perform inspection and maintenance. In some cases, to avoid impacts on designated wilderness, the park may seek permission from the adjacent property owner to access the fence from their property. ▪ Five of the eight existing cattle guards would be replaced and three additional cattle guards would be constructed in strategic locations. ▪ The existing bison holding facility would remain in its current location. A mobile corral would be needed for roundup activities in the eastern parts of the bison range. ▪ The addition of the identified 22,553 acres to the bison range would include water sources previously unavailable to the bison herd (e.g., ephemeral streams, wetlands, or other existing water impoundments throughout the range) (see map, "Vegetation (1999) and Hydrology"). ▪ The above bison-related facilities would be strategically placed to avoid wildlife populations and game trails / movement corridors.
Bison Roundup	<ul style="list-style-type: none"> ▪ Park staff would continue to conduct roundups as needed. Procedures related to the use of mobile corrals would need to be developed as part of this alternative. ▪ Park staff sometimes would use horses to perform the roundup in the Sage Creek and Conata Basin Units of the designated wilderness or would wait for the bison to cross into nonwilderness and then use vehicles in nonwilderness to herd the animals to the bison holding facility. The roundup would likely last longer than the two weeks currently required and would involve a larger number of park employees and volunteers. ▪ As appropriate, the park may consider interagency collaboration opportunities for bison management in the future.
Trespass Bison Procedures	<ul style="list-style-type: none"> ▪ The trespass bison protocol would be formalized and added to the park superintendent's compendium until a rule specific to Badlands National Park could be developed related to trespass bison protocol. ▪ The park superintendent would reserve the right to use whatever means deemed appropriate for removal of problem bison.



Alternative 2 (NPS-preferred Alternative)

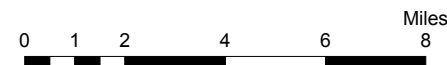


- | | | |
|-----------------------------------------------------------------|-----------------------------------|------------------------------------------------------|
| Paved Road | Existing Pullout/Overlook | Current Bison Range |
| Unpaved Road
(may be impassable when wet) | Proposed New Pullout | Proposed Bison Range |
| Badlands National Park Boundary
(from Lands Division) | Proposed Pullout Expansion | Existing Bison Fencing |
| Private Inholding | Retained Cattle Guard | Proposed Bison Fencing |
| | Replaced Cattle Guard | Natural Topographic Barrier to Bison Movement |
| | New Cattle Guard | |

North Dakota

South Dakota

Nebraska



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Midwest Region Geospatial Support Center

Coordinate System:
NAD 1983 UTM Zone 13N

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MONITORING GUIDELINES AND MITIGATION MEASURES FOR THE NPS-PREFERRED ALTERNATIVE

Congress has charged the National Park Service with managing the lands under its stewardship “in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (NPS Organic Act, 54 USC 100101(b) et seq.). As a result, the National Park Service routinely evaluates resources and implements mitigation measures whenever conditions are present that could adversely affect the sustainability of national park system resources.

The following tables detail past and ongoing monitoring guidelines and mitigation measures for each natural, cultural, and visitor use impact topic retained for analysis in this plan. It is intended that the past and ongoing monitoring and mitigation measures would be continued upon implementation of the NPS-preferred alternative and would also be supplemented by those actions labeled as “future monitoring guidelines and mitigation measures.” These actions would monitor the impacts of implementation of the NPS-preferred alternative to minimize potential adverse impacts.

Monitoring Guidelines and Mitigation Measures for Paleontological Resources
Past and ongoing monitoring and mitigation measures
<ul style="list-style-type: none"> ▪ NPS <i>Management Policies 2006</i>, section 4.8.2, requires that all NPS construction projects in areas with potential paleontological resources must be preceded by a preconstruction surface assessment prior to disturbance. For any occurrence noted, or when the site may yield paleontological resources, the site is to be avoided or the resources collected and properly cared for before construction begins. Areas with potential paleontological resources must also be monitored during construction projects. ▪ A paleontologist has been on site during all excavation work for the Badlands National Park boundary fence and other park development and bedrock intrusion. Several new paleontological sites have been discovered during the monitoring of fencing excavation activity. ▪ Paleontological surveys during the past 20 years have documented several fossil localities within the Badlands Wilderness that contain extensive bison trampling. Special care was taken to design the alignment of the park boundary fence for the expanded bison range so that fossil-rich paleontological localities are protected from potential bison trampling. ▪ Since the late 1920s and 1930s, basic infrastructure at Badlands National Park has been built directly on fossil-rich bedrock; thus, most excavation work must be closely monitored by a qualified paleontologist. ▪ The park has adopted a proactive approach to limit bison impacts in sensitive areas because limited resources are available to conduct ongoing monitoring of paleontological resources.
Future monitoring guidelines and mitigation measures
<ul style="list-style-type: none"> ▪ All ground-disturbing activities, such as fence post placement and vehicle pullout construction, would be assessed by surveying for the presence of paleontological resources. ▪ During construction in areas considered to have potential for paleontological resources, monitoring would be conducted to ensure paleontological sites are avoided and to evaluate uncovered resources. ▪ If previously unknown paleontological resources are discovered during construction, work in that location would be stopped. Measures would be taken to avoid further resource impact or to mitigate resource loss or disturbance. If paleontological resources cannot be avoided by project redesign, data recovery excavations would be completed before construction. ▪ High-use bison corridors in the expanded range would be monitored for accelerated rates of erosion, newly exposed fossils, and signs of impacts on fossils. Measures would be taken to mitigate these issues, such as salvage collection of as many fossil resources as is practical and reconsideration of fencing layout and design. ▪ New or expanded visitor use areas (official trails and social trails, parking pullouts, overlooks) would be monitored for signs of scavenging or other visitor use impacts on paleontological resources. Measures such as signage and visitor education, increased law enforcement presence, and possible salvage collection would be taken to mitigate these issues. If visitor use activities continued to disturb exposed fossils in high-use areas after these mitigation efforts, trail rerouting, boardwalk development, or other measures could be taken to minimize resource damage. ▪ Protective enclosure fencing (to keep bison out) would be installed around known highly sensitive paleontological sites such as the Pig Dig site, as described in the action alternative. In addition, if new highly sensitive or unique paleontological sites were identified within the project area, additional fencing enclosures would be installed, as appropriate, to prevent bison from disturbing the paleontological resources. ▪ If mobile corrals are used for bison roundups, park staff would strive to locate the corrals away from areas that have a notable potential for the presence of paleontological resources.

Monitoring Guidelines and Mitigation Measures for Vegetation
Past and ongoing monitoring and mitigation measures
<ul style="list-style-type: none"> ▪ A sampling and analysis protocol established by the NPS Northern Great Plains Inventory and Monitoring Network is used to monitor the plant community over the long term. ▪ The effects of prescribed fire on vegetation in the park are monitored by personnel working for the NPS Northern Great Plains Fire Ecology Program. ▪ Members of the NPS Northern Great Plains Exotic Plant Management Team collect data on the presence, abundance, and treatment of exotic plants. ▪ There are usually several research projects active in the park that contribute to monitoring of vegetation. Three current projects are studies of the pollinators of rare plants, effects of fire on downy brome (cheatgrass) (<i>Bromus tectorum</i>), and grazing resources for bison. ▪ When sites are disturbed by maintenance or construction activities, park staff reestablishes vegetation using local genotypes of native plants.
Future monitoring guidelines and mitigation measures
<ul style="list-style-type: none"> ▪ Bison herd size would be managed, in part, to maintain, mitigate, restore or improve the condition of native plant communities, as informed by the following monitoring activities: <ul style="list-style-type: none"> – Trampling of rare plant species populations (particularly Dakota buckwheat [<i>Erigonum visherii</i>]) by bison would be monitored. – Plant community condition and composition in wetlands and riparian areas would be monitored for impacts caused by high concentrations of bison. ▪ Areas used by visitors (trails, overlooks) would be monitored for signs of native vegetation disturbance and for the presence of new exotic species of plants. The park would use a variety of mitigation tools such as public education, erosion control, and barriers to control visitor use impacts on vegetation. ▪ During all construction activities, best practices for weeds management would be used, including: <ul style="list-style-type: none"> – Minimize new soil disturbance and select previously disturbed areas for construction staging and stockpiling. – Fence or clearly mark and enforce disturbance zones to prevent disturbances to vegetation outside construction limits. – Ensure project personnel make daily checks of clothing, boots, laces, and gear to ensure no exotic plant propagates and no off-site soil is transported to the work site. – Thoroughly pressure-wash equipment to ensure all equipment and machinery are clean and weed free before being brought into the project area. – Cover all haul trucks bringing materials from outside the park to prevent seed transport and dust deposition. – Obtain all fill, rock, topsoil, or other earth materials from approved sites. ▪ After completion of construction activities, the following measures would be applied to maximize vegetation restoration efforts: <ul style="list-style-type: none"> – Salvage available topsoil or several inches of native soil from the project area for reuse during restoration of disturbed areas. – Monitor for and treat invasive species within disturbed. – Revegetate disturbed areas with native species, as necessary, to minimize long-term soil erosion and exotic plant encroachment. An attempt would be made to restore vegetation by using seed of native genotype collected in the Northern Great Plains. The use of exotic species or genetic materials would be considered only where deemed necessary to maintain a cultural landscape or to prevent severe resource damage. – Use erosion-control blankets and waddles to reduce erosion and encourage seedling establishment. – Institute restoration activities immediately after construction is completed. Monitoring would be carried out to ensure that revegetation is successful, plantings maintained, and unsuccessful plant materials replaced. – Plan work on facilities in the park to reduce impacts on vegetation. Site-specific surveys would identify areas to be avoided because of terrain or resource concerns. – Revegetate so as to reconstruct the natural spacing, abundance, and diversity of native plant species as much as possible. All disturbed areas would be restored as much as possible to pre-construction conditions shortly after work is completed. – Monitor vegetation for impacts caused by maintenance of all facilities and infrastructure (including fencing) associated with the plan.

Monitoring Guidelines and Mitigation Measures for Archeological Resources
Past and ongoing monitoring and mitigation measures
<ul style="list-style-type: none"> ▪ The condition of known archeological resources is documented and monitored by staff for changes in condition and site-specific threats. ▪ Annual monitoring of known archeological sites is done according to a park visitation schedule generated by the NPS Archeological Sites Management Information System (ASMIS). ▪ Site-condition assessments by a NPS-approved archeologist are part of project-specific surveys. ▪ The park superintendent reports archeological site conditions to the NPS Midwest Archeological Center on an annual basis.
Future monitoring guidelines and mitigation measures
<ul style="list-style-type: none"> ▪ The National Park Service would practice good resource stewardship with regard to archeological resources. Standards would be developed that would signal when archeological resources were sustaining a minimally acceptable level of impact and for periodic monitoring of these resources. ▪ The National Park Service would continue, and possibly enhance, ongoing monitoring programs by its staff and partners. ▪ In consultation with the State Historic Preservation Officer, Tribal Historic Preservation Officer, Tribal officials, Advisory Council on Historic Preservation, and other interested parties the planning team would apply the following measures to avoid or minimize impacts on archeological and ethnographic resources: <ul style="list-style-type: none"> – All activities would comply with <i>The Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation</i> and Director's Order 28: <i>Cultural Resource Management</i> – Archeological inventory and/or evaluation would precede any and all ground-disturbing activities (such as along proposed fencing corridors, vehicle pullouts, cattle guards, and location of mobile bison corral) where inventories have not been previously conducted. – Archeological monitoring would continue during construction in areas where there is potential for buried resources. – Archeological resources in the vicinity of the project area would be identified and delineated prior to project work. – Cultural resources that have not been assessed for listing in the National Register of Historic Places would be evaluated and a determination of eligibility obtained. – The National Park Service would ensure that all contractors, subcontractors, and lessees are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites. Contractors and subcontractors would be instructed on procedures to follow if previously unknown archeological resources are uncovered during implementation. – Temporary corrals, enclosures, equipment and material staging areas used during bison roundups and construction projects would avoid known archeological resources. – Fencing off highly sensitive archeological and ethnographic sites from bison would be implemented if needed. – Site monitoring schedules and visitation frequency of known archeology sites would reflect changes such as increased erosion related to bison activity. – If previously undiscovered archeological resources are uncovered during construction, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the South Dakota State Historic Preservation Office and, as necessary, associated American Indian tribes. Newly discovered archeological sites would be assessed for significance and national register eligibility by a NPS-approved archeologist. The archeologist would then determine if the area should be excluded from construction activities and future bison impacts and how the exclusion would be made. All project personnel would be briefed to stay out of areas of sensitive archeological resources. – In compliance with the statute and all regulations of the Native American Graves Protection and Repatriation Act of 1990, and following the provision specified in the regulations, the park superintendent would notify all potentially culturally affiliated tribes upon the discovery of American Indian human remains, funerary objects, sacred objects, or objects of cultural patrimony. The park manager would consult with the federally recognized tribes that are potentially affiliated, either through the tribal governments or their duly designated representatives. All decisions regarding the disposition and/or treatment of American Indian human remains, funerary objects, sacred objects, or objects of cultural patrimony would be made in full compliance with the Native American Graves Protection and Repatriation Act and regulations.

Monitoring Guidelines and Mitigation Measures for Visitor Use and Experience
Past and ongoing monitoring and mitigation measures
<ul style="list-style-type: none"> ▪ Visitation data are monitored through various methods such as visitor surveys, transportation data, backcountry registry data, and concessioner data. ▪ Periodic visitor surveys and data collection are used to determine visitor use patterns, visitor characteristics, visitor use conflicts, and visitor preferences and satisfaction with wildlife viewing opportunities and other programs, services and facilities. ▪ Incidences of human and wildlife interactions are monitored. ▪ Resource condition surveys at recreation sites are conducted as needed. ▪ NPS staff proactively address safety measures and bison behavior parkwide through signs, bulletin boards, and sharing of safety information during interactions with visitors. ▪ Park staff continue to collaborate with other NPS units and state parks for visitor-bison interaction education and safety measures.
Future monitoring guidelines and mitigation measures
<ul style="list-style-type: none"> ▪ The National Park Service would continue and possibly enhance ongoing monitoring programs by park staff and partners. ▪ Measures would be implemented to reduce adverse effects of construction on visitor experience and safety. Measures may include, but are not limited to, phasing construction, temporary closures, noise abatement, visual screening, providing information to visitors on the purpose and need for construction, and directional signage to help visitors avoid construction activities. ▪ Feedback from routine patrols and ranger interactions with visitors and results from other resource monitoring programs would be used to analyze and manage current or future recreational activities and opportunities within the expanded bison range. ▪ Temporary area closures would be used during bison management activities to ensure visitor and employee safety. ▪ A visitor education program with consistent messaging on wildlife safety and appropriate behaviors toward wildlife (e.g., regulations on distance from wildlife and interactions) would continue to be supported. This information would also be shared through additional appropriate signage, park staff and volunteer messaging, and printed / visual materials available to visitors throughout the park. Visitor surveys could be done to evaluate visitor understanding of safety information related to wildlife. ▪ When visitors inquire with a ranger or in the visitor center about backcountry travel or camping, safety and leave no trace information would be provided to minimize resource impacts on backcountry areas and prepare visitors for wildlife interactions. ▪ Park staff would manage traffic congestion when needed to facilitate safe wildlife viewing and maintain vehicle flow. Incidences of traffic congestion would be monitored to determine if adaptive management strategies are needed. ▪ Park staff would ensure the facilities, programs, and services of the National Park Service and its partners are accessible to and usable by all people, including those who are disabled. This policy is based on the commitment to provide access to the widest cross-section of the public and to ensure compliance with the Architectural Barriers Act (42 USC 4151, et seq.) and the Rehabilitation Act (29 USC 701, et seq.). ▪ The park would respond to wildlife interactions and incidents using law enforcement protocols. Incidents would be reviewed by safety committees and incident reports generated and dispersed to park staff.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED EVALUATION

The following alternatives were considered but dismissed from detailed evaluation:

- **Allow bison to graze on areas of the North Unit not described in the range of alternatives.** A number of suggestions that would have expanded the geographic range of the bison within the North Unit were not included in the action alternative. Areas were dismissed because they were either technically or economically infeasible (such as the difficulty of managing a discontinuous bison herd if the range were split into discrete areas or the limited availability of water or vegetation) or had too great an environmental impact (such as impacts to areas with sensitive paleontological resources, impacts to areas with sensitive ethnographic resources, impacts to visitor safety from proximity to high visitor use areas, or impacts on cultural landscape and viewshed from fencing and other bison facilities).
- **Expand the bison range only in areas north or south of the Badlands wall, and use the Badlands wall as a natural barrier for the boundary of the bison range.** This option was dismissed from analysis because limiting the bison range to areas north of the Badlands wall would not provide sufficient rangeland to achieve the project objectives or resolve the need for the plan. Additionally, when considering expanding the bison range only in areas north or south of the Badlands wall, it was determined that using the Badlands wall as the boundary for the range would not provide a sufficient barrier to bison passage and would require additional fencing along segments of the wall. The additional fencing would be in close proximity to South Dakota State Highway 240 Badlands Loop Road and result in too great of an environmental impact on the cultural landscape and viewshed.

NPS-PREFERRED ALTERNATIVE

The preferred alternative is defined in Department of the Interior NEPA regulations as the alternative that the National Park Service determines “would best accomplish the purpose and need of the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors” (43 CFR 46.420(d)).

Identification of a preferred alternative is within the discretion of the National Park Service. The recommended preferred alternative is the Alternative 2 because it would best address the purpose and need for the proposed action.

It is important to note that, when identifying a preferred alternative, no final agency action is being taken. The purpose of identifying a preferred alternative is to let the public know which alternative the agency believes would best meet the purpose and need for the plan at the time an environmental assessment is released.

3

Chapter 3: **Affected Environment**



CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION

This chapter summarizes relevant resource components of the existing environment of Badlands National Park and the surrounding region. It focuses on the park resources and uses that have the potential to be affected if any of the alternatives were implemented (including the no-action alternative) and provides a baseline against which environmental consequences of the action alternative can be compared. Additional material related to the impacts and effects of the alternatives is included in “Chapter 4: Environmental Consequences.”

PALEONTOLOGICAL RESOURCES

BACKGROUND

The White River Badlands region, which encompasses the park, contains the largest known assembly of late Eocene and Oligocene mammal fossils in North America. Lakota people found large fossilized bones, fossilized seashells, and turtle shells in this region centuries ago and still consider paleontological resources to be part of their oral history and beliefs (Potapova and Rom 2009). Recognition of *mako sica* (bad land) as a significant paleontological area extends back to the traditional American Indian oral history of the area (Kiver and Harris 1999; Benton et al. 2015).

Euro-American 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. More specifically, Alexander Culbertson, an agent of the American Fur Company, gathered the first collection of fossils from the area and sent a fossilized jaw fragment to Dr. Hiram A. Prout in 1843. The badlands has played a major role in the development of paleontological sciences in North America since 1846 when Dr. Prout described the fossilized jaw as *Palaeotherium* (a large grazing animal resembling a rhinoceros), later to be described as a brontothere. Subsequently, many important finds from the area have served to define the North American Land Mammal Ages in the Late Eocene and Oligocene epochs (NPS 2006b; Benton et al. 2015).

Paleontological resources were a major reason for establishing Badlands National Monument in 1939 and designating the monument a national park in 1978. Thousands of specimens from the Badlands region are housed in museums and collections around the world, and hundreds of scientific papers have been published. Fossils from the region have provided valuable information for understanding mammalian evolution and diversity, paleoecology, and paleoclimates.

Erosion has exposed both terrestrial and marine fossils in the park. Marine fossils are present in the sediment deposits of an ancient sea that existed in the region some 75 million to 68 million years ago (also see the discussion on “Geologic Resources and Soils” in the section, “Impact Topics Considered but Not Retained for Full Analysis”). Fossils found in the Pierre Shale and Fox Hills Formations include ammonites, nautiloids, fish, marine turtles, plesiosaurs (large water reptiles), and mosasaurs (giant marine lizards) (NPS 2006b). These deposits can be found in the western part of the North Unit in the Badlands Wilderness Area Sage Creek Unit.

A great variety of land animal fossils are also present in the Badlands due to the high diversity of animals that occupied this region during the Eocene and Oligocene epochs, roughly 30 million to 37 million years ago. Untold numbers of those that died in the rivers, streams, swamps, floodplains, and lakes were preserved by layers of sediments. Late Eocene and Oligocene fossil remains found in the park include camels, three-toed horses, oreodonts (a sheeplike animal, the most common mammal found), antelopelike animals, brontotheres, rhinoceroses, false deer, rabbits, beavers, creodonts (predatory animals), saber-toothed cats, land and aquatic turtles, rodents, and birds (NPS 2006b).

EXISTING FOSSIL STUDY SITES

Fossils are prevalent throughout much of the North Unit landscape, but only a small percentage of the area has been surveyed for fossil resources. Many of these areas consist of historic research sites (Clark et al. 1967) and small-scale projects completed by individual contracts and park paleontology staff (Cicimurri 1995; Lala 1996; Martin and DiBenedetto 1997, 1998; Martin and McConnell 1998; Benton et al. 2015). Over the years, at least 150,000 fossil specimens have been collected in the park; the majority of them are housed at the South Dakota School of Mines and other institutions around the world. Of these, 29 confirmed species have been identified and 210 potential subspecies (R. Benton, Paleontologist, National Park Service, Badlands National Park, pers. comm. February 2016).

In 1993, the Big Pig Dig site was discovered along the Conata Road. Remains found at the site include *Subhyracodon* (early rhinoceros), *Archaeotherium* (piglike mammal), *Mesohippus* (early horse), *Leptomeryx* (deerlike mammal), saber-tooth cat, oreodont, and a rodent incisor. This major paleontological discovery may be the largest concentration of early Oligocene mammals ever uncovered; the preservation of the materials is excellent, and the individuals are relatively complete. More than 19,000 fossilized bones have been collected from this site.

Other significant fossil bone beds continue to be found in the park and are documented as they are discovered. 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 2000, and, in the first summer of study alone, the team documented and recorded 1,179 new paleontological sites in the park (Benton et al. 2007). Although hundreds of specimens are present in bone horizons at many of these sites, only 2,055 specimens were collected during the initial fieldwork. Criteria used to justify collection include threats from erosion or poaching and the overall scientific value of the fossil. A similar survey of the Poleslide Member of Brule Formation in the Cedar Pass Area of Badlands National Park was completed in 2005 (Benton et al. 2009). Since 2004, the park has been compiling a paleontology locality database, and it currently consists of more than 300 paleontological localities.

THREATS TO PALEONTOLOGICAL RESOURCES

The geologic nature of the badlands results in fossils disintegrating within a few years after emergence. Exposed surface materials often are lost before they can be recorded, collected, or preserved. Fossils being broken or crushed from bison trampling or wallowing in the existing bison range has also been documented by park staff and is quite prevalent in areas where bison roam. Even one individual bison can have substantial adverse effects on paleontological resources if it happens to wander or wallow in a unique or rich, exposed fossil bed. However, because the scientific value and uniqueness of each broken fossil varies substantially, it is very difficult to quantify the degree of

overall impact to scientific understanding (R. Benton, Paleontologist, National Park Service, Badlands National Park, pers. comm. June-July 2015; NPS 2015b).

Also, fossil collecting without a research permit, although illegal in national parks, is a popular pastime. Although park entrance signs and the park newspaper note that fossil collecting is not allowed, an unknown amount of illegal collecting occurs in the park by park visitors and private commercial operations. In past years, the number of cases of illegal fossil collection investigated ranged from 1 case in 1998, 32 in 2000, 72 in 2001, 37 in 2006, and 41 in 2007. More recently, illegal fossil collection cases have been limited to 1 in 2013, 0 in 2014, and 2 in 2015. This recent reduction in cases is likely due, however, to limited enforcement staff and a shifted focus from patrols to intelligence gathering (Graham 2008; NPS 2006b; R. Benton, Paleontologist, National Park Service, Badlands National Park, pers. comm. February 2016).

Overall, paleontological resources in the North Unit of Badlands National Park continue to be threatened by three primary factors (Potapova and Rom 2009):

- **Natural deterioration.** Fossils can be destroyed or deteriorated by weathering or erosion very quickly after exposure. Since certain rock formations erode faster than others, the rate of fossil exposure—and subsequent deterioration—varies across the landscape.
- **Bison trampling.** In areas of bison grazing and movement, fossils may be destroyed from trampling and increased erosion.
- **Poaching/theft and visitor collection.** Large specimens, especially complete skulls, mandibles, and skeletal parts, are generally easy to locate and remove.

VEGETATION

BACKGROUND

Badlands National Park is at the western edge of what was once a mixed-grass prairie ecosystem. The mixed-grass prairie of the central United States is 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 (Ashton et al. 2013). According to a 2012 vegetation study, the park tends to have a moderate diversity of native plants, within a natural range of variability, as compared with other mixed-grass prairies throughout the region. It also has a high level of variation in species composition. Species richness in the mixed-grass prairie is influenced by numerous factors including fire regime, large ungulate grazing, black-tailed prairie dog (*Cynomys ludovicianus*) disturbance, and weather fluctuations (Symstad and Jonas 2011; Ashton et al. 2013).

The vegetation of the park was mapped in 1999 as part of a nationwide vegetation mapping project of the US Geological Survey and the National Park Service (Bureau of Reclamation 1999; NPS 2006b). Other than sparsely vegetated areas, which are typically dominated by drought-tolerant shrubs and annual forbs, nine major vegetation communities were identified:

- Grasslands
 - Dry mixed-grass prairie
 - Mesic mixed-grass prairie
 - Introduced grasslands
 - Riparian / wet meadows
- Shrublands
 - Dry plains shrublands
 - Mesic plains shrublands
 - Riparian shrublands
- Woodlands
 - Dry coniferous forest and woodlands
 - Riparian deciduous forests and woodlands

Through the first half of the 20th century, farming, grazing, the elimination and reduction of native grazing wildlife, and fire suppression substantially affected the grasslands in Badlands National Park. Park managers have made efforts to preserve the native vegetation in the park through elimination of livestock grazing in the North Unit in the 1960s, introduction of prescribed burns, partial restoration of some bison range, and weed management. Although the partial restoration of the bison range has improved vegetation communities, areas of the park are trampled seasonally by bison, especially in high-use areas.

A total of 457 vascular plant species, representing about 70 families, have been documented in the park (NPS 2006b). About 38 more species are believed to inhabit the park but have not yet been documented. The largest numbers of species are in the Asteraceae (sunflower) family. There is also an inventory of lichens: a total of 128 lichen and lichenicolous fungi species have been recorded in the North Unit (Will-Wolf 1998). Little information is available on other nonvascular plants in the park.

VEGETATION COMMUNITIES

Grasslands

Grasslands are the dominant vegetation community in the North Unit of Badlands National 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 level, fire, and grazing. 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 keep the soil from being blown or washed away (NPS 2006b).

Dry mixed-grass prairies are present throughout the park. Western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), needle-and-thread (*Hesperostipa comata*), threadleaf sedge (*Carex filifolia*), little bluestem (*Schizachyrium scoparium*), side-oats grama (*Bouteloua curtipendula*), and buffalograss (*Buchloe dactyloides*) dominate this plant community. Other forbs and grasses are commonly present as well, including prairie coneflower (*Ratibida columnifera*), white milkwort (*Polygala alba*), and sand dropseed (*Sporobolus cryptandrus*). Mesic mixed-grass prairie, dominated by western wheatgrass and green needlegrass (*Nassella viridula*), is present in wetter spots on

selected hills, slopes, and riparian / wet meadows are a rare grassland community and are present along the bottoms of drainage channels. Switchgrass (*Panicum virgatum*) and prairie cordgrass (*Spartina pectinate*) are two grasses commonly present in these areas.

Shrublands

Shrublands cover about 2,800 acres, or 3% of the park. These communities are present mainly along river and creek floodplains and on sand deposits, mesic slopes, and draws. The most prevalent shrublands are dominated by silver sagebrush (*Artemisia cana*) and are present on floodplains and adjacent slopes. Sand hills support extensive stands of sand sagebrush (*Artemisia filifolia*) shrubland, particularly in the southern half of the park. Yucca (*Yucca glauca*) stands typically are present 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 (*Symphoricarpos occidentalis*), American plum (*Prunus americana*), and three-leaved sumac (*Rhus trilobata*) (NPS 2006b).

Woodlands

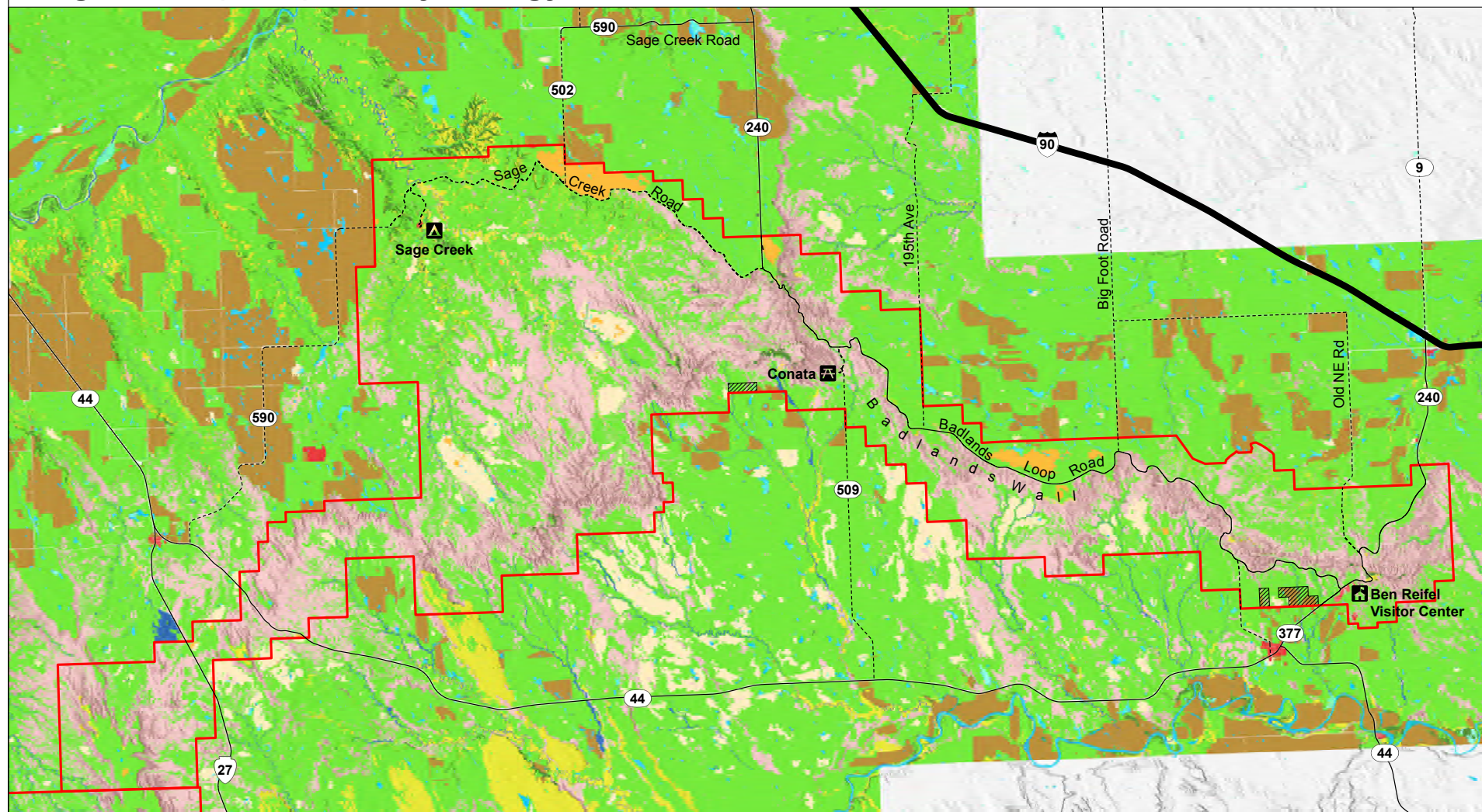
Woodlands are uncommon in the park, covering less than 1,000 acres, or 1%, of the North Unit. They generally are restricted to floodplains, drainage bottoms, the toes of sand hills, draws associated with eroding buttes, and slumps on butte and cliff faces. Rocky Mountain juniper (*Juniperus scopulorum*) forms the most common woodland in the park and is present on drier slopes and slumps, along butte edges, and in upper draws. Hardwoods are present in more mesic sites, including the bottoms of draws, stream floodplains, and the toes of sand hills; green ash (*Fraxinus pennsylvanica*) and American elm (*Ulmus americana*) are the most common trees. Extremely mesic sites, along river floodplains, minor streams, seeps, springs, and ponds, support stands of eastern or plains cottonwood (*Populus deltoids*) and peachleaf willow (*Salix amygdaloides*) (NPS 2006b).

Barrens and Sparsely Vegetated Areas

About 46% of the North Unit 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 chalcidony (a flat, crystalline rock with properties similar to quartz). Drought-tolerant shrubs such as silverscale saltbush (*Atriplex argentea*) and broom snakeweed (*Gutierrezia sarothrae*) are present in these areas, together with annual forbs. Sparse vegetation also is present 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 mostly nonvegetated features, including developments, roads, utilities, drainages, ponds, and quarries (NPS 2006b).



Vegetation (1999) and Hydrology



Paved Road

Unpaved Road
(may be impassable when wet)

NPS Boundary
(from Lands Division)

Private Inholding

Vegetation (based on 1999 assessment)

- Woodland
- Grassland
- Shrubland
- Badlands Sparse Vegetation Complex
- Prairie Dog Town (2015)
- Prairie Dog Town Complex (1999)
- Agricultural Land

Strip Mines, Quarries, & Gravel Pits

Sandy Areas - Beaches

Mixed-urban / Built-up land

Hydrology

- Wetlands
- Rivers & Streams
- Reservoirs & Open Water

North Dakota

South Dakota

Nebraska



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RARE PLANTS

No federally listed plant species are present in Badlands National Park; however, several plants are listed by the state as rare. Three rare species endemic to the region are found primarily in sparsely vegetated areas:

- Barr's milkvetch (*Astragalus barrii*)
- Dakota buckwheat
- Sidesaddle (or Secund) bladderpod (*Lesquerella arenosa* var. *argillosa*)

Two state-listed rare plants are present in the park's prairies but are not endemic to the region, Easter daisy (*Townsendia exscapa*) and largeflower Townsend daisy (*Townsendia grandiflora*). Another rare plant, Parry's rabbitbrush (*Ericameria parryi*), was documented in 2003 growing in the park's dry open plains.

INVASIVE EXOTIC PLANTS

Exotic (nonnative) plants are present throughout the park, particularly on lands that have been disturbed by human activities. As the prairies were settled during the late 19th and 20th centuries, exotic plants were introduced by grazing and dryland farming. Exotic plant seeds from lands outside the park have blown in or have been carried into the park by wildlife, vehicles, and other inadvertent means, including transport of exotic seeding by bison. A total of 71 exotic plant species are known to grow in the park (NPS 2006b). Most of the species have been present in the area for a long time and are likely to continue to exist. In a 2012 vegetation study of the park, the average cover of exotic species at sites in the park was relatively high. Similar to species richness, cover of exotic species varied considerably among the sites surveyed (Ashton et al. 2013).

Two exotic annual grasses, Japanese brome (*Bromus japonicus*) and downy brome (cheatgrass), are very common in the park. These species commonly are present to some degree in all of the park's grasslands, especially the western wheatgrass stands. Both Japanese brome and downy brome have demonstrated an ability to spread into native prairie, where they directly compete with native species. Managing the spread of annual brome grasses is a major management challenge for Badlands National Park and other parks in the region. The presence of annual bromes in mixed-grass prairie is associated with decreased productivity and altered nutrient cycling (Ogle et al. 2003; Ashton et al. 2013) and possible alterations to natural fire regimes and the persistence of native species (D'Antonio and Vitousek 2003; Ashton et al. 2013). Other relatively common exotic grasses present at various disturbed sites are smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), and Kentucky bluegrass (*Poa pratensis*) (NPS 2006b).

A biennial, exotic yellow sweetclover (*Melilotus officinalis*) is widespread through the North Unit. During wet years, this plant can grow to about four feet tall and become widespread in many areas, covering native grasslands. This plant is of concern because it may be causing ecological damage as a result of soil chemistry changes (NPS 2006b). 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 (*Ovis canadensis*) population.

Noxious weeds in the park that have been designated by local counties and the state are puncture vine (*Tribulus terrestris*), field bindweed (*Convolvulus arvensis*), spotted knapweed (*Centaurea*

maculosa), Russian knapweed (*Rhaponticum repens*), houndstongue (*Cynoglossum officinale*), perennial sow thistle (*Sonchus arvensis*), Russian thistle (*Salsola kali*), and Canada thistle (*Cirsium arvense*). 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 vegetation communities and excludes native vegetation (NPS 2006b). Other noxious weed species that currently are not widespread in the park are present on surrounding lands and, thus, pose a threat to the park's vegetation communities. They include leafy spurge (*Euphorbia esula*), sickleweed (*Falcaria vulgaris*), sulfur cinquefoil (*Potentilla recta*), hoary cress (*Lepidium draba*), and Dalmatian toadflax (*Linaria dalmatica*). Tamarisk (*Tamarisk* sp.) also is known to be present in the Cheyenne River and its tributaries as well as Sage Creek, where it has been treated.

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 on vehicles and clothing. Other visitor impacts on park vegetation have not been documented; however, trampling of vegetation has been observed, particularly at overlooks along the Badlands Loop Road (NPS 2006b). Once native vegetation areas are trampled or disturbed, they become prone to further infestation by exotic plants.

Park staff has several ongoing methods to control the spread of exotics in the park, primarily guided by the Northern Great Plains Exotic Plant Management Plan / Environmental Assessment, with a focus on managing the spread of Canada thistle, using both chemical and biological controls.

ARCHEOLOGICAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for federal review and protection of cultural resources and ensures that these resources are considered during federal project planning and execution. Archeological resources in Badlands National Park represent both American Indian and Euro-American inhabitation; sites date from the pre-historic period to the 20th century (Amburg et al. 2012). The sites, recorded beginning in 1951, exhibit surface artifact scatters, numerous and extensive subsurface deposits, and artifact-bearing paleosols. Nearly 73% of the park's archeological sites are classified as surface artifact scatters, but many of these have not been tested for subsurface deposits (Lynott 2012). Along with the ubiquitous lithic material, almost one in five known archeological sites contains fauna and almost one in ten sites has yielded prehistoric ceramic sherds. Hearths or roasting pits, stone rings, and human remains have also been documented at a few recorded sites (Lynott 2012). Dynamic, natural weather and geologic processes occur throughout the park, resulting in wind and rain erosion that are primary factors in archeological site preservation and exposure.

Only 6% of the North Unit has been systematically surveyed for archeological resources, and most of the land, including vast parts of the area that would potentially be affected by the alternatives, remains unsurveyed (M. Cherry, Museum Technician, National Park Service, Badlands National Park, pers. Comm. May 2016; Lynott 2012). Sites previously documented, including the more than 300 known archeological sites in the North Unit, have been poorly studied (NPS 2006b; E. Dempsey, Archeologist, National Park Service, Midwest Archeological Center, pers. comm., May 2016). Visitor use throughout the park, including open hiking, creation of social trails, off-road motorized uses, and vehicle and human trampling, poses potential threats to *in situ* archeological resources. Surface disturbances associated with fence installation and associated infrastructure construction may adversely affect archeological resources. Bison trampling and wallowing can cause erosion and have

the potential to damage resources located in the proposed management areas. As a result of potential construction-related and bison-related impacts and unknown locations of archeological resources, this topic is carried forward to additional analysis.

WILDERNESS CHARACTER

BACKGROUND

Wilderness, as defined in the Wilderness Act of 1964, is land “protected and managed so as to preserve its natural conditions and which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable.”

In 1976 Congress designated 64,250 acres of the North Unit of Badlands National Park as the Badlands Wilderness (PL 94-567). Within the North Unit, the designated wilderness is divided into two geographically separated units, referred to by NPS staff as the Sage Creek Unit and Conata Basin Unit.

The 1964 Wilderness Act directs federal agencies to manage wilderness so as to preserve its wilderness character. Wilderness character is described as the unique combination of (1) natural environments that are relatively free from modern human manipulation and impacts; (2) opportunities for personal experiences in environments that are relatively free from the encumbrances and signs of modern society; and (3) symbolic meanings of humility, restraint, and interdependence in how individuals and society view their relationship to nature (Landres et al. 2008). Using the definition of wilderness from section 2(c) of the Wilderness Act of 1964, four qualities of wilderness are relevant, as follows (Landres et al. 2008):

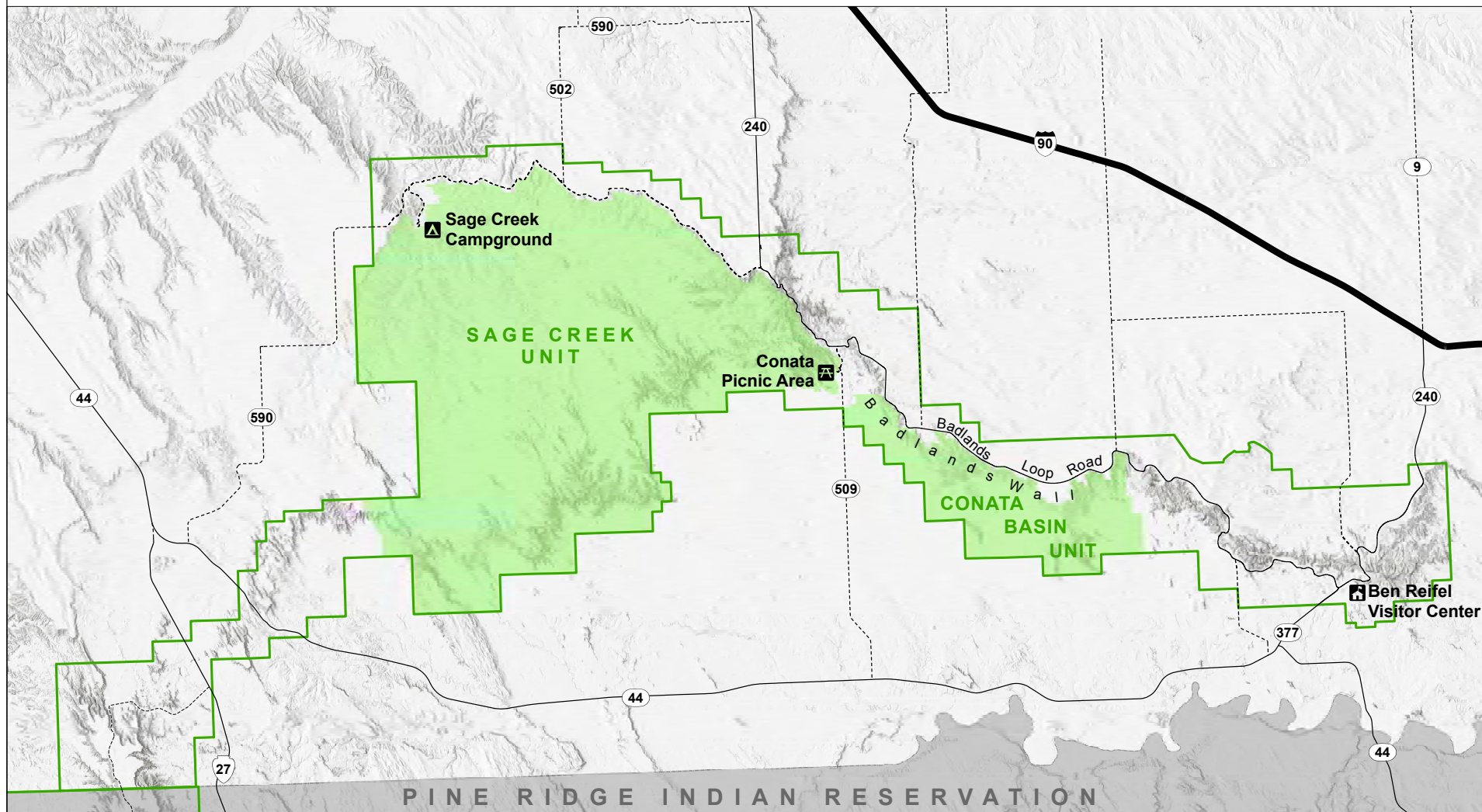
- **Natural.** Wilderness ecological systems are substantially free from the effects of modern civilization.
- **Untrammeled.** Wilderness is essentially unhindered and free from the actions of modern human control or manipulation.
- **Undeveloped.** Wilderness retains its primeval character and influence and is essentially without permanent improvement or modern human occupation.
- **Solitude or Primitive and Unconfined Recreation.** Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

The Badlands Wilderness may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. Although many of these other features of value apply to the Badlands Wilderness, for the purposes of this document, they have been analyzed in the closest fitting impact topic (archeological resources, visitor use and experience, and so forth).

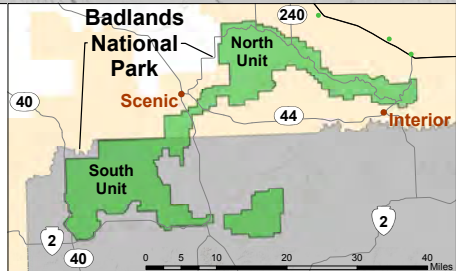
Principal tools for understanding the qualities of wilderness character include *Keeping it Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* and *Keeping it Wild in the National Park Service: A User Guide to Integrating Wilderness Character and Park Planning, Management, and Monitoring* (Landres et al. 2008; NPS 2014b).



Badlands Wilderness



- Paved Road
- Unpaved Road
(may be impassable when wet)
- NPS Boundary
(from Lands Division)
- Designated Wilderness
- Pine Ridge Indian Reservation



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NATURAL

Wilderness ecological systems are substantially free from the effects of modern civilization. This quality is preserved or improved, for example, by controlling or removing exotic species or restoring ecological processes. This quality is degraded by the loss of native species, the presence of exotic species, alteration of ecological processes such as water flow and fire regimes, the effects of climate change, and many others.

One of the largest degradations to the natural quality of the Badlands Wilderness is the presence, abundance, and distribution of exotic plant species in the wilderness area (most notably annual bromes, smooth brome, crested wheatgrass, Canada thistle, and yellow sweetclover). Additionally, some native species, such as bison and bighorn sheep, were extirpated from the park in the late 1800s and early 1900s. Since that time, some of these populations have been reintroduced to the North Unit of the park, including the existing bison herd within the Sage Creek Unit and the translocation of bighorn sheep to the park from New Mexico during the past 15 years. It should be noted, however, that bison did not historically populate the area within the North Unit year-round. Additionally, poaching and theft of paleontological resources is known to have occurred within the wilderness, particularly of large specimens that are generally easy to locate and remove. Overall, the natural quality of the wilderness is in fair to good condition despite the past and continuing alterations to the native plant and animals within the wilderness and visitor-caused impacts.

UNTRAMMELED

Wilderness is essentially unhindered and free from the intentional actions of modern human control or manipulation. This quality is influenced by any activity or action that intentionally controls or manipulates the components or processes of ecological systems inside wilderness. It is supported or preserved when such management actions are not taken. It is degraded when such management actions are taken even if those actions, such as spraying herbicides to eradicate or control exotic species or reducing fuel accumulation from decades of fire exclusion, are intended to protect resources.

The wilderness in the North Unit of Badlands National Park has been affected primarily by the forces of nature, with a few exceptions related to invasive plant control, fire suppression activities, and management of the bison herd within the Sage Creek Unit of the wilderness.

The park staff strategically sprays for invasive weeds (typically Canada thistle) in targeted areas of the wilderness. In several areas of the Sage Creek Unit park personnel have released a nonnative beetle and gal fly as biocontrol agents to help control the spread of Canada thistle.

In the wilderness, the park's fire management plan calls for monitoring any naturally ignited fires in wilderness until they reach a size of about 10,000 acres, at which time the park works to suppress the fire. It is extremely rare, however, that fires in the park's wilderness areas reach the size required for suppression activities.

Park staff manage the bison population in the Sage Creek Unit by periodically performing roundups to move bison to the handling facility (in nonwilderness) and performing a cull of the herd based on science and systematic random sample. These management actions control the overall number of bison, age distribution, and ratio of males to females within the bison herd.

UNDEVELOPED

The Badlands Wilderness is owned almost entirely by the National Park Service. One private 116-acre inholding is present within the Sage Creek Unit of the wilderness, and the park's boundary fence separates the inholding from park lands.

There are currently no authorized or unauthorized non-recreational installations or developments, such as scientific equipment or radio repeaters, within the wilderness areas. Several Civilian Conservation Corps (CCC) stock ponds / dams in each unit of the wilderness pre-date wilderness designation in the park, and a small historic gravesite is on the list of classified structures. There may be structures outside of the wilderness that are visible from within the wilderness, such as cell towers, roads, and several NPS- or privately owned structures.

The undeveloped quality of wilderness is degraded by the use of motorized equipment and mechanized travel, even though such uses may be allowable as the minimum requirements for the administration of the area as wilderness. Such uses include the authorized use of vehicle travel along the boundary fence for maintenance (approximately once per year) and rare emergency landing of aircraft during emergency or search and rescue operations (typically less than two times per year). Unauthorized uses of motor vehicles, motorized equipment, or mechanical transport (off-highway vehicle, motorcycle, or mountain biking use) are documented but rare.

SOLITUDE OR PRIMITIVE AND UNCONFINED RECREATION

Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation. This quality is primarily about the opportunity for people to experience wilderness and is influenced by physical settings that affect these opportunities. This quality is preserved or improved by management actions that reduce visitor encounters, signs of modern civilization inside wilderness, agency-provided recreation facilities, and management restrictions on visitor behavior.

The unique and special qualities of solitude or a primitive and unconfined type of recreation within the wilderness areas in Badlands National Park include self-reliance and choosing where to explore, listening to the sounds of nature, and the opportunity to explore wilderness without observing large numbers of other visitors, structures, and installations.

Primitive (nonmotorized) forms of recreation are allowed in wilderness. At Badlands National Park, these include hiking, horseback riding, and camping. Cross-country foot travel is allowed, and permits are not currently required for overnight stays in the Badlands Wilderness, though visitors are encouraged to register at backcountry registers located at the Conata Picnic Area, Sage Creek Basin Overlook, and Sage Creek Campground before traveling into the wilderness. Wilderness visitors must camp at least 0.5 miles away from a road or trail and must not be visible from a roadway. Campfires are not allowed.

The wilderness areas receive very little use by the public, and opportunities for backcountry camping at isolated and primitive sites are numerous. According to informal backcountry registers for backcountry hikers and campers, there are typically only about five backcountry hiking or camping individuals or groups per night in the North Unit. The Sage Creek Primitive Campground (in nonwilderness nearby the Sage Creek Unit of the Badlands Wilderness) hosts approximately 20 people per night from May to October. This campground provides two pit toilets, a corral for horses, and several designated campsites that many backcountry users use as their starting point for any trips

into the nearby Sage Creek Unit of the Badlands Wilderness. It is possible that the sounds and sights of this campground may be heard if backcountry hikers and campers choose to explore the wilderness in the immediate vicinity of the campground.

Within the two units of the Badlands Wilderness, there are no recreation facilities (designated trails, toilets, shelters, or waysides). Even though there is a lack of recreation facilities, user-created campsites, fire rings and associated resource damage, and user-built cairns are not common.

Human-caused sound and light pollution can be an unwanted intrusion into the solitude of the park. These sounds are usually confined to areas closer to developed areas such as the Badlands Loop Road, the Sage Creek Rim Road, and associated pullouts and camping areas. Lights may be visible within the wilderness from vehicles along nearby roads or from development in the surrounding area. Administrative and research activities that are conducted with the aid of helicopters also affect opportunities for solitude within the national park, though these typically occur less than two times per year. There are occasional overflights of crop dusters, helicopter tours, and commercial or military overflights.

VISITOR USE AND EXPERIENCE

OVERVIEW

This section describes the aspects of visitor use and experience that may be affected by the North Unit bison resource stewardship plan alternatives. The following topics will be discussed:

- **Visitor Use Levels and Characteristics.** Seasonal or annual visitor use levels and trends and demographics.
- **Visitor Access and Amenities.** Main visitor access points and amenities and visitor travel throughout Badlands National Park.
- **Interpretation and Education.** Opportunities for visitors to experience interpretation and education within Badlands National Park.
- **Recreational Opportunities.** Recreational opportunities in Badlands National Park.
- **Visitor Safety.** Bison and human interactions and availability and access to safety information.

VISITOR USE LEVELS AND CHARACTERISTICS

In the past 15 years, Badlands National Park has averaged over 900,000 visitors per year (see Figure 1). Weather in the park can be unpredictable; temperatures ranging from 116°F in the summer to -40°F in the winter contribute to the seasonal nature of visitation to the park (see Figure 2). Visitors can expect average temperatures of 90°F in July and August and 80°F in June and September. The highest visitation to Badlands National Park is in June, July and August (70% of annual visitation), followed by the “shoulder season” months of May, September, and October (NPS 2016).

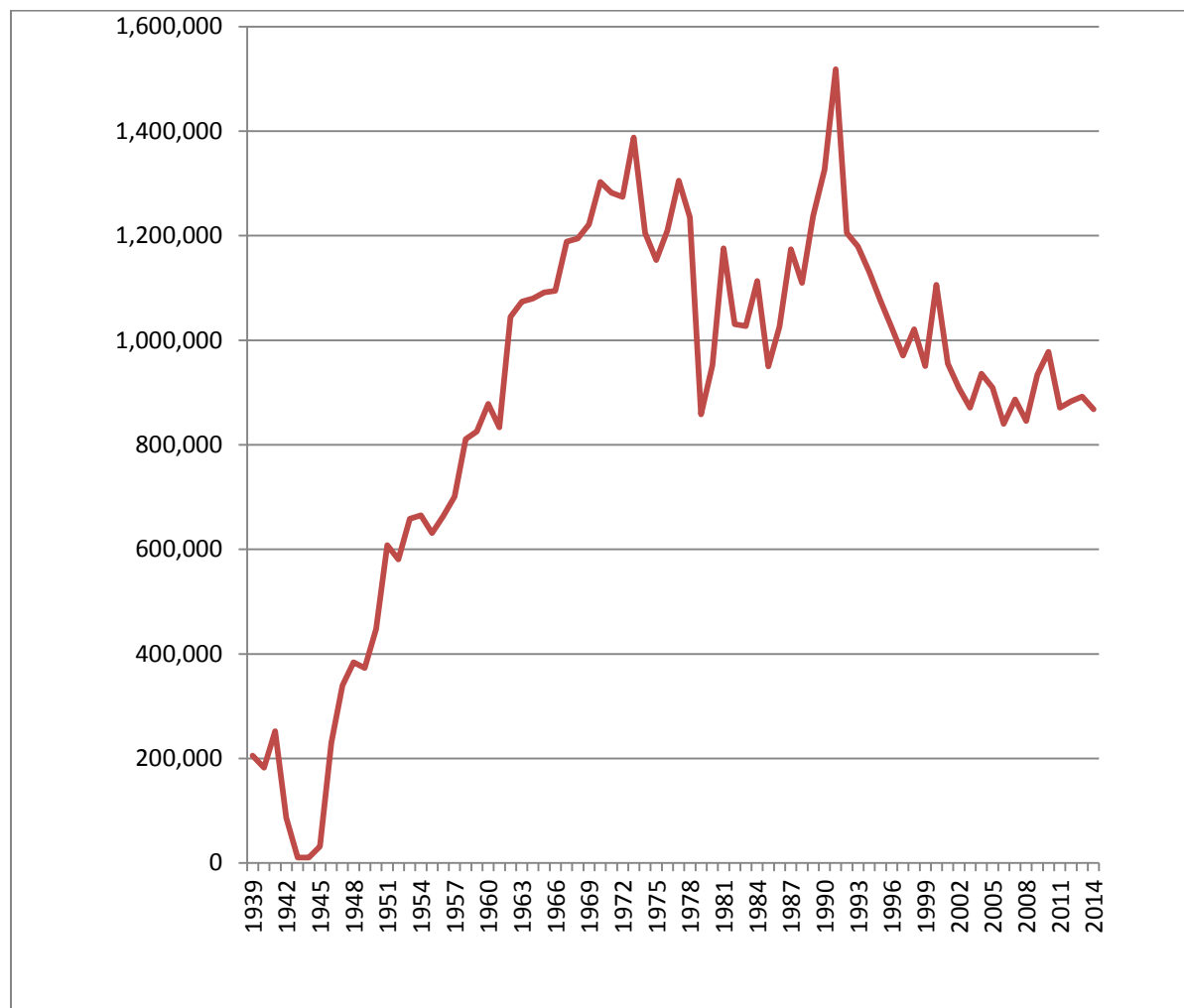


FIGURE 1. NUMBER OF RECREATION VISITORS BY YEAR TO BADLANDS NATIONAL PARK, FROM 1939 TO 2014.

A formal visitor survey conducted in August 2000 compiled statistics about visitor use characteristics including information on group composition, trip origin and destination, length of visit, favorite park sites, and other data (Simmons and Gramann 2001). Park employees routinely collect 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.

The visitor survey conducted in 2000 indicates that most groups (76%) that visit the park consist of four people or fewer, and more than 50% of the visitors to Badlands National Park are in family groups that stay less than one day. Tour buses frequently are on tightly managed schedules, and many bus travelers are senior citizen tour groups or international tour groups. Moderate numbers of school groups visit the park, mostly from Pine Ridge Indian Reservation or the greater region. Of the visitors that responded to the visitor survey, most (65%) were making their first visit to the park. Most visitors (83%) reported spending less than one day in the park, and 67% spent only two to four hours, mostly in the North Unit (Simmons and Gramann 2001).

Many visitors originated from the upper Midwest, including the states of Minnesota, Wisconsin, Illinois, and Michigan. Some visitors were from 40 other states and Washington, DC. International visitors (7% of visitors) were primarily from Canada, England, and Germany, and some were from 11 other countries (Simmons and Gramann 2001).

VISITOR ACCESS AND AMENITIES

Most visitors travel along Interstate 90, the major highway west into the Black Hills, to access the park. Badlands National Park is often the first or last stop on a longer trip to Mount Rushmore National Memorial, Wind Cave and Jewel Cave National Parks, and Custer State Park. Interstate 90 is also traveled by people going to destinations farther west such as Yellowstone National Park, and some visitors make a spur-of-the-moment decision to visit Badlands National Park when they see signs along the highway.

Visitation to Badlands National Park is primarily concentrated in the North Unit (Simmons and Gramann 2001). Sites visited typically include Pinnacles Overlook, Ben Reifel Visitor Center, Cedar Pass Lodge Bigfoot Pass picnic area, and Roberts Prairie Dog Town. Visitors also went to the Big Pig Dig, a paleontological site. The services and facilities most used by visitors are also in the North Unit. Visitors use the paved roads and overlooks, trails, visitor center, directional road signs, and restrooms. Visitors considered the overlooks and Cedar Pass Campground the most important visitor services and facilities in the park (Simmons and Gramann 2001).

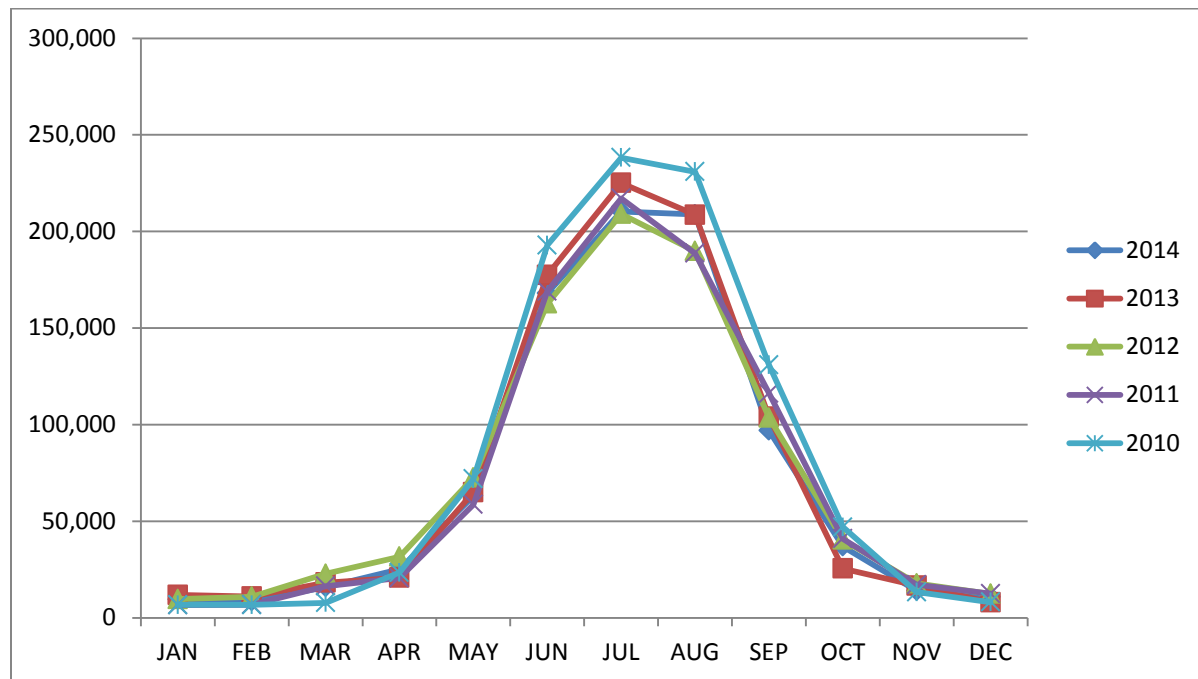


FIGURE 2. NUMBER OF RECREATION VISITORS BY MONTH TO BADLANDS NATIONAL PARK, FROM 2010 TO 2014.

The campgrounds at both Cedar Pass and Sage Creek contain campsites available on a first-come, first served basis. Reserved sites available for groups have clustered picnic tables and parking and areas for multiple tents. The campgrounds fill to capacity, especially on weekends and holidays.

The Cedar Pass Campground is located near the Ben Reifel Visitor Center and offers scenic views of the badlands features. Facilities include cold running water, flush toilets, showers, shaded picnic tables, gravel roads, parking areas, and a trailer sewage dump station. In summer, nightly programs at the amphitheater are popular. The Sage Creek Campground, at the west edge of the North Unit off Sage Creek Rim Road, has pit toilets and picnic tables but no potable water. This campground is popular with visitors to the wilderness and with pack-stock users and provides a unique opportunity to view bison, who often wander through the primitive campground. Approximately 12% of visitors surveyed in 2000 visited the Sage Creek Campground (Simmons and Gramann 2001). Small picnic areas with a few tables each are available at the Ben Reifel Visitor Center, Cedar Pass campground, Journey Overlook, and Conata Road.

The major park roads in the North Unit are the Badlands Loop Road and the Sage Creek Rim Road, both of which are accessible to the average passenger vehicle. No off-road travel is allowed for any wheeled vehicles, including cars, motorcycles, and bicycles, and vehicle access is restricted to designated roads. The windy, steep Badlands Loop Road descends from the Northeast entrance station to the Cedar Pass complex, which contains the Ben Reifel Visitor Center, park headquarters, Cedar Pass campground, and concessioner-operated Cedar Pass Lodge. The National Park Service maintains the Badlands Loop Road year-round. The Sage Creek Rim Road, which intersects the Badlands 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 County Road 590. Proportionately fewer visitors travel some part of this road, which offers a quieter, more remote experience than the Badlands Loop Road and presents the best opportunity to see the park's bison herd within its existing range. It travels approximately five miles from the Badlands Loop Road to County Road 590 and continues another five 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 nine miles long connecting the Badlands Loop Road with South Dakota State Highway 44, about 20 miles east of Scenic. For the first seven miles from the state highway it is a county road; it enters the park at approximately mile 7 and becomes a park road. This road provides access to the Conata Road picnic area and the Big Pig Dig.

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

Visitors arriving in personal cars stay mostly on paved roads in the North Unit of the park (Badlands Loop Road) and miss many of the best opportunities to view bison within the park, such as are available along the unpaved section of the Sage Creek Rim Road. The Badlands Loop Road and many pullouts are crowded in the summer peak visitation period; however, recently redesigned pullouts and parking lots along the Badlands Loop Road have reduced congestion and improved traffic flow.

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

that are used primarily by local residents. The National Park Service is responsible for managing and maintaining all designated roads in the park.

TABLE 3. ANNUAL VISITOR COUNTS AT NPS-STAFFED ENTRANCES, BADLANDS NATIONAL PARK

	2010	2011	2012	2013	2014
Interior Entrance	103,799	96,662	81,232	103,534	98,137
Northeast Entrance	152,056	134,023	139,281	152,167	149,131
Pinnacles Entrance	94,605	87,996	98,248	96,744	99,935

Historically, visitors entered at the Northeast entrance station, 2.5 miles from exit 131 of I-90, and followed the Badlands Loop Road through the park; however, in recent years, the number of visitors entering at the Northeast entrance has decreased. The Pinnacles entrance is the second most used entrance and is accessed by driving 8.5 miles south from exit 110 of I-90 (near the town of Wall, South Dakota). It is about 28 miles west of the Northeast entrance along the Badlands Loop Road. The least used entrance is the Interior entrance, in the town of Interior south of the Ben Reifel Visitor Center, but in recent years this entrance has seen similar use to the Pinnacles entrance (see Table 3).

A traffic counter at the Northeast Entrance, the most used entrance to Badlands National Park, counted 150,000 vehicles in 2014. The busiest traffic months were June, July, and August, and they averaged an average daily traffic count of 1,025 vehicles. The month of July alone, the busiest month in 2014, averaged approximately 1,140 vehicles per day. Bus traffic is increasing in the park.

Roads that traverse the park or connect the Badlands Loop Road and Sage Creek Rim Road are used for a number of other local purposes including local commuters, transport of goods, and students traveling to school. In addition, the Badlands Loop Road provides access between the Pine Ridge Indian Reservation and Interstate 90.

INTERPRETATION AND EDUCATION

Before visiting Badlands National Park, visitors can obtain information about the park from the NPS website (<<http://www.nps.gov/badl>>) and from travel guides and state or local welcome centers (Simmons and Gramann 2001). A trip planner or park brochure provides a map with popular park destinations, background information on the park, and safety information related to bison.

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

There is one visitor center in the North Unit of Badlands National Park. The Ben Reifel Visitor Center is in the Cedar Pass complex, about eight miles from the Northeast entrance station. Year-round services and facilities are available, including a theater that shows a park orientation film,

public classroom, research library, and exhibits. The visitor center also houses the park's division of resource education and the Badlands Natural History Association, the park's nonprofit partner. The visitor center is open for extended hours from Memorial Day to late August. Exhibits, many of them interactive, focus on the cultural history, prairie, ecology, and paleontology of the White River Badlands. The staffed information desk helps visitors orient themselves and provides information to help visitors plan their visit to the park. About 25% of park visitors stop at the visitor center.

RECREATIONAL OPPORTUNITIES

Visitors to Badlands National Park have opportunities to explore the prairie grasslands and rugged geologic formations while participating in activities such as sightseeing or scenic driving, camping, picnicking, bicycling, horseback riding, studying nature, attending ranger-led programs, experiencing the wilderness, photographing wildlife, and searching for birds or flowers, to name a few. There also are opportunities to study paleontology, the fossil remains of ancient life. The highly developed and most heavily visited section of the park is along the Badlands 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. Ranger programs, such as guided hikes, talks, activities, and evening programs, are offered during the summer season.

Sightseeing or Scenic Driving. Sightseeing is available for tour bus riders and other visitors along the Badlands 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. Visitors also enjoy viewing wildlife as well as the plants that compose the prairie ecosystem.

Fourteen designated overlooks along the Badlands Loop Road and Sage Creek Rim Road allow visitors to stop and take pictures or simply enjoy the view. National Park offers countless opportunities to glimpse wildlife including bison, bighorn sheep, and pronghorn antelope. Opportunities to view wildlife for most visitors are at the scenic overlooks along the Badlands Loop Road. The best opportunity for tour bus visitors to view the bison herd is from the Pinnacles Overlook because most tour buses do not travel the Sage Creek Rim Road.

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 Badlands Loop Road. Visitors have a greater chance of viewing bison along the Sage Creek Rim Road because it traverses the current extent of the bison range. The overlooks along the unpaved road, particularly Sage Creek Basin, Badlands Wilderness, and Hay Butte overlooks, provide the best opportunities to view roaming bison.

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 is 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 visitors the first opportunity to get 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 five miles west of Cedar Pass, visitors can stop at Fossil Exhibit Trail where paleontology is interpreted. The easy, elevated 400-yard boardwalk meanders among wayside panels and accessible bronze fossil replicas. Twenty-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 Badlands Loop Road is Pinnacles Overlook, which offers a spectacular view of the spires and canyons of the Pinnacles region and 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 Badlands Loop Road. Between Big Foot Pass and Dillon Pass, the Badlands Loop Road travels across the prairie, offering an extensive view of the open grasslands and big skies of the Great Plains. This overlook also provides rare opportunities for visitors to view the bison herd as they look into the current bison range in the Badlands Wilderness.

Hiking and Backpacking. Hiking is permitted throughout the North Unit, which 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 seven miles of marked and maintained trails. The Castle Trail is the longest, about five miles one way, and 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 that leads through a wooded oasis perched on the edge of the Badlands Wall. Badlands National Park is a destination park for an increasing number of backpackers and pack-stock users who come to experience the wilderness.

Backpacking is allowed throughout the park, and no backcountry permits are required. It is recommended that hikers carry in all the water they need, and the lack of available potable water limits the number of backpackers using the park. Hikers and backpackers have opportunities to view wildlife including bison when traveling the backcountry or through the current bison range.

Bicycling. Bicycles are allowed on park roads in Badlands National 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 Badlands Loop Road, Sage Creek Rim Road, and other secondary roads. A map of suggested distance routes is available at the visitor centers. Bicyclists along Sage Creek Rim Road section have additional opportunities to view rare wildlife including bison.

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 and are used to carry riders or goods. Horseback riding is very popular,

especially in the wilderness. Horseback riding and pack-stock use provides additional opportunities to view rare wildlife including bison.

VISITOR SAFETY

As previously described, visitors can explore Badlands National Park in a variety of ways, from the back of a tour bus to the back of their horse; visitors can enjoy the views of a rugged landscape from an overlook or the dark night sky from a backcountry prairie. It is National Park Service policy to provide enjoyable and safe experiences at NPS sites, and this goal takes precedence over all other management actions (NPS 2006a). Although recognizing that there are limitations on its capability to eliminate all hazards, the National Park Service and its concessioners, contractors, and cooperators seek to provide a safe and healthful environment for visitors. The National Park Service cannot control all risk inherent in recreational activities, and, therefore, park visitors must assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments (NPS 2006a). Badlands National Park staff are especially diligent in providing effective visitor safety information in easily accessible locations and formats. In the summer 2000 survey, respondents cited the park/brochure/map (92%), visitor center exhibits (67%), and roadside exhibits (66%) as the most commonly used services during their visit to the park. Currently, the park provides safety information, including appropriate behavior around wildlife such as bison, in a wide range of formats for visitors to review before they explore Badlands National Park. Visitor safety concerns include negative human and bison interactions, in particular at the Sage Creek Campground. Many of the negative interactions in other national park units occur between the months of March and September. These months contain the bison rut and calving seasons, and many negative interactions occur when the density of bison is high. Therefore, seasonality and bison density are two factors that could be used in bison safety messaging through interpretation and education.

4

Chapter 4: **Environmental** Consequences



CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

OVERVIEW

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if a proposed action is implemented. In this case, the proposed federal action is the adoption of a bison resource stewardship strategy for the North Unit of Badlands National Park. This chapter analyzes the environmental impacts of implementing the two alternatives on natural resources, cultural resources, wilderness character, and visitor use experience. (Please refer to the impact topics sections in Chapter 1 and Chapter 3 for a list of the impact topics addressed in this chapter.) This analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives. By examining the environmental consequences of all alternatives on an equivalent basis, decision makers can evaluate which approach would create the most desirable combination of benefits with the fewest adverse effects on the park.

This chapter begins with a brief explanation of general methods followed by a discussion of how cumulative impacts are analyzed for the alternatives. Following this section, the impact analysis is presented. Each of the alternatives, including the no-action alternative (continuation of current management), is analyzed for adverse or beneficial changes that would occur to the existing conditions of each impact topic as presented in “Chapter 3: Affected Environment.” After describing the impacts of the alternative, the cumulative effects of each impact topic are discussed and a conclusion stated. Adverse effects are not significant unless specifically stated.

GENERAL METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

This section describes the environmental impacts, including direct and indirect effects, and their significance for each alternative. The analysis assumes that the monitoring and mitigation measures identified in the section, “Monitoring Guidelines and Mitigation Measures for the NPS-Preferred Alternative,” in Chapter 2 would be implemented for the action alternative. Overall, the National Park Service based its impact analyses and conclusions on review of existing literature and park studies, information provided by experts within the park and other NPS personnel, other agencies, professional judgment, park staff insights, and public input.

To provide a thorough analysis of the effects of each alternative on each impact topic, the following sections have been organized in the same manner as used to describe the alternatives in Chapter 2:

- Geographic extent of bison range
- Visitor use and experience
- Visitor safety
- Bison-related facilities

- Bison roundup
- Trespass bison procedures

In accordance with Council of Environmental Quality (CEQ) regulations, direct, indirect, and cumulative impacts are described (40 CFR 1502.16), and the impacts are assessed in terms of context and intensity (40 CFR 1508.27). Where appropriate, mitigating measures for adverse impacts are described and incorporated into the evaluation of impacts. The specific methods used to assess impacts for each resource may vary and, therefore, are described as part of each impact topic.

The following terms are used in the discussion of environmental consequences to assess the impact intensity threshold and the nature of impacts associated with each alternative.

- **Type.** Impacts can be beneficial or adverse. A beneficial impact is an impact that would result in a favorable change in the condition or appearance of the resource. An adverse impact is an impact that causes an unfavorable result to the resource as compared with the existing conditions.
- **Context.** The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance usually would depend on the effects in the locale rather than in the world as a whole. In many cases, the term “localized” is used, intending to provide the context that impacts would only occur within a relatively small area (i.e., a few acres) as opposed to throughout the whole North Unit of the park, or into the neighboring areas. Both short- and long-term effects are also relevant.
- **Duration.** Duration of impact is analyzed independently for each resource because impact duration is dependent on the resource being analyzed. Impacts may last for the implementation period, a single year or growing season, or longer. Impact duration is described as short term, long term, or permanent for each resource. For the purposes of this analysis, short-term and long-term impacts are defined for each resource.
- **Direct and Indirect Impacts.** Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or further away but are still reasonably foreseeable. Direct and indirect impacts are considered in this analysis. Cumulative effects are discussed in the next section.
- **Intensity.** This refers to the severity of impact. The following should be considered in evaluating intensity:
 - Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.
 - The degree to which the proposed action affects public health or safety.
 - Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
 - The degree to which the effects on the quality of the human environment are likely to be highly controversial.
 - The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

- The degree to which the action may establish a precedent for future actions having significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions that have individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in, or eligible for listing in, the national register or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for protection of the environment.

For each impact topic analyzed, an assessment of the potential significance of the impacts according to context and intensity is provided in the “Conclusion” section that follows the discussion of the impacts under each alternative. The intensity of the impacts is presented using the relevant factors from the preceding list. Intensity factors that do not apply to a given resource topic and/or alternative are not discussed.

CLIMATE CHANGE

The impacts of climate change on the North Unit of Badlands National Park are not expected to vary by alternative, and the lack of certainty about regional climate change adds to the difficulty of predicting how these impacts would be realized. Furthermore, management actions that are inherently part of each alternative would not fundamentally change with the anticipated added effects of climate change. Climate change is one factor among many that cause similar outcomes among the alternatives, so management actions would not likely be taken due to climate change alone. Given this complexity, the potential influences of these changes on the park environment are included in “Chapter 3: Affected Environment,” as appropriate to pertinent impact topics, but are not analyzed in detail with respect to each alternative in this chapter. Please refer to the discussion of carbon footprint topic in the section, “Impact Topics Considered But Not Retained for Full Analysis,” in Chapter 1 for additional information.

CUMULATIVE IMPACTS ANALYSIS METHOD

The CEQ regulations require assessment of cumulative impacts in the decision-making process for federal projects. A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts are considered for all alternatives, including the no-action alternative.

Cumulative impacts are determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. It is necessary to identify other ongoing or reasonably foreseeable future projects and plans at the park and, if applicable, the

surrounding region. Actions that could affect or have affected the various resources at the park are described in this section.

The cumulative impact analysis was accomplished in four steps:

- **Step 1. Identify Resources Affected:** identify resources affected by any of the alternatives.
- **Step 2. Set Boundaries:** identify appropriate spatial and temporal boundaries for each resource.
- **Step 3. Identify Cumulative Action Scenario:** determine which past, current, and reasonably foreseeable future actions to include for each resource. These actions are not only those within or undertaken by the park, but also include those actions by any entity that have had or would have an effect on the resources impacted by this plan.
- **Step 4. Cumulative Impact Analysis:** determine the combined impact of the proposed alternative and the other identified actions of the cumulative scenario.

The following narrative provides detailed information for actions not discussed elsewhere that have been identified for the cumulative impact scenario for this plan.

Past, present, and reasonably foreseeable actions are organized into two main categories—actions attributable to the National Park Service (primarily within the North Unit of Badlands National Park, including park infrastructure, road construction and improvements, and resource protection activities) and non-NPS actions that are likely to affect the project area (including tourism enhancements, residential and commercial development, road construction and improvements, and resource protection activities). A summary of the actions that could contribute to cumulative impacts is provided for each of these categories. The evaluation of cumulative impacts, described under each impact topic, is qualitative in nature.

Actions and Projects Inside the North Unit of Badlands National Park

The primary projects and actions inside the North Unit of Badlands National Park that could contribute to cumulative effects are summarized below.

Badlands National Park Centennial Studio. This project would (1) produce design guidelines for the Cedar Pass developed area addressing long- and short-term planning and design needs, (2) define character-defining features of Cedar Pass, and (3) create a logical, systems-based framework to support future design projects. This multidisciplinary graduate-level design studio (planning, architecture, landscape architecture, engineering, and historic preservation) would develop a planning and management framework that would allow for growth within the existing cultural landscape but also address the rehabilitation and preservation of the remaining contributing resources. The design guidelines also would incorporate sustainability and universal design, as well as provide for enhancements to the visitor experience. These guidelines would be used to develop a range of alternatives and appropriate NEPA compliance document (environmental assessment or environmental impact statement) for preservation, rehabilitation, and future development within the Cedar Pass Developed Area. Implementation of the plan is subject to funding. The guidelines may provide guidance for development in other areas of the North Unit.

South Dakota State Highway 240 Badlands Loop Road Construction Projects. A project is expected in the near term (one or two years) to fund a study for an environmental assessment regarding feasibility, costs, and impacts on roadside repairs that addresses both hydrology and

erosion issues on and around Highway 240 Badlands Loop Road. This project also would consider that part of the loop road north of the park boundary to Wall, South Dakota. It would address maintaining, repairing, and replacement of culvert systems, soil stabilization, and buttress design / rebuild to support and increase the lifespan of repairs to the road. The project would also support park paleontological and cultural resource staffing for any excavations / surveys suggested in areas along the route in virgin soils in order to protect the park's natural and culture landscapes and resources. It is expected that significance road construction would follow this project during the next 10 to 20 years.

Potential entrance fee increase. Badlands National Park sought comments on a proposed fee increase in early 2016, which would go into effect on January 1, 2017 if implemented. Changes in entrance fees may impact visitation to the North Unit of the park.

Actions and Projects Outside the North Unit of Badlands National Park

Minuteman Missile National Historic Site. A visitor center / administrative facility and parking lot were recently constructed and opened to the public at the nearby Minuteman Missile National Historic Site. This facility is off I-90 east of Wall, near the northeast entrance to the North Unit of Badlands National Park. The grand opening of the Minuteman Missile National Historic Site visitor center is scheduled for September 24, 2016, and would have the potential to change visitor use patterns to the North Unit.

Buffalo Gap National Grassland. The US Forest Service is following a land and resource management plan for the Nebraska National Forest, which includes the Buffalo Gap National Grassland (2009). The plan calls for several actions that could affect Badlands National Park, largely within the Wall District of Buffalo Gap National Grassland. The Wall District extends east from the Cheyenne River through the White River Badlands, wrapping around the North Unit of Badlands National Park, to just south of Kadoka, South Dakota. This district provides largely contiguous habitat with the North Unit. The district is divided into three distinct geographic areas: Wall North, Wall Southeast, and Wall Southwest. The actions that could affect Badlands National Park include:

- Managing the southwest part of the Wall District to promote prairie dog expansion (primarily adjacent to the park) and blackfooted ferret reintroduction habitat. The southwest part of the Wall District shares a boundary with the northwestern part of the North Unit of Badlands National Park.
- Designating a backcountry nonmotorized area (Rake Creek) about 18 miles to the east on Interstate 90 from the North Unit's Northeast entrance station.
- Developing trails northeast of the park's North Unit.
- Developing a primitive campground southwest of Wall, near the northwestern part of the North Unit of Badlands National Park.

Other actions that may be taken in the grassland in order to achieve one or more desired condition objectives identified in the land and resource management plan may have the potential to affect Badlands National Park. These actions may include changes in public access (such as limiting or closing public access in areas adjacent to the park), changing livestock stocking rates, and changing fuel treatments (such as prescribed burning).

Nearby Commercial Development. Proposed commercial development outside the North Unit boundary may include a campground at the Ranch Store, approximately seven miles north of the Northeast entrance station. Proposed commercial development outside the South Unit boundary may include a convenience store / gas station, hotel / restaurant, and 50-site RV campground. These developments could result in increased traffic and visitation to the North Unit of Badlands National Park.

Mako Sica Trail. The West River Trails Coalition has proposed converting an existing railway line that has fallen into disuse into a multiuse trail for bicyclists and hikers. The trail would run roughly east/west for 104 miles from Rapid City to Kadoka, South Dakota. A feasibility study has been completed and some public meetings have been conducted regarding this trail.

Unexploded Ordnance Cleanup and Removal. The cleanup of the former bombing range in Badland National Park's South Unit is an ongoing effort by the Army Corps of Engineers and the Oglala Sioux Tribe to identify and mitigate public safety concerns relating to the former military use of these lands. The effort involves a thorough survey of the bombing range (including the South Unit), followed by investigations of areas identified to have high concentrations of metals. Such investigations involve excavating the area of concern by means that can range from hand tools to a backhoe. All excavated areas are backfilled upon removal or destruction of ordnance. Large excavated areas are seeded with a mix of native plant species.

PALEONTOLOGICAL RESOURCES

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

Environmental Consequences as a Result of Alternative 1

Geographic Extent of Bison Range. The existing bison range (57,640 acres) is abundant with paleontological resources, and bison use in this area would continue to adversely affect fossils in this area. Through site sampling of bison use areas in the Sage Creek Unit of the Badlands Wilderness Area, park staff have documented clear evidence of crushed and broken fossils from bison activity in multiple areas (R. Benton, Paleontologist, National Park Service, Badlands National Park, pers. comm. June-July 2015; NPS 2015b). Thus, the continued bison presence and activity in the existing range would likely result in considerable, permanent, adverse impacts on these resources. These adverse effects primarily would relate to fossils being broken or degraded by bison trampling and wallowing, particularly in high-use areas such as along bison movement corridors, near water impoundments, and in bison wallowing areas. Although bison are native to this landscape and have inhabited these lands for millennia, the unnatural concentrations and year-round residency of bison in the existing range would continue to result in direct loss of otherwise intact fossils and fossil beds at a rate and to a degree that is greater than what likely occurred prior to European settlement. For example, paleontological resources in and around water impoundments and other wet areas in the existing range would continue to be degraded or crushed by bison due to the unnatural, concentrated use by resident bison. Although the most notable impacts on paleontological resources in the existing range would be mostly localized in high-use areas, the permanent, adverse effects to these resources could continue to occur anywhere in the existing bison range where any one individual bison roams.

Visitor Use and Experience. Paleontological resources along park roads, existing pullouts and waysides, and in undesignated areas currently used for parking along the roads would continue to be degraded or crushed by vehicles. Off-trail visitor use also would continue to result in losses of fossils taken by passing visitors. These adverse effects would be minor and very localized in some of the above-noted areas. However, the adverse effects would be permanent.

Visitor Safety. Visitor safety measures under this alternative (as described in Chapter 2) would continue to have no effect on paleontological resources.

Bison-Related Facilities. The continued maintenance of bison fence around those parts of the existing bison range in the park where topography does not serve as a natural barrier (about 36 miles of fencing) could continue to result in the degradation or loss of surface and subsurface paleontological resources along fence lines and in and around fence posts as they are maintained or replaced. Impacts could result from post-hole digging as well as maintenance vehicles and foot traffic crushing fossils while accessing fences, though in most cases, maintenance vehicles would continue to be traveling along previously disturbed routes used for maintenance activities. A paleontologist would continue to be onsite for all boundary fence excavation work and would document any newly discovered fossil sites and realign the fence to avoid further damage to the extent possible. Nevertheless, fence construction and maintenance could continue to result in localized, but permanent adverse effects to paleontological resources. Also, the installation of a small bison enclosure in the Pinnacles area would involve ground disturbance from post-hole digging and associated construction and maintenance activities that could have a very localized, but permanent, adverse effects on fossils (i.e., crushing or breaking). However, the enclosure fence would reduce or eliminate future bison-related impacts to any enclosed paleontological resources by protecting them from bison trampling or wallowing.

Bison Roundup. The existing bison holding facility for roundups at the north end of the existing bison range would continue to receive high numbers of bison during roundups, and paleontological resources in this area and along bison paths to this area could continue to be degraded or crushed from this use. Although these adverse impacts would be very localized, the adverse effects on fossils would be permanent.

Trespass Bison Procedures. When trespass bison are pursued by park staff, all-terrain and four-wheel drive vehicles often are used to round up the bison and direct them back into the park. In addition to potential disturbances to paleontological resources outside the park, these vehicles could continue to disturb and crush exposed fossils when driven over bedrock. Although these adverse impacts would be minor and localized in a parkwide context (i.e., in random small areas of trespass bison containment), the effects on the fossils would be permanent.

Cumulative Impacts

Several future actions have the potential to combine with the effects of the no-action alternative to produce cumulative impacts on paleontological resources in the park. A project expected to begin in the next year or two would seek to improve water movement and reduce erosion through roadside repairs to South Dakota State Highway 240 Badlands Loop Road. The project would also support park paleontological resource staffing for any excavations or surveys suggested in areas along the route in virgin soils to protect the park's natural and cultural landscapes and resources. Although the project would seek to mitigate impacts on paleontological resources, it is possible that the disturbance of virgin soils along the route could impact *in situ* fossils. These impacts, when added to the continued adverse impacts on fossils from bison trampling and vehicles under the no-

action alternative, could contribute a permanent, adverse increment to the cumulative impact on these resources.

Some anticipated future developments in the area such as the construction of campgrounds, convenience stores, restaurants, and hotels could bring an increase in traffic and visitation to the park. Although there may be no direct impacts on paleontological resources in the park from increased visitation, it could lead to increased occurrences of off-trail use, parking in undesignated areas, and stress on limited law enforcement staff responsible for protecting resources from prohibited activities such as fossil looting.

When the effects of alternative 1 are added to the effects of these other projects and actions, there would be the potential for a minor, localized, and permanent cumulative adverse effect on paleontological resources in the existing bison range. The incremental effect of alternative 1 would be considerable, as it contributes to the majority of the cumulative effect given that much of this adverse effect relates to ongoing bison trampling and wallowing in the existing bison range.

Conclusion

Overall, the no-action alternative would continue to have minor, localized, and permanent adverse impacts on the park's paleontological resources in the existing bison range from bison trampling and wallowing and from fossils being crushed by bison fence maintenance activities and vehicle use during bison roundup and trespass bison activities. Fossils would continue to be degraded or crushed by visitor vehicles parked in undesignated areas or by visitors removing fossils along official trails or social trails. Given the finite nature of paleontological resources, all of these impacts would be permanent but primarily would be limited to high-use areas for both bison and visitors.

When the effects of the no-action alternative are added to the effects of these other projects and actions, there would be the potential for a minor, localized, and permanent cumulative adverse effect on paleontological resources in the existing bison range. The incremental effect of the no-action alternative would be considerable, as it contributes to the majority of the cumulative effect given that much of this adverse effect relates to ongoing bison trampling and wallowing in the existing bison range.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

Environmental Consequences as a Result of Alternative 2

Geographic Extent of Bison Range. The project area is abundant with paleontological resources in both the existing and expanded bison ranges. Although the adverse impacts from ongoing bison use in the existing range would continue, reintroduction of bison into the expanded range would result in a notable increase of permanent adverse impacts on the paleontological resources in the expanded range. These adverse effects would result primarily from bison trampling and wallowing, particularly in high-use areas such as along bison movement corridors, near water impoundments, and in bison wallowing areas. Although bison are native to this landscape and have inhabited these lands for millennia, the unnatural concentrations and year-round residency of bison in the existing and expanded ranges (57,640 acres and 80,193 acres, respectively) would result in direct loss of otherwise intact fossils and fossil beds to a degree and rate that would be greater than what likely occurred prior to European settlement. For example, paleontological resources in and around water impoundments and other wet areas could be degraded or crushed by bison due to the

unnatural, concentrated use by resident bison in the existing and expanded range and result in localized, permanent adverse effects to paleontological resources in and around water impoundments. Although the most notable impacts on paleontological resources in the existing and expanded ranges would be localized in high-use areas, the permanent, adverse effects to these resources could technically occur from trampling or wallowing anywhere in the bison range where any individual bison roams.

Fenced bison exclosures would be used to help mitigate or avoid these impacts in some areas of known, fossil-rich sites; however, the siting and development of the exclosures depends on documented locations of known paleontological sites. Undocumented and newly surfacing sites would still be prone to degradation from bison use until they are identified by park staff and properly protected with exclosure fencing. If paleontological resources cannot be avoided by project redesign, data recovery excavations would be completed. In addition, exclosures can draw attention to sensitive resources and could cause increased fossil poaching, a localized adverse impact that could be quite notable and permanent.

As another impact mitigation measure, high-use bison corridors in the project area would be monitored by park staff for accelerated rates of erosion, fossil impacts, and newly exposed fossils. The measure would help minimize adverse impacts on fossils from bison in the existing and expanded ranges. Identified adverse impacts could be mitigated by measures such as salvage collection of as many fossil resources as is practical and a reconsideration of bison fencing layout and design.

Last, as noted above, disturbances and degradation of paleontological resources in the existing bison range would also continue under this alternative. However, the impacts from this use could diminish somewhat in some localized areas, relative to current conditions, as bison migrate into newly opened range to the east. This dispersal of bison into the expanded range could reduce the concentration and frequency of bison use in the existing range, possibly resulting in a small reduction of paleontological resource degradation from bison trampling and wallowing in the existing bison range. This potential effect would be beneficial to fossils but would be minor and localized.

Visitor Use and Experience. The addition of five new vehicle pullouts and the expansion of two existing pullouts along South Dakota State Highway 240 Badlands Loop Road could result in the degradation or loss of fossils along the road due to construction excavation and paving. These adverse impacts would be very localized but permanent. Some of these adverse effects could be mitigated by monitoring and other best management practices. For example, all ground-disturbing activities, such as vehicle pullout construction, would be assessed for the presence of paleontological resources through surveying. During construction in areas considered to have potential for paleontological resources, monitoring would be conducted to ensure that paleontological sites would be avoided. If previously unknown paleontological resources are discovered during construction, work in that location would be stopped, and measures would be taken to avoid further resource impacts or to mitigate their loss or disturbance. If paleontological resources cannot be avoided by project redesign, data recovery excavations would be completed before construction.

By adding or expanding visitor parking and pullout areas, fossil degradation or loss from off-trail visitor use could increase due to additional or expanded access for visitors to wander in surrounding areas. This localized adverse effect to paleontological resources would be most notable in areas that provide vantage points for bison viewing in the new range. Paleontological resources along park roads, existing pullouts and waysides, and in undesignated areas used for

parking would continue to be degraded by vehicles and by visitors taking fossils. This adverse effect would be localized and permanent. New or expanded visitor use areas (e.g., in vicinity of pullouts) would be monitored for signs of scavenging or other visitor use impacts on paleontological resources. Measures would be taken to mitigate these impacts, including signage and visitor education, increased law enforcement presence, and possible salvage collection. If visitor use activities continue to disturb exposed fossils in high-use areas, trail rerouting, boardwalk development, or other measures could be taken to minimize additional resource damage.

Visitor Safety. Visitor safety measures under this alternative (as described in chapter 2) would have no effect on paleontological resources.

Bison-Related Facilities. The installation and maintenance of an additional 38.3 miles of bison fence to contain the expanded bison range to the east could result in disturbances to surface and subsurface paleontological resources along fence lines and in and around fence posts. Some of the new fence posts would likely disturb portions of Badlands formations in undocumented fossil-rich areas. Impacts could result from post-hole digging and by maintenance vehicles compacting soils while accessing fences. To allow for future maintenance and inspection of bison fencing in the expanded bison range, a corridor along the interior of the boundary fence would be developed for access by off-highway vehicles, horseback, or foot. This fence installation and maintenance work could result in localized, but permanent adverse effects to paleontological resources. It should be noted that of the 38.3 miles of new bison fence 36.8 miles would be placed along the alignment of the existing park boundary fence, and only 1.5 miles of the new fence would be constructed in previously undisturbed areas in the interior of the park. Thus, the greatest threat to paleontological resources would be along the 1.5 miles of new fence in the interior of the park where very limited surface and subsurface disturbances previously have occurred. To mitigate this potential for paleontological resource degradation, a qualified paleontologist would be needed to survey the proposed perimeter fence route for possible fossils prior to fence installation and to monitor the installation as postholes are dug. A qualified paleontologist would also need to monitor all excavation work associated with fence construction and installation.

Maintenance of bison fences around the perimeter of the existing bison range in the park (about 36 miles of fencing) could continue to result in disturbances to surface and subsurface paleontological resources along fence lines and in and around fence posts when they are maintained or replaced. Impacts could result from post-hole digging as well as maintenance vehicles and foot traffic crushing fossils while accessing fences. These activities would continue to result in localized, but permanent adverse effects to paleontological resources.

Bison Roundup. The existing bison holding facility for roundups at the north end of the existing bison range would continue to receive high levels of bison use during roundups, and paleontological resources in this area and along bison paths to this area could continue to be degraded or crushed from this use. Although these adverse impacts would be localized, the effects on fossils would be permanent. Additional degradation and crushing of fossils by concentrations of bison could also occur in other areas of the park where portable corrals would be utilized for roundups. These impacts could be minimized, however, by not placing the portable corrals in the vicinity of areas considered to have the potential for paleontological resources.

Trespass Bison Procedures. When trespass bison are pursued by park staff, all-terrain and four-wheel drive vehicles commonly are used to round up bison and direct them back into the park. In addition to potential disturbances to paleontological resources outside the park, these vehicles could continue to disturb and crush exposed fossils when driven over bedrock. Although these

adverse impacts would be localized and minor in a parkwide context, the effects on the fossils would be permanent.

Cumulative Impacts

The cumulative impacts of the NPS-preferred alternative would be similar to those outlined for the no-action alternative. The cumulative impacts related to bison trampling and wallowing would be extended to paleontological resources in the expanded bison range, a substantial increase in the geographic extent of the impacts. Additionally, the potential for increased visitation due to regional development activity could increase as visitors are drawn to the park by new opportunities to see bison and would result in a greater adverse cumulative impact on fossils from visitor actions (parking in undesignated areas, off-trail use, and looting).

If the effects of the NPS-preferred alternative are added to the effects of these other projects and actions, there would be the potential for a considerable, localized, and permanent cumulative adverse effect on paleontological resources in the existing and expanded bison range area. The incremental effect of NPS-preferred alternative would be considerable, as it contributes to the majority of the cumulative effect given that much of this adverse effect relates to bison trampling and wallowing in high-use areas of the existing and expanded bison range.

Conclusion

Overall, when compared to the continued minor, localized, and permanent adverse impacts of the no-action alternative, the NPS-preferred alternative would have minor to considerable adverse impacts on the park's paleontological resources from bison trampling and wallowing and from fossils being crushed by bison fence maintenance activities and vehicular use during bison roundup/trespass bison activities. The geographic extent of these impacts would expand to resources in the expanded bison range and would be intensified by impacts related to the construction and long-term maintenance of more than 40 miles of new bison fence. In addition, fossils would continue to be degraded or crushed by vehicles parked in undesignated areas or by visitors removing fossils. These impacts could occur more frequently with greater visitation and additional visitor use amenities. Given the finite nature of paleontological resources, all of these impacts would be permanent but would primarily be limited to high-use areas of bison and visitors.

When the effects of the NPS-preferred alternative are added to the effects of these other projects and actions, there would be the potential for a considerable, localized, and permanent cumulative adverse effect on paleontological resources in the existing and expanded bison range area. The incremental effect of NPS-preferred alternative would be considerable, as it contributes to the majority of the cumulative effect given that much of this adverse effect relates to bison trampling and wallowing in high-use areas of the existing and expanded bison range.

VEGETATION

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

Environmental Consequences as a Result of Alternative 1

Geographic Extent of Bison Range. As native keystone herbivores, bison have a significant influence on the health of vegetation communities in the park (Symstad and Jonas 2011). Under the no-action alternative, bison would continue to play a significant beneficial role in the maintenance of the mixed-grass prairie ecosystem across their current range through grazing and foraging when at an appropriate density. Bison would continue to limit the loss of nitrogen to fires through reductions in above-ground plant litter and increased landscape patchiness and thus improve soil nutrition to the benefit of vegetation. Bison grazing would continue to increase the foraging efficiency of prairie dogs, thus improving the health of prairie dog colonies and the number of plant species atop prairie dog towns. Bison wallowing would continue to produce temporary pools that support ephemeral wetland species and a vegetation structure that is more drought and fire tolerant.

Although the presence of bison in the park is primarily beneficial to vegetation, unnatural concentrations and year-round residency of bison in the existing range would continue to result in disturbances to native soils, particularly in high-use areas near water sources and trails. These disturbed areas make a suitable environment for the establishment of exotic species such as Japanese brome, downy brome, and Canada thistle. Although members of the NPS Northern Great Plains Exotic Plant Management Team collect data on the presence, abundance, and treatment of exotic plants, helping to mitigate their spread, certain exotic plants would continue to be beneficial in areas heavily disturbed by bison. Bison would also continue to disturb vegetation due to trampling of woody and non-woody plants and to damage individual woody plants through rubbing activities. These disturbances would continue to result in minor seasonal (primarily summer) adverse impacts on certain vegetation types in high-use areas of the park. In addition, the prolonged trampling of some areas could continue to deter or prohibit regeneration of woody and non-woody species over the long term in areas where heavy bison use continues.

Visitor Use and Experience. Under the no-action alternative, vegetation along park roads and pullouts and waysides would continue to be trampled by vehicles parked in undesignated areas and by off-trail visitor use. This would have a moderate impact on vegetation in those areas in the summer when visitation is highest. There would continue to be adverse impacts on vegetation through the introduction and spread of exotic plants by visitors and vehicles, and the duration and intensity of the impact would depend on the species introduced and the ability of the park to control its spread.

Visitor Safety. There would continue to be no effect on vegetation from visitor safety activities.

Bison-Related Facilities. Small-scale additions, maintenance, and improvements to the bison fence would continue to create short-term adverse impacts on vegetation by trampling during construction or implementation, although disturbances would be limited to vegetation immediately adjacent to the fences and along approach corridors. The construction of a small bison enclosure in the Pinnacles area would create some localized impacts on vegetation through trampling during implementation and shortly after work is completed. The impacts would likely be restricted to within a few yards of the fence, resulting in a very slight adverse effect on vegetation.

Bison Roundup. Some adverse impact on vegetation would continue during the roundup of bison. If high numbers of bison are held in the pastures at the bison holding facility for longer than 48 hours, substantial trampling, over-grazing, and loss of vegetation can result. Because this is limited to the relatively small area of the bison holding facility, the impact on vegetation overall would continue to be minor and highly localized and would occur intermittently, providing ample time for vegetation to recover.

Trespass Bison Procedures. There would continue to be no effect on vegetation from trespass bison procedures.

Cumulative Impacts

Several future actions have the potential of interacting with the effects of the no-action alternative to produce noteworthy cumulative impacts on vegetation in the North Unit of the park. A project expected to begin in the next year or two would seek to improve water movement and reduce erosion through roadside repairs to South Dakota State Highway 240 Badlands Loop Road. Impacts on vegetation would likely be beneficial because the project would maintain, repair, and replace culvert systems and soil stabilizations in place. If the project addresses any of the adverse impacts of visitors on vegetation along park roads and pullouts and waysides that are anticipated under the no-action alternative, the cumulative impact on vegetation would be long term and beneficial.

The US Forest Service is following a land and resource management plan for the Nebraska National Forest, which includes the Buffalo Gap National Grassland adjacent to the park. The plan calls for several actions that could indirectly affect vegetation in Badlands National Park, such as prairie dog expansion and changes in livestock grazing rates. Healthy, robust prairie dog colonies tend to have a beneficial impact on vegetation by increasing the number of plant species present on top of prairie dog towns. If prairie dog expansion adjacent to the park leads to healthier colonies within the park, it could augment the beneficial impacts that bison continue to have on prairie dog colonies under the no-action alternative to result in long term benefits to park vegetation, primarily in areas along the park boundary.

Any changes in livestock populations adjacent to the park could impact park vegetation; if populations were increased to a level that causes over-browsing and disturbances to native plant communities, the risks of exotic vegetation establishment or spread along park boundaries could increase. This could exacerbate anticipated impacts of the no-action alternative (the tendency for bison in the park to create disturbed areas that favor exotics and the potential introduction of exotics by visitors and during construction activities) to create a long-term adverse cumulative impact on vegetation in the park, especially adjacent to park boundaries. If livestock populations were reduced or kept at levels that do not lead to disturbances of native plant communities, the cumulative impact could be to lessen the risks of exotic establishment in the park.

When the effects of the no-action alternative are added to the effects of these other projects and actions, there would be the potential for minor, localized cumulative effects that are both beneficial and adverse. The incremental effect of the no-action alternative on the cumulative effect would be considerable, given that much of the adverse effect relates to ongoing bison trampling in high-use areas of the existing bison range.

Conclusion

Under the no-action alternative, bison would continue to play a primarily beneficial role in the maintenance of the mixed-grass prairie ecosystem through grazing and foraging. Unnatural concentrations and year-round residency of bison would continue to result in disturbances to native soils and certain vegetation types, particularly in high-use areas near water sources and trails. Impacts on vegetation from visitor trampling and exotic species introduction, as well as from intermittent fence maintenance and bison roundup activities, would continue. Overall, the no-action alternative would continue to have moderate, long-term benefits on vegetation across the current range and minor adverse impacts seasonally in high-use areas.

If the effects of the no-action alternative are added to the effects of these other projects and actions, there would be potential for minor, localized cumulative effects that are both beneficial and adverse. The incremental effect of the no-action alternative on the cumulative effect would be considerable, given that much of the adverse effect relates to ongoing bison trampling in high-use areas of the existing bison range.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

Environmental Consequences as a Result of Alternative 2

Geographic Extent of Bison Range. Under the NPS-preferred alternative, the reestablishment of bison as keystone grazers in the proposed expanded bison range would enhance plant biodiversity, especially in areas stressed by human activities such as fire suppression, farming, and ranching (Symstad and Jonas 2011). Selective grazing by bison on dominant grasses, combined with secondary activities such as wallowing, trampling, and rubbing, would result in a patchy vegetative distribution that favors plant species diversity and allows forbs to flourish. By reducing aboveground plant litter and increasing landscape patchiness, bison would limit the loss of nitrogen to fires, resulting in improved soil nutrition. Their grazing would increase the foraging efficiency of prairie dogs, which would improve the health of prairie dog colonies and, by proxy, increase the number of plant species atop prairie dog towns. Additionally, bison wallowing would produce temporary pools that support ephemeral wetland species and a vegetation structure that is more drought and fire tolerant. All of these impacts would lead to a substantial, long term benefit to vegetation across the expanded range.

Although the effect of expanding the bison range would be mostly beneficial to vegetation, year-round residency of bison in the current and expanded bison range could result in disturbances to native soils, particularly in high-use areas near water sources and trails. New disturbed areas in the expanded range could make a suitable environment for establishment of exotic species such as Japanese brome, downy brome, and Canada thistle, to the detriment of native plant communities. Localized minor disturbances to vegetation in the current bison range would continue seasonally due to trampling, wallowing, and rubbing and would begin to occur in the expanded range, but could diminish somewhat parkwide due to a decreased overall density of bison on the landscape.

Some of the adverse impacts on vegetation would be partially mitigated by studying the effects of bison on native plant communities and managing herd size accordingly. Specifically, plant community condition and composition in wetlands and riparian areas would be monitored for impacts caused by high concentrations of bison, and the park would assess the extent to which bison trampling affects populations of rare plant species. The NPS Northern Great Plains Exotic Plant Management Team would continue to collect data on exotic plants in an effort to mitigate

their spread. These monitoring and mitigation activities would help ensure that impacts are short term, minor, and do not inhibit the ability of native plant communities to return to healthy conditions after bison disturbances.

Overall, the expansion of the bison range under the NPS-preferred alternative would have substantial long-term benefits across the current and expanded range and minor adverse impacts seasonally on vegetation in the park in high-use areas.

Visitor Use and Experience. The addition of five new vehicle pullouts and the improvement of two existing pullouts would result in long-term adverse effects on vegetation along South Dakota State Highway 240 Badlands Loop Road due to soil compaction and loss of suitable habitat from excavations and paving. The associated construction activities would have short-term adverse effects on vegetation due to vegetation removal, soil erosion and compaction, and the potential introduction of exotic plants. During all construction activities, best practices for exotics and weed management would be implemented such as use of previously disturbed areas for construction staging and stockpiling, clearly marking and enforcing disturbance zones, and ensuring project personnel make daily checks of clothing and equipment to safeguard against exotic plant propagation. Restoration activities would be instituted immediately after construction is completed in an effort to reconstruct the natural spacing, abundance, and diversity of native plant species to the extent possible (salvaging native soil from the project area for reuse in disturbed areas, monitoring for and treating invasive species, and revegetating disturbed areas with seeds of native genotype). Although the construction related to visitor use infrastructure could have moderate impacts on vegetation in those immediate areas during and shortly after construction, the use of monitoring and best management practices would abate long-term impacts and keep short-term impacts minor.

By adding or expanding visitor parking and pullout areas, vegetation trampling from off-trail visitor use would likely increase with new opportunities for visitors to wander off-trail in surrounding areas. These impacts would likely be most notable in areas that are vantage points for bison concentrations in the new range. Areas used by visitors such as trails and overlooks would be monitored for signs of native vegetation disturbance and for the presence of new exotic plants. Vegetation along park roads and existing pullouts or waysides and in undesignated areas used for parking would continue to be trampled by vehicles and off-trail visitor use. The expansion of some pullouts and the creation of new pullouts along park roads under the NPS-preferred alternative may help minimize these disturbances, however, by providing controlled areas where vehicles and people can congregate and park. The park would use a variety of tools such as public education, erosion control, and barriers to mitigate potential impacts on vegetation from visitor use and ensure that these impacts are short term and minor.

Visitor Safety. No effects to vegetation are anticipated from visitor safety related activities proposed in the NPS-preferred alternative.

Bison-Related Facilities. The construction of 1.5 miles of bison exclosures and additional boundary fences, as well as upgrades to 36.8 miles of the existing fence around the North Unit of the park, would create some localized impacts on vegetation through trampling during implementation and shortly after work is completed. Under the NPS-preferred alternative, a new corridor along the interior of the boundary fence would trample vegetation periodically during inspection and maintenance. The impacts would likely be restricted to within a few yards of the fence and would occur infrequently, resulting in minor adverse effects on vegetation. The same best practices noted above under the visitor use and experience section would be applied during

and after the construction of bison-related facilities and ensure that impacts were minor and did not persist in the long term.

Bison Roundup. Trampling, over-grazing, and loss of vegetation would continue to occur during the roundup of bison and could impact vegetation in the expanded range if roundups are conducted there as well. The use of a portable corral would have adverse effects on vegetation in the expanded range during roundups, though the impact on vegetation overall would continue to be minor and highly localized and would only occur intermittently, providing ample time for vegetation to recover. Depending on the roundup schedule adopted by park managers, impacts on vegetation could decrease if the park conducted roundups less frequently.

Trespass Bison Procedures. No effects to vegetation are anticipated from trespass bison procedures as proposed in the NPS-preferred alternative.

Cumulative Impacts

The cumulative impacts of the NPS-preferred alternative would be mostly the same as the impacts outlined in the no-action alternative, although where cumulative impacts are related to the geographic extent of bison, they would apply to vegetation across the expanded range.

If the effects of the NPS-preferred alternative were added to the effects of these other projects and actions, there would be potential for minor, localized cumulative effects across the existing and proposed bison ranges that are both beneficial and adverse. The incremental effect of the alternative on the cumulative effect would be considerable, given that much of the adverse effect relates to ongoing bison trampling in high-use areas of the existing and proposed bison ranges.

Conclusion

Under the NPS-preferred alternative, bison would continue to play a primarily beneficial role in the maintenance of the mixed-grass prairie ecosystem through grazing and foraging, and those beneficial impacts would be extended to vegetation communities in the expanded range. Unnatural concentrations and year-round residency of bison would continue to result in disturbances to native soils and certain vegetation types, particularly in high-use areas near water sources and trails. Those adverse impacts would extend to the expanded range; however, the severity and frequency of adverse impacts on vegetation parkwide could decrease due to a lower total bison density. Impacts on vegetation from visitor trampling and exotic species introduction, as well as from construction for new and expanded vehicle pullouts, fence construction and maintenance, and bison roundup activities, would continue. The use of best practices during and after construction would keep impacts minor and short term. Overall, when compared to the continued moderate, long-term benefits on vegetation across the range and minor adverse impacts seasonally in high-use areas as a result of the no-action alternative, the action alternative would have substantial, long-term benefits on vegetation and minor adverse impacts seasonally in high-use areas across the existing and expanded bison ranges.

If the effects of the NPS-preferred alternative are added to the effects of these other projects and actions, there would be the potential for minor, localized cumulative effects across the existing and proposed bison ranges that are both beneficial and adverse. The incremental effect of the NPS-preferred alternative on the cumulative effect would be considerable, given that much of the adverse effect relates to ongoing bison trampling in high-use areas of the existing and proposed bison ranges.

ARCHEOLOGICAL RESOURCES

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

Environmental Consequences as a Result of Alternative 1

Geographic Extent of Bison Range. Under the no-action alternative, bison wallowing and trampling would continue to occur in the existing 57,640 acres of the current bison range. These activities could potentially expose or damage *in situ* archeological resources throughout the range. Adverse impacts would likely be concentrated along bison movement corridors, in riparian areas, and where bison congregate, such as near water sources. Although impacts in the current range would be localized to areas of high-use, any damage to or uncovering of sites by bison would be adverse, permanent, and may occur anywhere in the existing range where an individual bison may roam.

Visitor Use and Experience. Archeological resources along park roads, near existing pullouts and waysides, and in undesignated parking areas have the potential to be further degraded by vehicles and visitor use. These visitor activities would continue to result in vehicle and visitor trampling and could expose or damage *in situ* archeological resources. This type of disturbance could leave exposed archeological materials vulnerable to unauthorized collecting; however, because the majority of developed and high visitor use areas have been surveyed for archeological resources, these adverse effects would be minor and localized, but permanent.

Visitor Safety. Visitor safety measures would continue to have no impact on archeological resources.

Bison-Related Facilities. Maintenance of bison fence around those parts of the existing bison range in the park where topography is not sufficient to serve as a natural barrier (about 36 miles of fencing) could continue to result in degradation or loss of surface and subsurface archeological resources along fencelines and in and around fence posts as they are maintained or replaced. The proposed enclosure in the Pinnacles area will contribute to ground disturbance and trampling during its construction, but the fence would limit future bison-related impacts to any enclosed sensitive archeological resources. Impacts could result from post-hole digging as well as maintenance vehicles disturbing resources while accessing fences. In most cases, however, maintenance vehicles would be traveling along previously disturbed routes used for regular maintenance activities. These maintenance activities could continue to result in localized, but permanent adverse effects to archeological resources. Also, archeological resources in and around water impoundments and other wet areas would continue to be degraded due to the concentrated use by bison in the existing range. This would continue to result in localized, permanent adverse effects to archeological resources.

Bison Roundup. The existing bison holding facility for roundups at the north end of the existing bison range would continue to receive high levels of bison use during roundups. Archeological resources in this area and along bison paths to this area would continue to be impacted by roundup activities. Although these adverse impacts would be localized, the adverse effects on archeological resources would be permanent.

Trespass Bison Procedures. Trespass bison procedures currently include the use of all-terrain and four-wheel drive vehicles to round up the trespass bison and direct the animal back into the park. Large vehicles can disturb archeological sites and potentially destroy *in situ* artifacts near the

park boundaries. Adverse effects related to trespass bison procedures would be localized, but all effects on archeological resources would be permanent.

Cumulative Impacts

Several future actions have the potential to combine with the effects of the no-action alternative to produce cumulative impacts on archeological resources in the park. Improvements to South Dakota State Highway 240 Badlands Loop Road, additional trail development at nearby public lands, opening of a new visitor center at Minuteman Missile National Historic Site, and proposed commercial development may increase visitation to Badlands National Park. Related traffic and use of undesignated bison viewing areas could increase effects on archeological resources near roadways. Park undertakings such as improvements to Badlands Loop Road and other construction connected to visitor use developments also have the potential to impact archeological resources through ground-disturbing activities including clearing, trenching, and grading. Park construction-related impacts would be minimized through Section 106-driven archeological surveys completed before breaking ground.

Overall, if the effects of the no-action alternative are added to cumulative effects scenarios, there would continue to be minor, localized and permanent adverse impacts on archeological resources as a result of bison and human trampling, primarily in areas of high bison and visitor use. The cumulative effect of the no-action alternative would be considerable, as bison trampling and wallowing in high-use areas constitute the majority of adverse effects experienced by archeological resources within the current range.

Conclusion

Under the no-action alternative, impacts related to visitor and bison traffic would continue to create localized and permanent adverse impacts on archeological resources primarily in areas of high bison and visitor use. Trampling by bison, social trails created by visitors, unauthorized artifact collecting, and roadside parking near unofficial bison viewing areas would continue to uncover or damage archeological resources in the current bison range. Equipment used during construction projects, bison roundup activities, bison fence and facility maintenance, and trespass bison procedures could continue to degrade or damage archeological sites. All impacts under the no-action alternative would be localized, however, to areas of high use.

When the effects of alternative 1 are added to the effects of other projects and actions, there would be potential for localized, permanent, cumulative effects on archeological resources in the existing bison range area. The cumulative effects of additional development outside the park, as well as park improvements to South Dakota State Highway 240 Badlands Loop Road, could result in higher visitation and an increased frequency of the visitor-related impacts already observed in the bison range. The incremental effect of alternative 1 would be considerable, as it contributes to the majority of cumulative effect given that much of this adverse effect relates to bison trampling and wallowing in high-use areas of the existing bison range.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

Environmental Consequences as a Result of Alternative 2

Geographic Extent of Bison Range. Bison activities such as trampling and wallowing and high-use corridors could occur throughout the 80,193 acres of expanded range included in the NPS-preferred alternative. These activities have the potential to expose or damage *in situ* archeological resources throughout the proposed expanded bison range. Impacts would likely be the most concentrated along movement corridors, in riparian areas, and where bison congregate. Although most impacts in the expanded range would be localized to any areas of high-use, any damage to or uncovering of sites by bison would be adverse and permanent and could occur anywhere in the existing range where an individual bison may roam. The park would perform archeological monitoring to track conditions of known archeological sites and minimize adverse impacts on significant or sensitive archeological areas by installing bison exclosures. Despite these monitoring and mitigation measures, adverse impacts on archeological resources related to bison activities throughout the range would be localized, and permanent.

Visitor Use and Experience. Construction activities for new vehicle pullouts and improvement of existing pullouts as part of the NPS-preferred alternative have the potential to unearth or damage archeological resources in these localized areas. Site surveys completed before construction begins would identify and delineate significant archeological resources within the project area. Identified archeological sites would then be considered during pullout design to minimize construction-related impacts. Archeological monitoring would help curb the extent of damage to resources by ground disturbances and construction equipment at the sites of the new and improved vehicle pullouts.

Once the pullout construction and improvements are complete, increased foot traffic and new social trails associated with the pullouts could damage archeological resources previously inaccessible to visitors. The construction of additional pullouts within the expanded bison range could limit off-road and shoulder parking, however, and lessen the potential adverse impacts on archeological resources in close proximity to the roadway.

Visitor Safety. Visitor safety measures would continue to have no effect on archeological resources.

Bison-Related Facilities. The NPS-preferred alternative includes replacement of 36.8 miles of existing boundary fence with bison fence and construction of 1.5 miles of new bison fence in previously undeveloped areas around parts of the proposed expanded bison range where topography is not sufficient to serve as a natural barrier. The 1.5 miles of new bison fence may include several bison exclosures intended to separate the bison from known archeological resources within expanded range. A corridor would be developed along the interior of the boundary fence where it does not currently exist for access by off-highway vehicles, horseback, or foot travel for fence inspection and maintenance. Heavy equipment associated with fence construction and ground disturbances associated with new fence posts have the potential to cause compaction and erosion, uncover previously unidentified archeological sites, and damage *in situ* archeological resources. Adverse effects from the construction of additional bison-related facilities would be localized but permanent. Access to additional water sources within the expanded range could contribute to erosion, wallowing, and bison traffic and localized, adverse effects to archeological resources near these water features.

Mitigation measures including site surveys prior to construction, archeological monitoring during construction, and installation of exclosures to protect sensitive archeological sites could minimize the adverse impacts of construction activities and bison trampling and wallowing, but any adverse effects to archeological sites and *in situ* resources would be permanent.

Bison Roundup. Human and bison traffic related to the periodic bison roundups may create high-use corridors that can unearth or damage archeological resources near the existing bison holding facilities at the north end of the existing bison range. In addition, mobile corrals may be necessary in the eastern part of the expanded bison range. Erosion and soil compaction along corridors used by bison and roundup staff and equipment could create localized, permanent adverse impacts.

Permanent adverse impacts on archeological resources would remain localized throughout the expanded 80,193-acre range. Mitigation measures including installation of exclosures around identified sensitive archeological areas to restrict trampling during bison or roundup activities, siting of the mobile corral in areas known or not likely to have sensitive archeological resources, and the removal of sensitive archeological artifacts may help lessen the severity of impact on archeological resources within the expanded bison range.

Trespass Bison Procedures. Trespass bison procedures under the NPS-preferred alternative would mirror those currently employed. All-terrain and four-wheel drive vehicles used to round up trespass bison and direct them back into the park can disturb archeological sites near the park boundaries. Adverse effects related to trespass bison procedures would be localized, but all effects on archeological resources would be permanent.

Cumulative Impacts

The cumulative impacts of alternative 2 would mostly be the same as the impacts outlined in the no-action alternative. Park construction projects could affect archeological sites, but effects would be mitigated through pre-construction surveys and considering significant archeological resources during the design. Increased visitation related to improvements within the park and additional visitor use and commercial developments outside the park could contribute to additional damage to archeological resources through trampling in high-use areas and social trails, erosion, and vehicle damage at unofficial bison viewing areas, as well as increased threat of theft. Bison-related impacts throughout the proposed expanded range would be the same as outlined in the no-action alternative above.

Overall, if the effects of the no-action alternative are added to cumulative effects scenarios, there would continue to be minor, localized and permanent adverse impacts on archeological resources as a result of bison and human trampling, primarily in areas of high bison and visitor use. The incremental effect of alternative 2 would be considerable, as bison trampling and wallowing in high-use areas would constitute the majority of adverse effects experienced by archeological resources within the expanded range.

Conclusion

Overall, when compared to the continued, localized, and permanent adverse impacts in areas of high bison and visitor use as a result of the no-action alternative, bison, visitor use, and facility development as identified in the NPS-preferred alternative would continue to have minor adverse impacts on archeological resources. These impacts would extend throughout the expanded bison range. Bison could damage archeological resources through trampling and wallowing. Visitors could also trample resources or steal artifacts throughout the expanded range. Archeological

resources close to roadways would continue to be at risk of damage from unauthorized vehicle use and parking at undesignated areas, and additional damage could occur during construction projects related to constructing facilities and fencing around the expanded bison range. These impacts mostly would be limited, however, as compared with the potential impacts from bison. All impacts under alternative 2 would be localized to areas of high bison and human use.

When the effects of alternative 2 are added to the effects of other projects and actions, there would be potential for localized, permanent, cumulative effects on archeological resources in the expanded bison range area. The cumulative effects of additional development outside the park, as well as park improvements to South Dakota State Highway 240 Badlands Loop Road, could result in construction-related impacts, higher visitation, and an increase in frequency of visitor-related impacts already experienced in the bison range. The incremental effect of alternative 2 would be considerable, as bison activity would contribute to the majority of cumulative effect to archeological resources in the expanded bison range.

WILDERNESS CHARACTER

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

Environmental Consequences as a Result of Alternative 1

Geographic Extent of Bison Range. Under the no-action alternative, bison would be limited to their existing range of 57,640 acres including the Sage Creek Unit of wilderness. Bison would continue to play a beneficial role in the maintenance of the mixed-grass prairie ecosystem through grazing and foraging, leading to a substantial, long-term beneficial impact on the natural quality of the Sage Creek Unit. Under the no-action alternative, bison would not have access to the Conata Basin Unit of wilderness.

Visitor Use and Experience. Under the no-action alternative, relatively low levels of visitor use in both the Sage Creek and Conata Basin wilderness units would allow for ample opportunities for solitude. Limited management restrictions related to wilderness backcountry use would continue (backcountry permits are not required, although backcountry campers must camp 0.5 miles from a road or trail and cannot have campfires), though the nominal nature of these restrictions would continue to have little to no effect on opportunities for primitive and unconfined recreation. The continued ability of visitors to easily find solitude and have opportunities for primitive and unconfined recreation in the Badlands Wilderness would result in slight beneficial, long-term impacts on wilderness character.

Visitor Safety. Visitor safety activities would continue to have no impact on wilderness character.

Bison-Related Facilities. Both the Sage Creek and Conata Basin units are relatively free of manmade developments. Under the no-action alternative, the park's boundary fence would continue to parallel parts of the two wilderness units where the designated wilderness abuts the park boundary. In the Sage Creek Unit, this part of the boundary fence would continue to be the more substantial bison fence because it is built to keep the bison herd from leaving NPS-owned land. In the Conata Basin Unit, the fence would continue to be the slightly shorter and less-developed boundary fence not intended to constrain bison movement. These sections of fences bordering the wilderness areas would continue to have minimal, long-term adverse impacts on the undeveloped value of wilderness character because they represent very minor manmade developments along the outer edges of the designated wilderness.

Bison Roundup. Under the no-action alternative, bison within the Sage Creek Unit would continue to be rounded up periodically using horses in order to assess the bison population and cull bison as appropriate. This management of wildlife in the Sage Creek Unit of wilderness would continue to represent a minimal impact on the untrammeled quality of wilderness character. In addition, during the short bison roundup period, there would be a slight but unlikely possibility that backcountry users could encounter horseback riders conducting the bison roundup. Such an encounter would have potential to adversely and temporarily affect the users' solitude in wilderness. Bison would not be present in the Conata Basin Unit, and the Conata Basin Unit would remain untrammeled as it relates to bison management. Generally, bison roundup activities would have minimal, localized short-term adverse impacts on wilderness character.

Trespass Bison Procedures. The continuation of existing trespass bison procedures under the no-action alternative would have little impact on wilderness character. Minimal adverse impacts on the natural value could occur if damage to the fence from trespass bison occurs within the Sage Creek Unit of the wilderness, and requires fence repair. Repair activities could have localized and minimal adverse impacts on the soil or vegetation as a result of trampling by NPS employees during repair activities or when moving small amounts of soil for repair of fence posts.

Cumulative Impacts

The actions described in the cumulative impact scenarios attributable to activities of the National Park Service, primarily within the North Unit of Badlands National Park and including park infrastructure, road construction and improvements, and resource protection activities, and to non-NPS actions, including tourism enhancements, residential and commercial developments, road construction and improvements, and resource protection activities, would not result in actions being taken directly to or within the park's designated wilderness. It is likely, however, that some of these activities would increase visitation in the region and in the park and thus increase human-related impacts on wilderness character. Increased vehicular use on park roads in nonwilderness and potential increasing development within the park and on park roads, as well as outside the park boundary, could increase noise and light pollution within the park's designated wilderness. These actions would result in a long-term, slight adverse impact on wilderness character. Resource protection activities taken on neighboring US Forest Service lands could indirectly benefit the natural quality of the Badlands Wilderness as those effects are felt across the connected landscape. These actions would result in a long-term, slight beneficial impact on wilderness character. When the long-term and slight adverse impacts and long-term and negligible beneficial impacts of the no-action alternative are considered together with the impacts on wilderness character resulting from other NPS and non-NPS actions, the overall impact on wilderness character is long-term, minimal, and adverse and long-term, negligible, and beneficial.

Conclusion

The no-action alternative would continue to have long- and short-term adverse and beneficial impacts on wilderness character. The continuation of existing bison management actions, fencing along the park boundary bordering sections of the wilderness, and human-caused impacts as a result of sound and noise pollution would continue to adversely affect wilderness character. The continuation of minimal restrictions of visitor use in wilderness and the presence of bison as a natural grazer would continue to beneficially affect wilderness character.

If the long-term and slight adverse impacts and long-term and negligible beneficial impacts of the no-action alternative are considered together with the impacts on wilderness character as a result of

other NPS and non-NPS actions as described in the section on “Cumulative Impacts”, the overall impact on wilderness character is long-term, minimal, and negligible.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

Environmental Consequences as a Result of Alternative 2

Geographic Extent of Bison Range. Under the NPS-preferred alternative, the bison range would be expanded to 80,193 acres, including both the Sage Creek and Conata Basin units of wilderness. Bison would continue to play a beneficial role in the maintenance of the mixed-grass prairie ecosystem through grazing and foraging in the Sage Creek Unit, and these benefits would expand to the Conata Basin Unit as bison are allowed to reenter that area. These activities would contribute a modest, long-term beneficial impact on the natural quality of the Sage Creek and Conata Basin units.

Visitor Use and Experience. Under the NPS-preferred alternative, the actions related to visitor use, interpretation, and education would likely result in some increases of visitation to the park but would have little impact on the relatively low levels of visitor use in the park’s wilderness. These low levels of visitor would continue to allow for ample opportunities for solitude within the wilderness. Limited management restrictions related to wilderness backcountry use would continue, although the nominal nature of these restrictions would continue to have little to no effect on opportunities for primitive and unconfined recreation. The continued ability of visitors to easily find solitude and have opportunities for primitive and unconfined recreation in the Badlands Wilderness would result in slight, beneficial long-term impacts on wilderness character.

Visitor Safety. Visitor safety activities would continue to have no impact on wilderness character.

Bison-Related Facilities. Both the Sage Creek and Conata Basin units are relatively free of manmade development. Under the NPS-preferred alternative, the park’s boundary fence would continue to parallel parts of the two wilderness units where the designated wilderness abuts the park boundary. In the Sage Creek Unit, this part of the boundary fence would continue to be the more substantial bison fence because it is built to stop the bison herd from leaving NPS-owned land. In the Conata Basin Unit, the fence would be upgraded to bison fence in order to contain the bison herd within the proposed expanded range. Additionally, one or two bison exclosures would be constructed in the Conata Basin Unit to protect archeological or paleontological resources (1–2 acres of land fenced with bison fence). These upgraded developments bordering or within the wilderness areas would adversely impact the undeveloped quality of the wilderness, though the location and limited nature of these developments along the outer edges or within the designated wilderness would have a relatively slight impact on wilderness character. Construction activities for the upgraded fence and exclosures could have localized, short-term, minimal adverse impacts on the soil or vegetation as a result of trampling by NPS employees resulting in slight adverse impacts on the natural quality of wilderness character. Together, the bison-related facilities would result in modest, long-term adverse impacts on wilderness character.

Bison Roundup. Under the NPS-preferred alternative, bison within the Sage Creek Unit would continue to be rounded up periodically using horses in order to assess the bison population and cull bison as appropriate during the roundups. These management actions would be expanded to include the Conata Basin Unit. If possible, park staff would wait for bison to cross into nonwilderness without using horses. This periodic and localized management of wildlife in the wilderness would represent a minimal impact on the untrammelled quality of wilderness character. Additionally, during the short bison roundup period there is a slight but unlikely possibility that backcountry users could

encounter horseback riders conducting the roundup. Such encounters could adversely and temporarily affect the users' solitude in wilderness. Generally, bison roundup activities would have slight, localized, short-term adverse impacts on wilderness character.

Trespass Bison Procedures. The trespass bison protocol in the NPS-preferred alternative would have little impact on wilderness character. Minimal adverse impacts on the natural value could occur if damage to the fence from trespass bison were to occur within the Sage Creek or Conata Basin units of the wilderness and require fence repair. Repair activities could have a localized and minimal adverse impact on soil or vegetation as a result of trampling by NPS employees during repair activities or when moving small amounts of soil for repair of fence posts.

Cumulative Impacts

The actions described in the cumulative impact scenarios attributable to the National Park Service, primarily within the North Unit of Badlands National Park and including park infrastructure, road construction and improvements, and resource protection activities, and to non-NPS actions, including tourism enhancements, residential and commercial development, road construction and improvements, and resource protection activities, would not result in actions being taken directly to or within the park's designated wilderness. It is likely, however, that some of these activities would increase visitation in the region and in the park and thus increase human-related impacts on wilderness character. Increased vehicular use on the park roads in nonwilderness and potential increasing development within the park and park roads, as well as outside the park boundary, could increase noise and light pollution within the park's designated wilderness. These actions would result in a long-term, slight adverse impact on wilderness character. Resource protection activities taken on neighboring US Forest Service lands could indirectly benefit the natural quality of the Badlands Wilderness because those effects would be felt across the connected landscape. These actions would result in a long-term, slight beneficial impact on wilderness character. If the long-term, minimal adverse impacts and long-term, slight beneficial impacts of the NPS-preferred alternative are considered together with the impacts on wilderness character as a result of other NPS and non-NPS actions, the overall impact on wilderness character would be long-term, minimal, and adverse and long-term, minimal, and beneficial.

Conclusion

Overall, the NPS-preferred alternative would have long-term, minimal adverse impacts and long-term, slight beneficial impacts on wilderness character, when compared with the long-term and slight adverse impacts and long-term and negligible beneficial impacts of the no-action alternative. The proposed expansion of the bison range to include the Conata Basin Unit of the Badlands Wilderness would result in implementation of bison management actions within that unit, upgrades of fencing along the park boundary bordering the unit, and construction of one or two small bison exclosures within wilderness. Human-caused impacts as a result of sound and noise pollution would continue to adversely affect wilderness character. The continuation of minimal restrictions of visitor use in wilderness and the expansion of bison to the Conata Basin Unit to capitalize on the bison's role as a natural grazer would beneficially affect wilderness character.

If the long-term, minimal adverse impacts and long-term, slight beneficial impacts of the NPS-preferred alternative are considered together with the impacts on wilderness character as a result of other NPS and non-NPS actions as described in the section on "Cumulative Impacts", the overall impact on wilderness character remains long-term and minimal, and adverse and long-term, minimal, and beneficial.

VISITOR USE AND EXPERIENCE

ALTERNATIVE 1 (NO-ACTION ALTERNATIVE)

Environmental Consequences as a Result of Alternative 1

Geographic Extent of Bison Range. Under the no-action alternative, the majority of visitors would continue to have few opportunities to view bison during their visit to the North Unit of the park unless their visit includes entering the current bison range (west side of the North Unit) by travelling the unpaved section of the Sage Creek Rim Road (usually between the Sage Creek Campground and Roberts Prairie dog town).

Bison are historically, culturally, and ecologically important to the area. The presence of bison in the current bison range would continue to provide some visitors with an opportunity to learn about and see bison in their native ecosystem. However, because no new management strategies are being proposed under the no-action alternative, there would continue to be slight adverse impacts on visitor opportunities to view bison due to the limited extent of their geographic range.

Visitor Use and Experience. Visitor opportunities for interpretation and education related to bison would remain the same, including curriculum-based bison programming (both in the classroom and for distance learners); regular ranger programs related to wildlife, including programming focused on bison; and also information about bison as part of the park's junior ranger program. There would continue to be some educational programs related to bison for youth groups. Roving rangers would continue to provide educational and interpretive material about bison to visitors during patrols and at visitor contact facilities within the park. The park would continue current research efforts related to bison. There would be no change in the visitors' experience or opportunities to view the bison herd but continued adverse impacts on the quality of the visitor experience as a result of few opportunities to view bison. Although no new strategies are being proposed under the no-action alternative, there would be some beneficial impacts on the visitor opportunities for interpretation and education due to the continuation of current programming.

Visitor Safety. Information available to visitors regarding how to safely interact with wildlife would continue to be available at visitor contact facilities, online, and through roving contacts with NPS staff. The park would respond to wildlife interactions and incidents via law enforcement protocols. Any incidents would be reviewed by safety committees and incident reports would be generated and dispersed to park staff. These services would continue at their current levels and would not be expanded in this alternative. Because no new management strategies are being proposed under the no-action alternative, there would be no new beneficial or adverse impacts on visitor safety.

Bison-Related Facilities. The existing bison fence would continue to be visible to visitors, and would not have an additional impact on visitor use and experience; however, some small-scale additions and improvements to the bison fence would be performed to secure a recently acquired inholding, remove some cross-fencing for cattle, and construct a small enclosure in the Pinnacles area. There would be small adverse effects to visitor experience as a result of restricting visitor access to certain areas of the park during the small-scale fence construction activities but the park may implement mitigation measures to reduce adverse effects of construction. These measures may include, but are not limited to, phasing construction, temporary closures, noise abatement, visual screening, providing information to visitors on the purpose and need for construction, and directional signs to help visitors avoid construction activities.

Bison Roundup. The bison roundup would continue to take approximately two weeks and involve a large number of park employees and volunteers. Some visitors may value seeing the bison roundup and experiencing the park's management of bison, the roundup activity has proven to be popular at other national parks. There would continue to be a small adverse effect to visitor experience as a result of restricting visitor access to certain areas of the park during bison roundups and reduced visitor interactions with park staff; however, the park may implement mitigation measures to reduce adverse effects of the roundup. These measures may include, but are not limited to, (1) using temporary area closures during bison management activities to ensure visitor safety, (2) providing information to visitors on the purpose and need for the bison roundup including information on bison health monitoring and herd management, and (3) conducting the roundup near the end of the park's peak visitation period.

Trespass Bison Procedures. The park would continue to strive to rapidly respond to trespass bison. The park would continue to contact the landowner, remove the bison, repair the fence, and then follow up with the landowner after these procedures have been completed. There would be no change in the visitor experience or opportunities, and therefore no beneficial or adverse impacts as a result of trespass bison procedures.

Cumulative Impacts

The contributions of the cumulative impacts scenario would be largely long-term and beneficial to the visitor experience due to increased visitor opportunities within the park and on adjacent lands as a result of other NPS and non-NPS actions, such as new opportunities to access new trails on other public lands, different recreation opportunities on a restored multi-use trail, information and visitor contact facilities, and also improvements to the main travel corridor of the park, South Dakota State Highway 240 Badlands Loop Road. However, because no new management strategies are being proposed as part of the no-action alternative, small adverse incremental impacts on visitor use and experience would continue due to continued limitations to view bison within the North Unit and continued impacts on visitor use and experience during bison roundup activities and bison-related facility maintenance. Overall, when the effects of the no-action alternative are added to the effects of the cumulative impacts scenario, there would be small beneficial impacts on the visitor use and experience due to increased visitor opportunities within the park and region.

Conclusion

Overall, there may be large beneficial impacts on visitor use and experience as a result of the other NPS and non-NPS actions that increase visitor opportunities within the park and on adjacent lands. Under the no-action alternative, small adverse incremental impacts on visitor use and experience would continue due to continued limitations to view bison within the North Unit and continued impacts on visitor use and experience during bison roundup activities and bison-related facility maintenance. Overall, when the effects of the no-action alternative are added to the effects of the cumulative impacts scenario, there would be small beneficial impacts on the visitor use and experience due to increased visitor opportunities within the park and region.

ALTERNATIVE 2 (NPS-PREFERRED ALTERNATIVE)

Environmental Consequences as a Result of Alternative 2

Geographic Extent of Bison Range. Under the NPS-preferred alternative, the bison would be expanded to 80,193 acres, including a portion of the paved South Dakota State Highway 240 Badlands Loop Road. The presence of bison in the expanded bison range would provide many visitors to the North Unit who travel the main park thoroughfare increased opportunities to learn about and see bison in their native ecosystem. Bison are historically, culturally, and ecologically important to the area and visitors value opportunities to view and learn about native wildlife. Increased opportunities to see bison in their native range would create major beneficial effects on the visitor experience.

Visitor Use and Experience. In this alternative, visitors would continue to have opportunities to view the bison herd along the unpaved Sage Creek Rim Road past the Pinnacles overlook or the short connector road to the Sage Creek Campground, and also at Sage Creek Campground, dispersed camping sites, or while hiking or riding horses into the backcountry of the Sage Creek Unit of the designated wilderness. With the expanded bison range, visitors would also have the opportunity to view bison from most of the current, proposed, and expanded overlooks as well as along the South Dakota State Highway 240 Badlands Loop Road. These new opportunities to view bison would improve the quality of the visitor experience by providing additional opportunities to understand the cultural, historical, and ecological importance of bison. Very few national parks provide opportunities for visitors to view bison and this would be an important reason for a visitor to plan a visit to Badlands National Park.

It is possible that the expanded bison range would draw increased interest and visitation to Badlands National Park. The expanded bison range would include much of Highway 240 Badlands Loop Road, and would attract visitors to popular overlooks or wildlife viewing areas. During busy times of the year, the NPS would alleviate possible increased congestion through additional and expanded vehicle pullouts, managing traffic congestion when needed to facilitate safe wildlife viewings and to maintain vehicle flow, and also by monitoring incidences of traffic congestion to determine if adaptive management strategies are needed.

Increased access to educational programs would improve the visitor experience at the North Unit of Badlands National Park by providing opportunities through personal and non-personal interpretive media at more bison viewing areas such as pullouts located within the expanded bison range, web-based information and/or social media, and also other forms of educational and interpretive programming. Roving rangers would continue to provide educational and interpretive material about bison to visitors at various locations within the park. Visitor experiences are often enhanced by interacting with rangers because it provides them the opportunities to ask questions and learn new information about the park and local wildlife. These interactions also allow opportunities for rangers to deliver important safety information to visitors, creating moderate beneficial effects for the visitor experience related to interpretation and education. Additional details of new interpretation and education opportunities would be developed upon implementation of the plan, allowing the National Park Service to determine where the bison congregate within the expanded range.

The majority of visitors to Badlands National Park remain in the front country on the paved Highway 240 Badlands Loop Road and some visit the park through commercial tours. Commercial tours would continue to stay largely on the paved Highway 240 Badlands Loop Road, but with an expanded bison range, bison may be viewable from most of the new and expanded vehicle turnouts

and this would enhance the visitor experience by providing many new opportunities to view and learn about the bison herd.

The park would continue current research efforts and explore new opportunities for research related to bison. The park would also explore partnership opportunities with other agencies, education institutions, and nonprofit groups. This would increase opportunities for new partners, foster new understanding of the importance of bison in the area, and create opportunities for improved understanding of the Badlands National Park North Unit bison herd.

Visitor Safety. The expansion of the bison herd within the North Unit may increase the risk of human-wildlife interactions, though visitor safety would continue to be of utmost importance, with a focus on visitor education.

NPS staff (including law enforcement rangers) would receive increased training on how to protect against and respond to bison-visitor incidents, which would help minimize any increased adverse effects to visitor safety.

The National Park Service would continue to support a visitor education program with consistent messaging on wildlife safety and appropriate behaviors toward wildlife (e.g., regulations on distance from wildlife safety and interactions). Visitors would have increased access to safety information to ensure a safe and quality visit to Badlands National Park. This information would be shared through additional appropriate signage, park staff and volunteer messaging, or printed / visual materials available to visitors throughout the park.

The park would respond to wildlife interactions and incidents via law enforcement protocols. Any incidents would be reviewed by safety committees and incident reports would be generated and dispersed to park staff. Although there would be increased potential for visitor and bison interactions, the extensive NPS training and education and outreach efforts would create a small beneficial effect on visitor safety due to increased awareness of visitors and increased effort by management to mitigate human-wildlife conflicts.

Bison-Related Facilities. Additional fencing would be constructed where natural barriers do not exist in order to contain the bison herd within the expanded bison range. The existing bison fence would be upgraded to a consistent height and constructed to contain the bison while allowing the other wildlife to move freely. Both the additional bison fencing and the upgraded fencing would have a slight adverse impact on the visitor experience. This adverse impact would be due to the fences impact on the natural setting and the viewshed as well as restricted access during construction; however, these visual impacts would be minimized by careful design that blends with the landscape and is conducive for movement of other wildlife and best management practices during construction such as, but not limited to, phasing construction, temporary closures, noise abatement, visual screening, providing information to visitors on the purpose and need for construction, and directional signs to help visitors avoid construction activities. It could also impact the visitor perception of the bison herd being contained and not free range; however, this impact on visitors' experiences would be minimized through interpretive and educational materials and ranger activities.

Bison-related facilities would also include the limited use of a portable corral during bison roundups. The corral would have a minimal effect on the visitor experience due to potential limited impacts on the viewshed and visitor perception of bison being corralled. The impact on visitor use and experience would be minimized through interpretive and educational material and ranger activities.

Bison Roundup. Under the NPS-preferred alternative, the roundup would likely last longer than the two weeks because of the expanded bison range. This effort would involve a larger number or park

employees and volunteers. There would be short-term and localized adverse effects to visitor experience as a result of restricting visitor access to certain areas of the park during bison roundups, reduced visitor interactions with park staff, and decreased bison viewing opportunities; however, the park may implement mitigation measures to reduce adverse effects of the roundup. These measures may include, but are not limited to, (1) using temporary area closures during bison management activities to ensure visitor safety, (2) providing information to visitors on the purpose and need for the bison roundup including information on bison health monitoring and herd management, (3) conducting the roundup near the end of the park's peak visitation period, and (4) providing directional signage for visitors to avoid certain areas. The round-up would provide additional opportunities for the park to partner with volunteers for the round-up and provide useful information to research and future applications of bison management. In addition, some visitors may value seeing the bison roundup and experiencing the park's management of bison, the roundup activity has proven to be popular at other national parks.

Trespass Bison Procedures. With the expanded bison range under the NPS-preferred alternative, the landowners who neighbor the expanded bison range would be informed of the park's trespass bison procedures. Information available to visitors regarding how to safely interact with wildlife would continue to be available at visitor contact facilities, on-line, and through roving contacts with NPS staff, and this information would also be provided to neighboring landowners of the expanded bison range.

In the case of a trespass bison situation, the park would continue to strive to rapidly respond by continuing to contact the landowner, remove the bison, repair the fence, and then follow up with the landowner after these procedures have been completed. There would be no beneficial or adverse impacts on the visitor use and experience.

Cumulative Impacts

The contributions of the cumulative impacts scenario would be largely long-term and beneficial to the visitor experience due to increased visitor opportunities within the park and on adjacent lands as a result of other NPS and non-NPS actions, such as new opportunities to access new trails on other public lands, different recreation opportunities on a restored multi-use trail, information and visitor contact facilities, and also improvements to the main travel corridor of the park, South Dakota State Highway 240 Badlands Loop Road.

Overall, when the mostly beneficial effects of the NPS-preferred alternative are added to the large beneficial cumulative effects, there would be long-term beneficial effects on visitor use and experience due to expanded opportunities to view bison within the North Unit of Badlands National Park, in addition to other increased visitor opportunities within the park and region.

Conclusion

Under the NPS-preferred alternative, there would be more opportunities to view the bison herd while driving South Dakota State Highway 240 Badlands Loop Road and exploring new and expanded vehicle pullouts. Additional opportunities to view the bison herd would improve the quality of the visitor experience by providing additional opportunities to understand the cultural, historical, and ecological importance of bison in the ecosystem.

Overall, the NPS-preferred alternative would create major beneficial effects for the visitor experience due to increased opportunities to view bison, improved and expanded education and outreach efforts, and increased management efforts to ensure safety, as compared to the small

adverse incremental impacts on visitor use and experience as a result of the no-action alternative. However, there would be slight adverse impacts on the visitor experience due to increased fencing and short term adverse impacts on visitor use and experience during bison roundup activities and bison-related facility construction and maintenance. Overall, the NPS-preferred alternative would contribute a moderate beneficial increase to the impacts on the visitor experience. There would not be significant adverse impacts on the visitor experience caused by actions under the NPS-preferred alternative. When the mostly beneficial effects of the alternative are added to the large beneficial cumulative effects, there would be long-term beneficial effects on visitor use and experience due to expanded opportunities to view bison within the North Unit of Badlands National Park, in addition to other increased visitor opportunities within the park and region.

Chapter 5: Consultation and Coordination



CHAPTER 5: CONSULTATION AND COORDINATION

INTRODUCTION

The National Park Service consulted with various agencies, tribes, organizations, and interested persons in preparing this document. The process of consultation and coordination is an important part of this project. The public had two primary avenues for participation during the development of the plan—participation in public meetings and responding to newsletters by submitting comments via regular mail, by hand, and electronically using the NPS Planning, Environment, and Public Comment (PEPC) system website. In this chapter the opportunities the public had to participate in the planning process and consultations that occurred with federal and state agencies and tribes are summarized.

PUBLIC INVOLVEMENT, INCLUDING SCOPING

To inform the public of the scoping process, a press release describing the context for the plan and how to comment was distributed in the summer of 2013. This press release provided a general overview on issues and opportunities related to bison management.

In addition, two public open house meetings were held on June 4, 2013 (Wall, South Dakota) and on June 11, 2013 (Rapid City, South Dakota). Spoken and handwritten comments at these meetings were transcribed and entered into the PEPC system.

During the summer of 2015, the NPS planning team began developing a range of preliminary alternatives for the *North Unit Bison Resource Stewardship Plan / Environmental Assessment*. Although public feedback on preliminary alternative is not required as part of NEPA, the planning team felt it would be vital to inform development of the environmental assessment.

To inform the public on the range of preliminary alternatives and provide an update on the planning effort, a newsletter was released on September 29, 2015. The newsletter described the purpose and need for the plan, preliminary alternatives retained for analysis in the environmental assessment, additional management strategies, alternatives considered but dismissed from analysis in the environmental assessment, and the next steps in the planning process. The public was asked to provide feedback on the preliminary alternatives during a 30-day comment period between September 30 and October 30, 2015.

To reach a broad audience, the newsletter was shared with the public in a variety of ways. Paper copies of the newsletter were mailed to individuals on the park's general mailing list (482 contacts). A press release that received coverage from South Dakota Public Broadcasting was distributed announcing the release of the range of preliminary alternatives. The park's website included information on the plan and a link to the NPS PEPC website where the public could access an electronic version of the newsletter and submit their comments.

During the public comment period, eight pieces of correspondence were entered into the PEPC system. Individual comments were submitted from the states of Maryland, New Mexico, South Dakota, Virginia, and Wyoming and from Great Britain. Comments from organizations included the

following from commenters who self-identified as official representatives for the organization or were discerned to be affiliated with an organization from the content of their comments):

- Defenders of Wildlife
- World Wildlife Fund

CONSULTATION AND COORDINATION TO DATE WITH OTHER AGENCIES, OFFICES, AND THE TRIBES

SECTION 7 CONSULTATION WITH THE US FISH AND WILDLIFE SERVICE

The National Park Service initiated informal consultation with the US Fish and Wildlife Service, South Dakota Ecological Services Field Office, in a letter dated June 8, 2015. The letter notified the US Fish and Wildlife Service that the National Park Service was developing a bison resource stewardship plan for the North Unit of Badlands National Park and was initiating informal consultation on the project. The Endangered Species Act requires (section 7(a)(2)) that each federal agency, in consultation with the Secretary of the Interior, ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The US Fish and Wildlife Service was requested to provide a current list of federally listed plant and animal species and any designated critical habitat for such species that might be present in and around the project area.

The US Fish and Wildlife Service replied in a letter dated June 18, 2015, and included an appendix of federally listed plant and animal species that might be present in and around the North Unit of Badlands National Park, as generated by the US Fish and Wildlife Service Information for Planning and Conservation (IPaC) system (<https://ecos.fws.gov/ipac>).

A separate consultation letter is being prepared that analyzes the effects of the preferred alternative on listed and endangered species in accordance with the Endangered Species Act. The consultation letter will be submitted to the US Fish and Wildlife Service for their concurrence.

CONSULTATION WITH THE SOUTH DAKOTA DEPARTMENT OF GAME, FISH, AND PARKS

The National Park Service initiated informal consultation with the South Dakota Game, Fish, and Parks Department in a letter dated June 8, 2015. The letter notified the South Dakota Game, Fish, and Parks Department that the National Park Service was developing a bison resource stewardship plan for the North Unit of Badlands National Park and was initiating informal consultation on the project. The South Dakota Game, Fish, and Parks Department was requested to provide a current list of state-listed plant and animal species that might be present in and around the project area.

The South Dakota Game, Fish, and Parks Department replied in an email dated June 30, 2015, supplying a link to a list of state threatened, endangered, or rare species by county (<http://gfp.sd.gov/wildlife/threatened-endangered/>). The South Dakota Game, Fish, and Parks Department will be provided a review copy of the plan / environmental assessment.

CONSULTATION WITH AMERICAN INDIAN TRIBES

In letters dated June 12, 2015, the National Park Service (Badlands National Park) notified representatives of the park's associated tribal governments of the intent to prepare a bison resource stewardship plan / environmental assessment for the North Unit of Badlands National Park and to seek to consult with the tribes under section 106 of the National Historic Preservation Act. The tribes were informed of the status of the project throughout the planning process and in correspondence dated September 29, 2015, were provided copies of the preliminary alternatives newsletter for their review and comment.

On May 16, 2016, park cultural resource specialists met with the Oglala Sioux Tribe Tribal Historic Preservation Officer to discuss various projects taking place in the park, including the North Unit bison resource stewardship plan and environmental assessment. The Oglala Sioux Tribe Tribal Historic Preservation Officer was briefed on the plan and its proposed actions. The Tribal Historic Preservation Officer acknowledged that the ethnographic resources impact topic did not need to be retained for full analysis in this plan.

Associated tribes will be provided copies of the plan / environmental assessment for their review and comment and will be invited to participate, as appropriate, in follow-up project meetings. In accordance with section 106 provisions, the National Park Service will continue to consult with the tribes as actions identified in the plan advance to more detailed design development and implementation stages.

SECTION 106 CONSULTATION WITH THE SOUTH DAKOTA STATE HISTORIC PRESERVATION OFFICE

In a letter dated June 4, 2015, the National Park Service (Badlands National Park) notified the South Dakota state historic preservation office (SHPO) of the intent to consult under section 106 of the National Historic Preservation Act regarding the preparation of a bison resource stewardship plan / environmental assessment for the North Unit of Badlands National Park. The South Dakota state historic preservation office responded in informal correspondence dated July 6, 2015, that the information provided in the letter and map initiating section 106 consultation was not enough information for it to provide meaningful comments on the proposed project. Subsequently, the South Dakota state historic preservation office has been informed of the status of the project throughout the planning process and was provided a copy of the preliminary alternatives newsletter on September 29, 2015.

The South Dakota state historic preservation office will be provided a review copy of the plan / environmental assessment to assess the potential effects of the proposed alternatives on cultural resources (archeological resources; ethnographic resources; historic structures and sites, and cultural landscapes). In accordance with section 106 provisions, the National Park Service will continue to consult with the South Dakota state historic preservation office, associated American Indian tribes, and other stakeholders as actions identified in the plan advance to more detailed design development and implementation stages.

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING A COPY OF THIS DOCUMENT

FEDERAL AGENCIES

Advisory Council on Historic Preservation

Bureau of Indian Affairs

Environmental Protection Agency

US Department of Agriculture

- Animal and Plant Health Inspection Services
- US Forest Service
 - Grand River National Grassland
 - Rocky Mountain East Zone Paleontologist
- Natural Resources Conservation Service

US Department of Interior

- National Park Service
 - Midwest Archaeological Center
 - Midwest Regional Director
 - Devils Tower National Monument
 - Fossil Butte National Monument
 - Hagerman Fossil Beds National Monument
 - Jewel Cave National Monument
 - Minuteman Missile National Historic Site
 - Museum Management Program
 - Pipestone National Monument
 - Wind Cave National Park
- US Fish and Wildlife Service
- US Geological Survey

US SENATORS AND REPRESENTATIVES

Senator John Thune

Senator Mike Rounds

Representative Kristi Noem

STATE AGENCIES

North Dakota Geologic Survey

South Dakota Department of Agriculture

South Dakota Department of Environmental and Natural Resources

South Dakota Department of Game, Fish, and Parks

South Dakota Department of Tourism

South Dakota Department of Transportation

South Dakota State Historical Society (South Dakota state historic preservation office)

STATE OFFICIALS

Governor Dennis Dugard

LOCAL AND REGIONAL GOVERNMENT AGENCIES AND OFFICIALS

Bennett County

- Booster

Jackson County

- Commissioners
- Conservation District

Town of Interior

- Finance Officer

Town of Kyle

- Postmaster

Town of Manderson

- Postmaster

Town of Martin

- Postmaster

Town of Porcupine

- Postmaster

Town of Wall

- Chamber of Commerce
- Mayor

Town of Wounded Knee

- Postmaster

AMERICAN INDIAN TRIBES TRADITIONALLY ASSOCIATED WITH BADLANDS NATIONAL PARK

Arapaho Tribe of the Wind River Reservation

- Chairman
- Tribal Historic Preservation Officer

Fort Peck Assiniboine and Sioux Tribes

- Chairman
- Tribal Historic Preservation Officer

Blackfeet Nation

- Chairman
- Tribal Historic Preservation Officer

Cheyenne and Arapaho Tribes of Oklahoma

- Chairman
- Tribal Historic Preservation Officer

Cheyenne River Sioux Tribe of the Cheyenne River Reservation

- Chairman
- Tribal Historic Preservation Officer

Crow Creek Sioux Tribe of the Crow Creek Reservation

- Chairman
- Tribal Historic Preservation Officer

Crow Nation of Montana (Apsaalooke')

- Chairman
- Tribal Historic Preservation Officer
- Lower Brule Sioux Tribe of the Lower Brule Reservation
 - Chairman
 - Tribal Historic Preservation Officer
- Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation
 - President
 - Tribal Historic Preservation Officer
- Oglala Sioux Tribe
 - President
 - Tribal Historic Preservation Officer
 - Park and Recreation Department
- Omaha Tribe
 - Chairman
- Ponca Tribe
 - Chairman
 - Tribal Historic Preservation Officer
- Rosebud Sioux Tribe of the Rosebud Indian Reservation
 - Chairman
 - Tribal Historic Preservation Officer
- Santee Sioux Nation
 - Chairman
 - Tribal Historic Preservation Officer
- Sisseton-Wahpeton Oyate of the Lake Traverse Reservation
 - Chairman
 - Tribal Historic Preservation Officer
- Spirit Lake Dakota
 - Chairperson
 - Tribal Historic Preservation Officer
- Standing Rock Sioux Tribe of North & South Dakota
 - Chairman
 - Tribal Historic Preservation Officer
- Three Affiliated Tribes of the Fort Berthold Reservation
 - Chairman
 - Tribal Historic Preservation Officer
- Turtle Mountain Band of Chippewa Indians of North Dakota
 - Chairman
 - Tribal Historic Preservation Officer
- Winnebago Tribe
 - Chairwoman
 - Tribal Historic Preservation Officer
- Yankton Sioux Tribe of South Dakota
 - Chairman
 - Tribal Historic Preservation Officer

LIBRARIES

Colorado State University Library

MEDIA

Black Hills Press
Central Dakota Times
Chamberlain-Oacoma Sun
Custer County Chronicle
Kadoka Press
KBHE News
KEVN News
KILI Radio
KOTA News
KQSK Radio
Minneapolis Star-Tribune
Mitchell Republic
Murdo Coyote
Pennington County Courant
Pierre Capitol Journal
Pioneer Review
Rapid City Journal
Sioux Falls Argus Leader
South Dakota Public Broadcasting

ORGANIZATIONS AND BUSINESSES

American Motorcycle Association
American Museum of Natural History, Division of Paleontology
Badlands Petrified Gardens
Black Hills, Badlands and Lakes
Circle View Guest Ranch
Corn Palace
Ducks Unlimited, Great Plains Regional Office
Forever Resorts
Georgia College & State University
Kadoka Depot Museum
Keystone Area Historical Society
Lakota Fund
Lakota Student Alliance
Museum of Texas Tech University
National Parks Conservation Association
National Wildlife Federation
Oglala Lakota College
Orton Geological Museum
Pinky's
Pioneer Trails Regional Museum
Pioneer Worldwide
Prairie Homestead Museum
Sierra Club
Sierra College
Society of Vertebrate Paleontology

South Dakota School of Mines & Technology Museum of Geology
South Dakota Stock Growers Association
The Conservation Fund
University of Texas at Austin
Wall Drug
Wounded Knee Museum
Wyoming Dinosaur Center

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